

NUCLEAR REGULATORY COMMISSION ISSUANCES

OPINIONS AND DECISIONS OF THE NUCLEAR REGULATORY COMMISSION WITH SELECTED ORDERS

November 1, 1981 — December 31, 1981

**Volume 14
Book II of II
Pages 933 - 1812**



ared by the Division of Technical Information and Document Control, Office of Administration,
U. S. Nuclear Regulatory Commission, Washington, D. C. 20555
(301/492-8925)

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PREFACE

This is Book II of the fourteenth volume of issuances (933-1812) of the Nuclear Regulatory Commission and its Atomic Safety and Licensing Appeal Boards, Atomic Safety and Licensing Boards, and Administrative Law Judge. It covers the period from November 1, 1981 to December 31, 1981.

Atomic Safety and Licensing Boards are authorized by Section 191 of the Atomic Energy Act of 1954. These Boards, comprised of three members conduct adjudicatory hearings on applications to construct and operate nuclear power plants and related facilities and issue initial decisions which, subject to internal review and appellate procedures, become the final Commission action with respect to those applications. Boards are drawn from the Atomic Safety and Licensing Board Panel, comprised of lawyers, nuclear physicists and engineers, environmentalists, chemists, and economists. The Atomic Energy Commission first established Licensing Boards in 1962 and the Panel in 1967.

Beginning in 1969, the Atomic Energy Commission authorized Atomic Safety and Licensing Appeal Boards to exercise the authority and perform the review functions which would otherwise have been exercised and performed by the Commission in facility licensing proceedings. In 1972, that Commission created an Appeal Panel, from which are drawn the Appeal Boards assigned to each licensing proceeding. The functions performed by both Appeal Boards and Licensing Boards were transferred to the Nuclear Regulatory Commission by the Energy Reorganization Act of 1974. Appeal Boards represent the final level in the administrative adjudicatory process to which parties may appeal. Parties, however, are permitted to seek discretionary Commission review of certain board rulings. The Commission also may decide to review, on its own motion, various decisions or actions of Appeal Boards.

The Commission also has an Administrative Law Judge appointed pursuant to the Administrative Procedure Act, who presides over proceedings as directed by the Commission.

This volume is made up of pages from the six monthly issues of the Nuclear Regulatory Commission publication *Nuclear Regulatory Commission Issuances (NRCI)* for this period, arranged in chronological order. Cross references in the text and indexes are to the NRCI page numbers which are the same as the page numbers in this publication.

Issuances are referred to as follows: Commission--CLI, Atomic Safety and Licensing Appeal Boards--ALAB, Atomic Safety and Licensing Boards--LBP, Administrative Law Judge--ALJ, Directors Denial--DD, and Denial of Petition for Rulemaking--DPRM.

The summaries and headnotes preceding the opinions reported herein are not to be deemed a part of those opinions or to have any independent legal significance.



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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS

Nunzio J. Palladino, Chairman
Victor Gilinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of

Docket Nos. STN-50-498 OL
STN-50-499 OL

HOUSTON LIGHTING & POWER
COMPANY, et al.
(South Texas Project, Units 1
and 2)

November 4, 1981

The Commission decides (by 3-2 vote) not to reconsider its earlier 2-2 vote on the question of whether to review *sua sponte* the Appeal Board's decision in ALAB-639, 13 NRC 469 (1981), authorizing the withholding by staff from discovery of the names of confidential informants on the quality assurance program for the plant.

ORDER

The Commission voted 2-2 on June 30, 1981, on the question of whether to take review *sua sponte* of the Atomic Safety and Licensing Appeal Board decision in ALAB-639, 13 NRC 469 (1981), regarding the release during discovery of the identity of certain confidential sources of information.* The result of this vote was to allow the time for review to expire pursuant to 10 CFR §2.276. Shortly thereafter, a request was made by one Commissioner to reconsider that vote *sua sponte*. The Commission has voted 3-2 not to reconsider.

Separate views of Commissioners Gilinsky, Bradford and Ahearne are attached.

* The Commissioners participating in that vote were Chairman Hendrie and Commissioners Gilinsky, Bradford and Ahearne.

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.
this 4th day of November, 1981

SEPARATE VIEWS OF COMMISSIONER GILINSKY

By refusing to review the Appeal Board's decision in this case, the Commission has again lost an opportunity to provide much needed guidance to the agency's adjudicatory boards and staff. NRC's inspections of licensed facilities play a crucial role in assuring the safe construction and operation of such facilities. The success of these inspections sometimes depends upon information provided by the employees of the licensees and their contractors, and in those cases, these employees are often willing to provide information to NRC's inspectors only in confidence. This case makes it clear that a coherent policy is needed which strikes a reasonable balance between protecting sources of information and the public's right of access to safety information. The Commission should itself decide that policy rather than allow it to develop haphazardly.

SEPARATE VIEWS OF COMMISSIONER BRADFORD

What is at issue in this decision is not the desirability of extending confidentiality or other protections to those who discuss safety matters with the NRC. The Commission can and should extend such protection when circumstances so warrant. However, there are degrees of confidentiality, and, while the Commission may choose to err on the side of caution, it may not blind itself to other considerations such as the integrity of its licensing process. To strike a fair balance in any given case, some part of the NRC must review the matter in some detail, which neither the Commission nor its Appeal Board did in this case.

Instead, two Commissioners blocked Commission review of the split Appeal Board decision to withhold all names of persons interviewed in the investigation of the quality assurance program at the South Texas facility, and a majority has now, months later, been assembled to support this result. In reversing a unanimous Licensing Board decision requiring release under a protective order, the Appeal Board majority claimed to have balanced the interests of the agency in receiving safety information, the interests of parties in an adjudicatory hearing and the interests of individuals assisting an NRC investigation. However, it did not take the minimum steps necessary to assure that this balance was fairly done.

Commission inaction leaves in place a decision which will not withstand court review and which may weaken our own final record and the safety of the plant. This indecision invites delay, uncertainty and further safety concerns in the licensing of the troubled South Texas reactors. This refusal even to examine the issue is also a serious Commission retreat from its adjudicatory responsibility.

The primary defect in the Appeal Board's decision is its failure to examine the particular factual circumstances of the I&E investigation and the persons interviewed. The Appeal Board's scrutiny was so superficial that it did not even ascertain whether or not the interviewees had any objections to having their names released. Without such examination, it is not possible to determine either the interests of the persons interviewed or the extent to which the agency's ability to gather information might be hampered by revelation of the interviewees' names. Indeed, to state the worst case, we may be "protecting" 60 people who are perfectly prepared to be identified. Hence, a proper balance has not been struck, and the abstract propositions about confidentiality that adorn other opinions are devoid of factual support in the case at hand.

Another essential line of inquiry missing from the Appeal Board analysis is the exact nature of the pledge of confidentiality and what might reasonably be inferred from this pledge. A pledge which stated that confidentiality would not be maintained for agency hearings might be treated differently in the balancing process from a pledge which gave assurance that the interviewee's name would not be disclosed to anyone other than the investigator. This appears particularly serious in light of an indication in a subsequent I&E investigation of the licensee's quality assurance/quality control program that I&E only "assured confidentiality, *barring any court or legal hearing process . . .*" (April 30, 1981 letter to Houston Lighting and Power Company from J. E. Gagliardo, I&E, page 4) (emphasis added)

In addition to the above omissions, other areas of the decision need Commission review. The Appeal Board asserts that the intervenors have not shown that the staff came forward with less than the information necessary for a fair hearing. However, the I&E report itself suggests that not all the information relevant to safety concerns has been gathered.¹ Furthermore, the Commission itself has significant information on this subject in a report on the South Texas I&E investigation by its Office of Inspector and Auditor. The conclusions of this report strongly indicate that further

¹ The following are but a few of the many excerpts from the disclosed summaries of the I&E interviews which suggest the possible safety concerns not corrected by remedial actions to date: A43 "stated that there are many in-house problems between managers, claiming A35 and A40 are the biggest problems in QA/QC. A43 did not specify or detail the problems. . . ." (Statement of A43); A construction worker "told me that he would be waiting for me in the parking lot with a .357 magnum. I became worried that he was serious about it and about a month later I finally told my supervisor, A35. We discussed it and I decided not to pursue it any further" (Statement of A30); A41 "stated that he has not been threatened, but routinely gets a lot of static from construction." (Statement of A41)

NRC investigations at South Texas would uncover additional relevant information and that not all potential witnesses had been interviewed. The Commission has not released the OIA report.² In short, the Commission has declined to review the Appeal Board decision even though it has information, which it has not shared with the Boards or the parties, which strongly indicates that a principal underpinning of the Appeal Board decision is wrong.

If the Commission took review, it might ultimately agree with the result reached by the Appeal Board. Whether it did or not, its action would provide definitive guidance in this troublesome area. However, such an order should be issued only after considering whether interviewees objected to disclosure of their identities, whether their identities had already been revealed unintentionally and whether they had given a pledge of confidentiality which extended to agency proceedings. Additionally, any NRC order must take into consideration the conclusions in the OIA report and whether the adjudicatory proceeding ordered by the Commission can take place on the basis of secondhand information if the names are not disclosed.

In the case's present posture, four of the six agency judges who have reviewed the matter would reach a different result than will occur. Nevertheless, the Commission declines even to consider the situation. No coherent policy guidance has issued. The Commission has taken no position at all. This is just about what the post-TMI investigations had in mind when they remarked disapprovingly on the Commission's posturing as the agency's Supreme Court while declining to do the adjudicatory work that that title requires.³

² Intervenors have requested the identities of confidential sources relied upon by the Office of Inspector and Auditor in its review. The Licensing Board denied this request "on the ground that the inspection undertaken by OIA was performed directly for the Commission," implying that the Board felt itself to be without jurisdiction over OIA. March 24, 1981 Lic. Bd. M.&O. Slip op. at note 2, p. 7, citing the transcript of the proceedings at pp. 707-713. The intervenors' appeal of this issue was dismissed as interlocutory by the Appeal Board.

³ "The NRC Commissioners have largely isolated themselves from the licensing process." Report of the President's Commission on the Accident at Three Mile Island, (Kemeny Commission), Finding G.4, pt. 51-52.

"At the same time that the Commission holds itself out as the 'Supreme Court of the Agency,' (it) hardly ever grants certiorari to review a case. It isolates its members from detailed consideration of case-related safety issues" Three Mile Island Report, NRC Special Inquiry Group; Volume 1, pp. 140-141.

SEPARATE VIEWS OF COMMISSIONER AHEARNE

I agree with the Appeal Board majority opinion. The NRC's primary mission is to protect the public health and safety. Often this requires the cooperation of individuals with knowledge of particular circumstances in order to detect or confirm problems. If these people believe they will be subject to retaliation, we should expect they will not be as likely to cooperate. Therefore the Nuclear Regulatory Commission has a strong interest in protecting the identity of confidential informants. As the Appeal Board said, "The need to protect confidential information is not an academic concern to the NRC."¹ This is particularly true since apparently we can offer little assistance to individuals other than to protect their names.²

¹ *Houston Lighting Power Co., et. al* (South Texas Project, Units 1 & 2), ALAB-639, 13 NRC 469, 474 (1981).

² A case that I became aware of soon after I came to the Commission starkly illustrates the difficulty an individual faces. See *Union Electric Company* (Callaway plant, Units 1 & 2), ALAB-527, 9 NRC 126 (1979). "The Commission [had] licensed Union Electric Company to construct the Callaway nuclear-powered electric generating facility. Union Electric engaged Daniel Construction Company to build part of the plant; William Smart was among the ironworkers Daniel hired for the Callaway project. A number of times while working there, Mr. Smart reported to NRC inspectors what he considered safety-related deficiencies in Daniel's work. On March 21, 1978, Daniel fired him." *Id.* at 128 (footnotes omitted). "The final matter before [the Appeal Board] concerns the Commission's remedial powers in the event Mr. Smart's discharge was in fact in retaliation for his giving information to NRC safety inspectors adverse to his employer. The Licensing Board construed the issue to be outside its jurisdiction and refused to address it; Mr. Smart appeals. In the interim, however, the grievance proceedings terminated in his favor and Mr. Smart has been restored to employment with back pay. There thus remains no further relief which this Commission could afford him; in other words, his complaint is moot. . . . Were we to reach the question, however, we would be inclined to concur in the Licensing Board's judgment that the better view is [the issue was outside the scope of the proceeding]." *Id.* at 143-144 (footnotes omitted). Although the Appeal Board decision is not determinative, my preliminary inquiries in Callaway led to the conclusion that providing assistance to individuals such as Mr. Smart is at best very difficult.

Subsequently, Congress amended the Energy Reorganization Act of 1974 to provide an additional remedy. *Id.* at 131-132. This provides the Department of Labor with jurisdiction to investigate and order appropriate redress. However, because of resource constraints and questions of implementation (we still have not completed the Memorandum of Understanding with DOL concerning this authority), I still believe the primary protection we can offer to individuals is confidentiality.

More detailed guidance on the role of this interest in adjudicatory hearings might be useful, and I would support the Commission developing such a policy. Theoretically, Commission review of this case could result in such guidance. Realistically, Commission review of adjudications is a blunt instrument not suited to developing comprehensive policy. In this case, a majority of the Commission did not agree with Commissioner Bradford that there were major flaws in the approach taken by the Appeal Board.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS

Nunzio J. Palladino, Chairman
Victor Gilinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of

Docket No. 50-201
(Provisional Operating
License No. CSF-1)

NUCLEAR FUEL SERVICES, INC.
AND NEW YORK STATE ENERGY
RESEARCH AND DEVELOPMENT
AUTHORITY

(Western New York Nuclear
Service Center)

November 6, 1981

Acting on a request by a licensee for (1) postponement of the effectiveness of a license amendment issued by the NRC staff; and (2) a prior hearing on the amendment, the Commission denies the request but directs the Chairman of the Atomic Safety and Licensing Panel to establish a Licensing Board (1) to conduct a hearing on the amendment in accordance with 10 CFR Part 2, Subpart G while the amendment remains effective and (2) to rule on any petitions for leave to intervene in the license amendment proceeding which may be filed.

RULES OF PRACTICE: STAY OF PROCEEDINGS

A bare claim of absolute right to a prior hearing on the issuance of license amendment by the NRC staff does not constitute a substantial showing of irreparable injury necessary to satisfy the irreparable injury requirement for a stay under 10 CFR 2.788(e).

OPERATING LICENSE: AMENDMENTS

A license amendment may become immediately effective under 10 CFR 2.204 without prior hearing if the public health, safety, or interest requires.

OPERATING LICENSE: AMENDMENTS

Latent conditions which may potentially cause harm in the future are a sufficient basis for making a license amendment immediately effective without a prior hearing where the consequences may not be subject to correction in the future. *Nuclear Engineering Company, Inc.* (Sheffield, Illinois Low-Level Radioactive Waste Disposal Site), CLI-79-6, 9 NRC 673 (1979); *Consumers Power Company* (Midland Plant, Units 1 and 2), CLI-74-3, 7 AEC 10-12 (1973).

ORDER AND NOTICE OF HEARING

Nuclear Fuel Services, Inc. (NFS), co-holder with the New York State Energy and Research Development Authority (NYSERDA) of License No. CSF-1, has moved the Nuclear Regulatory Commission (NRC or Commission) to "postpone the effectiveness" of the license amendment (Change No. 31) issued by the NRC Staff on September 30, 1981 and has also requested a hearing regarding that license amendment.¹

I.

The Commission hereby denies NFS's motion for a stay of the license amendment (Change No. 31) and instructs the Chairman of the Atomic Safety and Licensing Board Panel to initiate a proceeding on the requests for a hearing. The Commission finds that the NFS showing falls far short of the showing necessary to entitle NFS to a stay or postponement of effectiveness of the amendment. See *Virginia Petroleum Jobbers Assn. v. Federal Power Commission*, 259 F.2d 921 (D.C. Cir. 1958). In particular, NFS had made no substantial showing of irreparable injury beyond the bare claim that it has an "absolute right" to a prior hearing. Furthermore, the Commission is not convinced at this point that the procedures followed

¹ A request for a hearing has also been filed by Dr. Irwin Bross.

by the Staff for the amendment were illegal and that the amendment must be declared a nullity.

With regard to the argument of NFS that it is entitled to a *prior* hearing under 10 CFR 2.204, the Commission has concluded that, even if one assumes the applicability of 10 CFR 2.204, the public health, safety or interest requires the amendment be made immediately effective.² Congress made plain in the West Valley Demonstration Project Act (WVDPA) that the start of the project should not be delayed past October 1, 1981. Section 2(b) directed the Secretary of Energy to carry out preparatory steps for the project during the fiscal year ending September 30, 1981. Moreover, the WVDPA required that by October 1, 1981, the Secretary and Commission shall have entered into an agreement for the Commission's informal review and consultation of DOE's proposed activities at the Center. This agreement has been implemented. The legislative history of the WVDPA also shows that Congress considered that prompt initiation of the waste solidification program was important for the protection of health and safety. The reports accompanying the bills that preceded the WVDPA and Congressional debate on those bills are replete with observations that techniques for solidifying the high-level liquid radioactive waste need to be developed before the storage tanks develop leaks and present a potential danger to public health and safety.³ See for example, S. Rep. No. 96-787, 96th Cong., 2d Sess. 5 (1980). There can be no question that the public interest is served by acting so as to forestall the potential for danger to public health and safety. Latent conditions which may potentially cause harm in the future are a sufficient basis for taking immediately effective action where the consequences may not be subject to correction in the future. *Nuclear Engineering Company, Inc.* (Sheffield, Illinois Low-Level

² Contrary to NFS's view, the Commission sees no inherent contradiction between a finding that an amendment involves "no significant hazards consideration" and a finding that the public health, safety or interest requires that the amendment be made effective immediately. In the present case, for example, there is no hazard consideration involved in letting DOE come on the site to begin preliminary assessments needed to prepare for DOE's work under the Demonstration Project Act, but unnecessary postponement of this work would clearly go against the public interest in promptly developing methods for preparing high-level wastes for safe disposal.

³ There are also sound technical reasons to initiate the solidification program as quickly as possible. During the period of storage of waste approximately 30,000 gallons of sludge have accumulated in the bottom of the tank. This sludge is believed to contain all the dangerous long-lived radioactive fission products, such as strontium-90, and almost all the transuranic elements, such as plutonium. Removal of this sludge is one of the most difficult problems of this program not only because of its physical characteristics, but also because of tank supports and other obstructions at the bottom of the tank. Moreover, the longer the sludge sits at the bottom of the tank, the greater the probability that it will harden and become even more difficult to remove. H.R. Rep. 96-1100, Part II, 96th Cong., 2d Sess. 12-13 (1980).

Radioactive Waste Disposal Site), CLI-79-6, 9 NRC 673 (1979); *Consumers Power Company* (Midland Plant, Units 1 and 2), CLI-74-3, 7 AEC 10-12 (1973).

Congress also recognized that the solidification program at West Valley would provide a significant step in the nation's overall waste management program and, thus, should not be delayed. West Valley would be the first full-scale demonstration facility for solidifying high-level waste and could be expected to provide significant technical knowledge. S. Rep. No. 96-787, 96th Cong., 2d Sess. 5 (1980). Accordingly, the project was perceived as the next logical step in the national effort to demonstrate technology capability in the nuclear waste area, H.R. Rep. No. 96-1100, Part I, 96th Cong., 2d Sess. 7 (1980), and described as a necessary step in the Government's program for disposing of high-level radioactive waste. 126 Cong. Rec. H. 8765 c.3 (daily ed. September 1980); 126 Cong. Rec. S. 12762 c.3 (daily ed. September 17, 1980). Thus, delay in initiating the West Valley program could be expected to also delay the long-awaited resolution of the nation's nuclear waste problem. Such delay would be inconsistent with Congress' continuing concern, as evidenced by continuing legislative activity, that the waste problem be expeditiously resolved. This circumstance also supports the Commission's finding that it is in the public interest to make this license amendment immediately effective.

Finally, NFS has made no showing that its private interests outweigh the public's interest.

II.

Pursuant to the Atomic Energy Act of 1954, as amended, the Commission directs the Chairman of the Atomic Safety and Licensing Board Panel to establish a Licensing Board to conduct an adjudicatory hearing in accordance with 10 CFR Part 2, Subpart G pursuant to the request of NFS, and to review Dr. Bross' request for a hearing.

Any person whose interest may be affected by this proceeding may file a petition for leave to intervene within 20 days from the date of this notice. The petitions for leave to intervene shall be filed in accordance with the Commission's "Rules of Practice for Domestic Licensing Proceedings" in 10 CFR Part 2. If a petition for leave to intervene is filed, this Atomic Safety and Licensing Board will rule on the request.

As required by 10 CFR §2.714, a petition for leave to intervene shall set forth with particularity the interest of the petitioner in the proceeding and how that interest may be affected by the results of the proceeding. The petition should specifically explain the reasons why intervention should be permitted with particular reference to the following factors: (1) the

nature of the petitioner's right under the Act to be made a party to the proceeding; (2) the nature and extent of the petitioner's property, financial, or other interest in the proceeding; and (3) the possible effect of any order which may be entered in the proceeding on the petitioner's interest. The petition should also identify the specific aspect(s) of the subject matter of the proceeding as to which petitioner wishes to intervene. Any person who has filed a petition for leave to intervene or who has been admitted as a party may amend his petition, but such an amended petition must satisfy the specificity requirements described above.

Not later than fifteen (15) days prior to the first prehearing conference scheduled in the proceeding, the petitioner shall file a supplement to the petition to intervene which must include a list of the contentions which are sought to be litigated in the matter, and the bases for each contention set forth with reasonable specificity. A petitioner who fails to file such a supplement which satisfies these requirements with respect to at least one contention will not be permitted to participate as a party.

Petitions for leave to intervene must be filed with the Secretary of the Commission, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, Attention: Docketing and Service Branch, or may be delivered to the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C., by (date). A copy of the petition should also be sent to the Executive Legal Director, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, to O.S. Hiestand, Esq., Morgan, Lewis and Bockius, 1800 M Street, N.W., Washington, D.C. 20036, and to Carmine J. Clemente, General Counsel, New York State Energy Research and Development Authority, Two Rockefeller Plaza, Albany, New York 12223, attorneys for the Licensees. Any questions or requests for additional information regarding the content of this notice should be addressed to the Chief Hearing Counsel, Office of the Executive Legal Director, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

Nontimely filings of petitions for leave to intervene, amended petitions, or supplemental petitions will not be entertained absent a determination by the Atomic Safety and Licensing Board that the petitioner has made a substantial showing of good cause for the granting of a late petition. That determination will be based upon a balancing of the factors specified in 10 CFR §2.714(a)(i)-(v) and §2.714(d).

Commissioner Ahearne dissents from this Order for the reasons stated below.

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.
this 6th day of November, 1981.

DISSENTING VIEWS OF COMMISSIONER AHEARNE

The Commission should have stayed the license amendment because the NRC should not have issued the amendment over the objections of NFS without providing it a prior hearing.

The staff treated this as a licensee initiated amendment.¹ I disagree — more because of sound regulatory policy than because of legal requirements of the Atomic Energy Act. There should be a correlation between responsibility and control. A third party, co-licensee or not, should not be allowed to affect the ability of a licensee to fulfill its responsibility over its objections.²

The argument that paragraph 4.A of the license provides otherwise is unpersuasive. By its terms it applies only to changes in the relationship *between* NFS and New York. In addition, it only provides that either may *apply* for an amendment, not that an amendment can be granted at the request of one over the objections of the other. Finally, circumstances have changed radically since the license was issued. It is highly unlikely that the provision was included to cover situations such as this.

¹ Response of NRC Staff in Opposition to NSF For Motion Order Postponing the Effectiveness of License Amendment at 1-3 (October 26, 1981).

² Some of the arguments against this position have focused on the specific language found in §2.204 and other portions of the Commission's regulations. However, I would note the matter is not solely one of Commission intent or completely within the Commission's discretion because that section stems from Section 558 of the Administrative Procedure Act. See 5 USC 558(c).

Consequently, I believe this should have been an NRC ordered amendment and that NFS properly invoked §2.204.³ Under §2.204 the NRC can still make the license effective immediately if it finds the public health, safety, or interest so requires.

I do not question the public interest in proceeding to clean up West Valley.⁴ However, I question whether this is the appropriate amendment to implement that objective and whether the public interest required making this amendment immediately effective. Leaving aside the issue of whether the Commission's arguments support a permissive rather than a mandatory amendment, it is not obvious to me that this amendment reflects the appropriate distribution of responsibility among New York, DOE, and NFS. In particular, I have concerns about our decision to agree to an ill-defined residual responsibility for NFS.

It is argued that the West Valley Demonstration Project Act (WVDPA)⁵ supports finding there is a public interest in making this amendment effective without a prior hearing. Although the WVDPA may provide a basis for an immediate transfer to DOE so it may begin the cleanup process, it does little to justify the role we have imposed on NFS.

The Act does not address the role of NFS and I can find virtually no discussion relating to this issue in the legislative history. There is a provision that the State and Federal Governments will enter a cooperative agreement concerning cleanup activities including "submission jointly by the Department of Energy and the State of New York of an application for a licensing amendment as soon as possible with the Nuclear Regulatory Commission providing for the demonstration."⁶ According to Senator Jackson, the purpose of this provision was to protect the interest of the Federal Government:

"The Senate-passed version of S. 2443 contained, under the provision for a cooperative agreement with the State of New York, a requirement that the Department of Energy be party to the licensing amendment which will be required in order to conduct the project. I believe that reinserting this provision will insure that

³ Although NFS's formal request for hearing was not submitted until October 13, it put the staff on notice prior to issuance of the amendment that it considered §2.204 to be applicable in its letter of September 11, 1981. Consistent with that interpretation, the staff should have either made the public health, safety, or interest finding or allowed NFS 20 days to request the hearing.

⁴ I do not believe the public health and safety requires an immediately effective amendment. In addition, I would note that the Commission's amendment permits but does not require transfer to DOE so that clean up may progress.

⁵ West Valley Demonstration Project Act, Pub. L. No. 96-368 (enacted October 1, 1980).

⁶ *Id.* §2(b)(4)(D).

the interests of the Federal Government, which will bear 90% of the cost of the project, will be protected.”⁷

There was no indication of any role for NFS. One reasonable explanation is that Congress did not expect NFS to be involved.

There is some indication this may have been the case. The General Accounting Office (GAO) prepared a series of reports on West Valley for Congress. In June 1980, about the time Congress was beginning to seriously consider the WVDPA, GAO described the situation as follows:

“NFS believes that it is not contractually responsible for permanent storage of radioactive waste or for long-term waste-related issues at West Valley. A company spokesman told us that under its contract, New York is responsible for these matters. Subject to the terms of its lease and NRC approval, NFS wishes to transfer responsibility for operating and maintaining West Valley to the State by December 31, 1980. However, an official of the State Energy Authority stated flatly that the agreements do not require New York to take possession of the facilities at West Valley on December 31, 1980, given the present levels of contamination and the maintenance and operation requirements that exist at the facilities today.

“DOE similarly believes that the State, acting through one or more of its instrumentalities, has residual responsibility for care of the waste storage facilities, subject to NRC approval, at the conclusion of NFS’s lease. Our 1977 report also viewed the matter as one in which New York, under the terms of the lease, has residual responsibility for waste storage. We did not, however, suggest that all responsibilities arising out of the West Valley situation were beyond doubt.”⁸

GAO concluded:

“The best solution for the issues at West Valley can be achieved through a joint Federal/State partnership to deal with the entire site.”⁹

“It is important to mention how we arrived at our conclusion that the best way to deal with West Valley is through a joint

⁷ 126 Cong. Rec. S12762 (daily ed. September 17, 1980).

⁸ General Accounting Office, “Status of Efforts to Clean Up the Shut-Down Western New York Nuclear Service Center” 14 (June 6, 1980) (EMD-80-69).

⁹ *Id.* at 23.

Federal/State partnership. We viewed the West Valley solution from the perspective of established legal views and responsibility, the status of high-level waste programs, the expected technical benefits of a West Valley demonstration project, the recognized storage problems involving low-level waste and spent fuel and, lastly, a sense of fairness as seen by an uninvolved party."¹⁰

In response to further Congressional questions, GAO provided the following comments:

"The report's objective was to propose an overall solution for West Valley to which the State and Federal Governments could agree. The State's agreement is important because it has residual responsibility for the wastes and because it controls decisions on the future of West Valley. The Federal Government's agreement is important, because the State has asked it to take primary responsibility for West Valley. We believe that once the State and Federal Governments reach an agreement on West Valley, progress toward a solution could begin. They could then work out the financial liability of NFS in the courts in what would likely be a protracted litigation."¹¹

Congress did not adopt GAO's entire approach. (In particular, it declined to tie Federal assistance to a State commitment to provide spent fuel and low-level waste facilities.) However, Congress seemed to adopt the concept that this was a Federal/State venture. For example, the following comment was made just prior to final Senate action:

"We have sent to the House for final passage a bill which makes the State of New York a partner with the Federal Government in a 10-year, \$200 million project to solidify and dispose of the nuclear wastes which have threatened the health and wellbeing of New Yorkers" in this rich farmland area on the outskirts of Buffalo."¹²

Certainly this does not conclusively establish that NFS should not be held responsible for any part of the cleanup. However, it is sufficient to raise the question of whether the structure dictated by this amendment is required by or even consistent with Congressional intent. I have significant reservations about accepting it without question. Consequently I would not

¹⁰*Id.* at 26.

¹¹ General Accounting Office, "Further Analysis of Issues at Western New York Nuclear Service Center" 26 (October 23, 1980) (EMD-81-5).

¹²126 Cong. Rec. S12763 (daily ed. September 17, 1980) (statement by Senator Javits).

have imposed license conditions on an immediately effective basis. I would have allowed NFS to have a prior hearing.

It is unfortunate there was not more of an effort to accommodate all interests. As the GAO stated:

“The question of legal responsibility, particularly outside the terms of the contract, can only be conclusively determined by the courts in what would likely be a protracted litigation. Therefore, a timely solution to the issues at West Valley depends on the parties voluntarily reaching an agreement on responsibility among themselves rather than waiting for court action.”¹³

¹³GAO Status Report, *supra* at 15.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS

Nunzio J. Palladino, Chairman
Victor Gllinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of

Docket No. 50-275 OL

**PACIFIC GAS AND ELECTRIC
COMPANY**

**(Diablo Canyon Nuclear
Power Plant, Unit 1)**

November 19, 1981

Following the licensee's discovery and reporting (subsequent to the grant of a license to load fuel and conduct low-power testing at the Diablo facility) of new information indicating, *inter alia*, that certain structures, systems and components important to the safety of the plant may not be properly designed to withstand the effects of earthquakes, the Commission suspends the license pending completion of certain reverification actions by the licensee. The Commission's order is made immediately effective and provides an opportunity for the licensee to show cause pursuant to 10 CFR 2.202 and 50.100 why the license should not be suspended pending satisfactory completion of the actions specified.

ORDER SUSPENDING LICENSE

1. On September 21, 1981, the Nuclear Regulatory Commission ("Commission" or "NRC") authorized the NRC staff to issue a license to Pacific Gas and Electric Company ("PG&E") for fuel loading and the conduct of tests at up to 5% of rated power at the Diablo Canyon Nuclear Power Plant Unit 1, CLI-81-22, 14 NRC 598. On September 22, 1981, the NRC staff issued such a license. License No. DPR-76. In taking these actions the Commission found that it was in the public interest to allow effectiveness, and the NRC staff found that the applicant was in compliance with NRC regulations and construction permit requirements relevant to the licensed activity.

2. In late September 1981, in the course of responding to a special NRC request for information, an error in the seismic design of equipment and piping in the containment annulus of Diablo Canyon Unit 1 was detected by PG&E and reported to the NRC. PG&E committed to postpone loading of fuel until the matter was resolved satisfactorily and initiated a reanalysis of portions of the seismic design of the facility. As a result, a number of different additional errors were found. Based upon information supplied by PG&E, and recent NRC staff inspections conducted at the offices of PG&E and URS/John A. Blume and Associates ("Blume") in San Francisco, Report Nos. 59-275/81-29 and 50-323/81-18, the NRC staff identified serious weaknesses in PG&E's quality assurance program. More specifically:

- a. the PG&E quality assurance program did not appear to effectively exercise control over the review and approval of design information passed to and received from Blume,
- b. the PG&E quality assurance program did not appear to adequately control the distribution of design information from Blume within affected internal PG&E design groups, and
- c. the PG&E quality assurance program did not appear to define and implement adequate quality assurance procedures and controls over other service-related contracts.

3. This new information indicates that, contrary to statements made in PG&E's operating license application, certain structures, systems, and components important to safety at the plant may not be properly designed to withstand the effects of earthquakes, and further indicates that violations of NRC's regulations in 10 CFR Part 50, Appendix B have occurred. Had this information been known to the Commission on or prior to September 22, 1981, Facility License No. DPR-76 would not have been issued until the questions raised had been resolved.

4. Accordingly, the Commission suspends PG&E's license to load fuel and conduct tests at up to 5% of rated power pending satisfactory completion of the actions specified in attachment 1 to this Order. In furtherance of this, PG&E is hereby ordered to show cause pursuant to 10 CFR 2.202 and 50.100, why Facility License No. DPR-76 should not be suspended pending satisfactory completion of the actions specified in attachment 1, insofar as it authorizes fuel loading and other operation of Diablo Canyon Nuclear Power Plant Unit 1. Further, the Commission finds pursuant to 10 CFR 2.202(f) that, because it is now uncertain as to the extent which structures, systems, and components important to safety of fuel loading and testing at up to 5% of rated power will in fact

withstand the effects of earthquakes, and because of the seriousness of the violations, the public health, safety and interest require that this Order be immediately effective. Within 20 days of the date of this Order, PG&E may file written answer to the Order under oath or affirmation and may demand a hearing. The issues to be addressed in any answer or hearing shall be whether the matters specified in paragraphs 2 and 3 are true and whether, as a consequence, the license should have been suspended as provided in this paragraph.

A separate statement by Commissioner Roberts is attached.
It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 19th day of November, 1981.

**SEPARATE DISSENTING OPINION OF COMMISSIONER ROBERTS
(November 19, 1981)**

I agree with the reverification program imposed on PG&E in this Order. I disagree, however, with two aspects of the action taken by the majority of the Commission today. First, I believe that suspension of the Diablo Canyon fuel load and low power license, without the opportunity for a prior hearing and the opportunity to cure provided by the Atomic Energy Act, the Administrative Procedures Act, and the Commission's regulations, is unwarranted in light of the minimal threat to the public health and safety that exists at this time and in light of the Commission's duty to exercise its emergency remedial powers responsibly. Second, I believe that the procedures outlined in this Order calling for the comments of adversary parties to the operating license proceeding on (1) the companies proposed by PG&E to undertake the reverification program and (2) the scope and acceptability of the proposed reverification program evidence an abnegation of the Commission's responsibility to use its technical expertise to assess independently and impartially any errors that may have occurred at the facility.

While there is no question that the Commission may suspend a license for false statements in the license application or for a violation of the

Commission's regulations, the Commission has, in the past, held itself to a standard of exercising its emergency powers carefully and with due regard for taking action commensurate with the magnitude of the risk posed to the public health and safety. This is so because emergency actions "can radically and summarily affect the rights and interests of others, including licensees and those who depend on their activities." *Licensees Authorized to Possess or Transport Strategic Quantities of Special Nuclear Material*, CLI-77-3, 5 NRC 16, 20 (1977). Thus, in the past, "the Commission has said that if risks to the public are identified, the Commission must determine their magnitude and take *appropriate* remedial action." *Petition for Emergency and Remedial Action*, CLI-78-6, 7 NRC 400, 405 (1978) (emphasis added). Violation of a regulation does not, by itself, result in a requirement that a license be suspended. *Id.*

A wide range of remedial actions are available to the Commission. In this case, the Commission could have continued to rely on PG&E's written commitment not to take actions authorized by its license until PG&E had completed to the Staff's satisfaction the program required by the Staff.¹ Alternatively, the Commission could have inserted a technical specification² or a license condition into the license to prevent fuel load. Finally, the Commission could have provided PG&E an opportunity for a prior hearing and an opportunity to cure before deciding whether to suspend the license.

In order to illustrate the severe and precipitous nature of the Commission's decision to suspend, it is important to note some of the facts before the Commission but omitted from the majority opinion. An underpinning of the Commission's September 21 Order authorizing issuance of the fuel load and low power license is the low risk that would be entailed by activities under this license. At present, fuel has not yet been loaded into the Diablo Canyon Unit 1 core and PG&E has committed in writing not

¹ It is not the Commission's experience that licensees have taken action contrary to a written commitment such as that involved here. This is due, in part, to the Commission's extensive power to take summary action if a licensee rescinds its commitment. To illustrate this, I note that the Commission recently filed a motion opposing a request for an injunction of the Diablo Canyon low-power license in *Jaffer v. Brown*, No. 81-5878 (9th Cir., filed November 4, 1981) which stated: "The discovery of a series of errors in portions of the engineering analysis has forced deferral of the implementation of the low-power license by Pacific Gas and Electric. No action under the license will be undertaken until problems at the facility are resolved to the NRC's satisfaction." Thus, as a practical matter, the Commission's reliance on PG&E's written commitment is not unreasonable and the Commission has so stated in court as recently as November 10.

² To the extent that the Commission needs to take any legal action, it is important to note that under the present technical specifications and license, the risk to the public is minimal because PG&E can load fuel but cannot change the plant status to above a cold shutdown condition (Mode 5). This is because of Section 1.19 of the Diablo Canyon Unit 1 Technical Specifications which provides the following definition of OPERABLE-OPERABILITY:

(CONTINUED)

to commence fuel load until it has received the concurrence of the Commission's Staff. Additionally, the Commission has two resident inspectors assigned to the site to monitor PG&E's activities. As the fuel intended for Unit 1 has not been loaded into the core and as assurance exists that it will not be loaded until satisfactory resolution of the present issues, minimal risk to the public exists at the present time.

With regard to my second point of disagreement, the Commission has decided to request the comments of adversary parties to the operating license proceeding on (1) the companies proposed by PG&E to implement the reverification program and (2) the scope and acceptability of the reverification program. The Commission is under a duty as an independent regulatory agency to identify any errors which may have been made, to assess what risk, if any, to the public health and safety exists, and to determine what measures need to be taken so that the Commission has reasonable assurance that the public health and safety is protected. Incorporation of adversary parties into this reverification process is an abnegation of the Commission's responsibility to fulfill its duties independently and impartially.

A system, subsystem, train, component or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s) and when all necessary attendant instrumentation, controls, electric power, cooling and seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component or device to perform its function(s) are also capable of performing their related support function(s).

In view of the above definition and references to it throughout the Limiting Conditions For Operation in the Unit 1 Diablo Canyon Technical Specifications, the licensee is legally precluded from entering into operational modes above cold shutdown (Modes 1, 2, 3 and 4) because systems technically affected by the seismic design error would not meet the definition for OPERABLE-OPERABILITY. For example, the supports for the containment fan coolers which may be affected by the mirror image error are addressed in section 3.6.2.3 "Containment Cooling System." This section reads as follows:

At least two independent groups of containment fan coolant units shall be OPERABLE with a minimum of two units to one group and one unit to the other group.

Since, in view of the known potential design errors, the Containment Cooling System might not be capable of performing its specified function. Therefore, the licensee would be legally obliged to remain in a cold shutdown condition.

1. Provide the following information for NRC review:

**For All Seismic Service-Related
Contracts Prior to June 1978**

- (a) The results of an independent design verification program on all safety-related activities performed prior to June 1, 1978 under all seismic-related service contracts utilized in the design process for safety-related structures, systems and components.

Information concerning this program should address quality assurance procedures, controls and practices concerning the development, accuracy, transmittal, and use of all safety-related information both within PG&E and within each contractor's organization, as well as the transmittal of information between PG&E and each contractor. It should also include performance of a suitable number of sample calculations related to each contract to verify the adequacy and accuracy of the design process for affected safety-related structures, systems and components. The information to be provided concerning this design verification program should be based on and include the following program elements.

- (1) A review of all quality assurance procedures and controls used by each pre-June 1978 seismic service related service contractor and by PG&E with regard to that contract; a comparison of these procedures and controls with the related criteria of Appendix B to 10 CFR 50; and an identification of any deficiencies or weaknesses in the quality assurance procedures and in controls of the contractor and PG&E.
- (2) Development of a network for the design chain for all safety-related structures, systems, and components involved. This should include all interfaces where design information was transmitted between PG&E internal design groups and each contractor.
- (3) A review of the implementation of quality assurance procedures and controls used by and for:
 - PG&E internal design groups,

- each contractor internal design group(s),
- transmittal of information between PG&E and each contractor,
- transmittal of contractor developed information within PG&E; and

identification of any deficiencies or weaknesses in the implementation of quality assurance procedures and controls by each contractor and by PG&E.

- (4) Development of criteria for the conduct of this design verification program should consider the relevant guidelines contained in ANSI N45.2.11, Section 6.3.1.
 - (5) Development of criteria for selection of a suitable number and type of sample calculations related to the design of safety-related structures, systems and components involved. The purpose of these sample calculations should be to verify the design process, particularly in the areas of any identified contractor or PG&E quality assurance weaknesses or deficiencies as determined from the procedure and implementation reviews discussed in steps 1 through 3 above. Criteria for expanding the sample size when problems in verification are encountered should also be developed.
 - (b) A technical report that fully assesses the basic cause of all design errors identified by this program, the significance of design errors found, and their impact on facility design.
 - (c) PG&E's conclusions on the effectiveness of this design verification program in assuring the adequacy of facility design.
 - (d) A schedule for completing any modifications to the facility that are required as a result of this program. For modifications that you propose not completing prior to fuel load, the bases for proceeding should be provided.
2. The following information shall be provided for NRC review and approval. NRC will make its decision on these proposed companies after providing the Governor of California and Joint Intervenors in the pending operating license proceeding 15 days for comment.

Qualifications of Companies Proposed To Conduct Independent Reviews

A description and discussion of the corporate qualifications of the company or companies that PG&E would propose to carry out the independent design verification program discussed in 1 above, including information that demonstrates the independence of these companies.

3. As soon as practicable following NRC approval of the company or companies to conduct the independent design verification program, the following information shall be provided for NRC review and approval. NRC will make its decision on the acceptability of the program plan after providing the Governor of California and Joint Intervenors in the pending operating license proceeding 15 days for comment.

Program Plan For The Design Verification Programs

A detailed program plan for conducting the design verification programs discussed in 1 above. The information provided should include the bases for the criteria proposed to be used for selection of a suitable number and type of sample calculations to be performed under these programs and the bases for the criteria proposed to be used for expanding the sample size based upon the results of the initial samples.

4. Status Reports

Starting on Friday, November 27, 1981, and continuing while the suspension is in effect, a semi-monthly status report on the second and fourth Friday of each month, on all of the ongoing reanalyses efforts and design verification programs being conducted by and for PG&E, including but not limited to the program referred to in paragraph 1, should be submitted to the Regional Administrator, Region V and the Director, Office of Nuclear Reactor Regulation.

5. NRC Review

Prior to authorization to proceed with fuel loading, the NRC shall be satisfied with the results of the seismic design verification program referred to in paragraph 1, and with any plant modification resulting from that program that may be necessary prior to fuel loading. The

NRC may impose additional requirements prior to fuel loading necessary to protect health and safety based upon its review of the program or any of the information provided by PG&E pursuant to paragraph 4. This may include some or all of the requirements specified in the letter to PG&E, dated November 19, 1981.

[The letter to Furbush, PG&E, from Denton, NRC, dated November 19, 1981, has been deleted from this publication but is available at the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS

Nunzio J. Palladino, Chairman
Victor Gilinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of

Docket Nos. 50-250
50-251

**FLORIDA POWER AND LIGHT
COMPANY**
(Turkey Point Plant, Units 3
& 4)

November 25, 1981

The Commission denies a person's request for a hearing on an order of the Director of the Division of Licensing, Office of Nuclear Reactor Regulation, confirming the licensee's commitment to comply with requirements related to the TMI Action Plan (NUREG-0737).

**RULES OF PRACTICE: STANDING TO INTERVENE
(ENFORCEMENT ACTIONS)**

A party seeking a hearing of right on an enforcement order must show that it has an interest adversely affected by the order. *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), CLI-80-10, 11 NRC 438, 439 (1980).

RULES OF PRACTICE: INTERVENTION PETITION

An intervention petition must, under 10 CFR 2.714(a)(2), (1) "set forth with particularity" certain factors regarding the petitioner's interest in the proceeding and (2) address the criteria set forth in 10 CFR 2.714(d).

ORDER

On July 10, 1981, the Director of the Division of Licensing, Office of Nuclear Reactor Regulation, issued an order confirming Florida Power & Light Company's commitment to comply with requirements related to the TMI Action Plan (NUREG-0737). By way of an undated postcard and pursuant to an opportunity for a hearing provided in the order (46 Fed. Reg. 37110, July 17, 1981), Mr. Jaffer requested a hearing on the order. The Federal Register notice directed that anyone other than the licensee requesting a hearing should "describe, in accordance with 10 CFR 2.714(a)(2), the nature of the person's interest and the manner in which the interest is affected" by the order.

In order to be granted a hearing of right on an enforcement order, a party must show that it has an interest adversely affected by the order. *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), CLI-80-10, 11 NRC 438, 439 (1980). The petitioner's request objects to "delay and deviation from the guidance of NUREG-0737" for implementation of plant modifications regarding the TMI Action Plan. The July 10, 1981 order does not grant any relief or modifications from any legally enforceable TMI Action Plan requirements, but imposes those requirements and an implementation schedule for the first time. Thus, the petitioner's letter does not allege any interest which would be adversely affected by the imposition of the terms of the order itself. Mr. Jaffer also states that he had previously requested a hearing on "major license amendment applications in 1979." Those license amendments, apparently a reference to amendments permitting steam generator repairs at Turkey Point, are unrelated to the July 10, 1981 order.

In addition, the petition is deficient in that it does not address the criteria specified in the order under 10 CFR 2.714(a)(2). 10 CFR 2.714(a)(2) requires a petitioner to "set forth with particularity" certain factors regarding the petitioner's interest in the proceeding, and to address the criteria of 10 CFR 2.714(d).

For the reasons given above, the request provides an insufficient basis for a hearing. Moreover, based upon the petitioner's postcard request and the record in this enforcement action, the Commission does not believe that a discretionary hearing is warranted. See *Portland General Electric Co.* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 613-14 (1976).

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.
this 25th day of November, 1981

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS

Nunzio J. Palladino, Chairman
Victor Gillinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of

Docket No. 50-155

CONSUMERS POWER COMPANY
(Big Rock Point Plant)

November 25, 1981

The Commission denies petitioner's request for a hearing on an order issued by the Director of the Division of Licensing, Office of Nuclear Reactor Regulation, confirming the licensee's commitment to comply with requirements related to the TMI Action Plan (NUREG-0737).

RULES OF PRACTICE: INTERVENTION PETITIONS (INTEREST)

In order to be granted a hearing of right on an enforcement order, a party must show that it has an interest adversely affected by the order. *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), CLI-80-10, 11 NRC 438, 439 (1980).

RULES OF PRACTICE: INTERVENTION PETITIONS

10 CFR 2.714(a)(2) requires a petitioner to "set forth with particularity" certain factors regarding the petitioner's interest in the proceeding, and to address the criteria of 10 CFR 2.714(d).

ORDER

On August 4, 1981, the Director of the Division of Licensing, Office of Nuclear Reactor Regulation, issued an order confirming Consumers Power Company's commitment to comply with requirements related to the TMI Action Plan (NUREG-0737). On August 24, 1981, pursuant to an oppor-

tunity for a hearing provided in the order (46 Fed. Reg. 40746, August 11, 1981), JoAnn Bier, Jim Mills, and Christa-Maria requested a hearing on the order. The Federal Register notice directed that anyone other than the licensee requesting a hearing should "describe, in accordance with 10 CFR 2.714(a)(2), the nature of the person's interest and the manner in which the interest is affected" by the order.

In order to be granted a hearing of right on an enforcement order, a party must show that it has an interest adversely affected by the order. *Public Service Company of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2, CLI-80-10, 11 NRC 438, 439 (1980)). The petitioners' request objects to "licensee relief" and "modifications for cost-benefit purposes." The order does not grant any relief or modifications from any legally enforceable TMI Action Plan requirements, but imposes those requirements and an implementation schedule for the first time. Thus, the petitioners' letter does not allege any interest which would be adversely affected by the imposition of the terms of the order itself.

In addition, the petition is deficient in that it does not address the criteria specified in the order under 10 CFR 2.714(a)(2). 10 CFR 2.714(a)(2) requires a petitioner to "set forth with particularity" certain factors regarding the petitioners' interest in the proceeding, and to address the criteria of 10 CFR 2.714(d).

For the reasons given above, the request is an insufficient predicate on which to institute a hearing. Moreover, based upon the petitioners' letter and the record in this enforcement action, the Commission does not believe that a discretionary hearing is warranted. See *Portland General Electric Co.* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610, 613-14 (1976).

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.
this 25th day of November, 1981



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Thomas S. Moore, Chairman
Dr. John H. Buck
Christine N. Kohl

In the Matter of

Docket No. 50-471 CP

BOSTON EDISON COMPANY, et al.
(Pilgrim Nuclear Power Station,
Unit 2)

November 16, 1981

At the applicants' request, the Appeal Board terminates this proceeding and vacates, on the ground of mootness, the Licensing Board's partial initial decision (LBP-81-3, 13 NRC 103) that conditionally authorized the issuance of a construction permit for the Pilgrim Nuclear Power Station, Unit 2.

ORDER

Pending before us are several appeals from the Licensing Board's February 2, 1981, partial initial decision in this proceeding (LBP-81-3, 13 NRC 103).¹ The Board concluded in that decision that applicants should be issued a construction permit, subject to certain conditions and favorable resolution, after further hearing, of emergency planning and Three Mile Island related issues.

Following briefing and oral argument of the appeals, applicants notified us that they have cancelled the Pilgrim 2 project. Accordingly, they move

¹ Appeals were filed by Alan R. and Marion W. Cleeton, the Commonwealth of Massachusetts, and the Massachusetts Wildlife Federation.

for termination of the proceeding before us.² The staff supports the motion; none of the appellants has replied to it.

The motion is *granted*, and the Board's February 2, 1981, partial initial decision is *vacated* on the ground of mootness. See *A.L. Mechling Barge Lines, Inc. v. United States*, 368 U.S. 324, 329 (1961); *Rochester Gas and Electric Corp.* (Sterling Power Project, Unit No. 1), ALAB-596, 11 NRC 867, 869 (1980).

It is so ORDERED.

FOR THE APPEAL BOARD

Barbara A. Tompkins
Secretary to the Appeal Board

² Because the Licensing Board still retains jurisdiction over some aspects of the case, applicants have moved that Board as well for leave to withdraw their application and to terminate that proceeding. See *Toledo Edison Co.* (Davis-Besse Station, Units 2 and 3), ALAB-622, 12 NRC 667, 669 (1980).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Alan S. Rosenthal, Chairman
Dr. W. Reed Johnson
Christine N. Kohl

In the Matter of

Docket Nos. 50-463 CP
50-464 CP

**PHILADELPHIA ELECTRIC
COMPANY**
**(Fulton Generating Station,
Units 1 and 2)**

November 17, 1981

The Appeal Board vacates a Licensing Board's unpublished decision dismissing a construction permit application "with prejudice," and remands the matter for action in conformity with the Appeal Board's opinion.

LICENSING BOARDS: DISMISSAL OF PROCEEDINGS

A dismissal "without prejudice" ordinarily signifies that no merits disposition was made; a dismissal "with prejudice" suggests otherwise. See *Jamison v. Miracle Mile Rambler, Inc.*, 536 F.2d 560, 564 (3d Cir. 1976); 5 Moore's Federal Practice, ¶41.05[2] at 41-75 (2d ed. 1981).

**LICENSING BOARDS: AUTHORITY TO REGULATE
PROCEEDINGS**

A licensing board is vested with the power to dismiss an application with prejudice. See 10 CFR 2.107(a), 2.721(d).

**LICENSING BOARDS: DISCRETION IN MANAGING
PROCEEDINGS
(WITHDRAWAL OF APPLICATION)**

A licensing board has substantial leeway in defining the circumstances in which an application may be voluntarily withdrawn (10 CFR §2.107(a)); but, as in all other areas, the board may not abuse this discretion by exercising its power in an arbitrary manner. See *LeCompte v. Mr. Chip, Inc.*, 528 F.2d 601, 604 (5th Cir. 1976); 5 Moore's Federal Practice ¶41.05[1] at 41-58 (2d ed. 1981).

**LICENSING BOARDS: DISCRETION IN MANAGING
PROCEEDINGS
(WITHDRAWAL OF APPLICATION)**

The terms prescribed by a licensing board at the time of voluntary withdrawal from a proceeding must bear a rational relationship to the conduct and legal harm at which they are aimed, and the record must support any findings concerning the conduct and harm in question. See *LeCompte v. Mr. Chip, Inc.*, 528 F.2d 601, 604-05 (5th Cir. 1976).

RULES OF PRACTICE: EARLY SITE REVIEWS

The Commission's early site review regulations do not require that the applicant have a "firm plan" to construct a nuclear plant at the involved site; rather, they were designed simply to enhance the licensing process by providing an opportunity to resolve siting issues in advance of any substantial commitment of resources. 10 CFR 2.101(a-1), 2.600 *et seq.*; 42 *Fed. Reg.* 22882-83 (1977). See also *Commonwealth Edison Co.* (Carroll County Site), ALAB-601, 12 NRC 18, 26 (1980).

RULES OF PRACTICE: OPPORTUNITY FOR HEARING

The parties must be given the opportunity, at oral hearing or by written pleadings, to produce relevant, material, and reliable evidence concerning alleged abuses of Commission regulations and adjudicatory process; a licensing board should not engage in its own independent and selective search of the record. See *LeCompte v. Mr. Chip, Inc.*, 528 F.2d 601, 605 (5th Cir. 1976). See also 10 CFR 2.749.

LICENSING BOARDS: DISMISSAL OF PROCEEDINGS

A dismissal with prejudice requires some showing of harm to either a party or the public interest in general. See Fed. R. Civ. P. 41 (2)(2); *LeCompte v. Mr. Chip, Inc.*, 528 F.2d 601, 604 (5th Cir. 1976); 5 Moore's Federal Practice ¶41.05[1] at 41-73 (2d ed. 1981); *Boston Edison Co.* (Pilgrim Station, Units 2 and 3), LBP-74-62, 8 AEC 324, 327 (1975).

LICENSING BOARDS: DISMISSAL OF PROCEEDINGS

A decision to order a dismissal with prejudice requires careful consideration of the circumstances, giving due regard to the legitimate interests of all parties. See *Selas Corp. of America v. Wilshire Oil Co. of Texas*, 57 F.R.D. 3, 5-6 (E.D. Pa. 1972); 5 Moore's Federal Practice ¶41.05[1] at 41-59 (2d ed. 1981).

LICENSING BOARDS: DISMISSAL OF PROCEEDINGS

It is well settled that the prospect of a second lawsuit (or another application to construct a nuclear plant at the same site) does not provide the requisite quantum of legal harm to warrant dismissal with prejudice. *Jones v. Securities and Exchange Commission*, 298 U.S. 1, 19 (1936).

Messrs. Donald P. Irwin and Lee B. Zeugin, Richmond, Virginia, and **Mr. Eugene J. Bradley**, Philadelphia, Pennsylvania, for applicant Philadelphia Electric Company.

Dr. Chauncey Kepford, State College, Pennsylvania, for intervenors York Committee for a Safe Environment, Central Pennsylvania Committee on Nuclear Power, and Committee for Responsible Energy Sources.

Mr. Michael J. Scibinico, II, Annapolis, Maryland, for the State of Maryland.

Mr. Sherwin E. Turk for the Nuclear Regulatory Commission staff.

DECISION

This appeal involves the propriety of the Licensing Board's dismissal of a construction permit application "with prejudice." The Licensing Board believed its action was compelled by the Commission's early site review regulations. See 10 CFR 2.101(a-1), 2.600 *et seq.* We vacate and remand this matter to the Board for action consistent with the following opinion.

I.

By motion filed December 5, 1980, applicant Philadelphia Electric Company (PEC) requested permission to withdraw, without prejudice, its application for construction of a high temperature gas-cooled reactor (HTGR) and sought termination of the proceeding. In an accompanying letter to the Director of the Office of Nuclear Reactor Regulation (NRR), PEC stated that it "no longer" saw significant benefits to maintaining the application, noting a then-pending Commission proposal to impose "additional" fees for withdrawal of applications.¹ The NRC staff stated that it had no objection to the withdrawal of the application. Because no work at the Fulton site had been authorized or undertaken, the staff also determined that there was no need, pursuant to 10 CFR 2.107(a), to impose any particular rehabilitative conditions on the withdrawal of the application.²

Two of the intervenors, York Committee for a Safe Environment and Central Pennsylvania Committee on Nuclear Power, supported PEC's motion to withdraw, but requested that the withdrawal be "with prejudice." In this connection, intervenors noted the costs incurred by the NRC and the other parties since the inception of this proceeding in 1973, and they alleged adverse effects on their members' physical and mental health as a "consequence of the uncertainties imposed by the Applicant's refusal to abandon this nuclear power project." They also alleged adverse economic impact on the value of their land in the immediate vicinity of the Fulton site. PEC replied that it had prosecuted its application in good faith and decided to withdraw it in view of, *inter alia*, "the NRC's post-[Three

¹ See 45 Fed. Reg. 74493 (November 10, 1980).

² That regulation provides:

The Commission may permit an applicant to withdraw an application prior to the issuance of a notice of hearing on such terms and conditions as it may prescribe, or may, on receiving a request for withdrawal of an application, deny the application or dismiss it with prejudice. Withdrawal of an application after the issuance of a notice of hearing shall be on such terms as the presiding officer may prescribe.

Mile Island] licensing suspension and a continuation of lower rates of load growth.”

In an unprecedented (and unpublished) decision entered on February 27, 1981, the Licensing Board dismissed the proceeding with prejudice.³ The Board briefly summarized some of the relevant procedural history of this case, which we summarize here:

- | | |
|----------------------------------|--|
| July 3, 1973 | PEC files an application for a construction permit. |
| 1975 | PEC's reactor supplier unilaterally stops work on the project; NRC suspends review of the application. |
| December 1975 -
December 1978 | PEC files monthly status reports on the project. |
| January 30, 1978 | NRC staff advises PEC that it will move to terminate proceeding in the absence of "firm plans for early use of the Fulton site." |
| March 8, 1978 | PEC informs staff that it will amend application to seek early site review, pursuant to 10 CFR 2.101(a-1), 2.600 <i>et seq.</i> |
| August 1978 | NRC staff decides not to move to terminate proceeding. |
| December 29, 1978 | PEC files an amendment to its application, formally requesting early site review. |
| December 5, 1980 | PEC moves to withdraw application. |

With this procedural history as background, the Licensing Board examined the Commission's early site review (ESR) regulations. The Board concluded that the purpose of ESR is "to expedite the licensing process" (slip op. at 4). Although it noted that an applicant has up to five years after a final ESR decision in which to file the remainder of its construction permit application, the Board found support in the ESR Statement of Consideration for its view that "[a] mere desire for an Early Site Review in anticipation that a decision to use the site may be made at some future time does not fall within the substance of the pertinent regulations" (*id.* at

³ We have discovered no other instance where permission to withdraw an application for an NRC (or AEC) license has been granted "with prejudice." A licensing board, however, recently denied such a request by an intervenor in *Puerto Rico Electric Power Authority* (North Coast Plant, Unit 1), Docket No. 50-376 CP; 46 Fed. Reg. 14099 (February 25, 1981), *appeal pending*.

5). See 42 Fed. Reg. 22882 (May 5, 1977). In other words, the applicant must have a "present intention" to construct a nuclear facility at the involved site at the time it files its ESR request (slip op. at 6). To discern if such present intent existed, the Board found that an inquiry into an applicant's "motives" and a determination of any periods of lack of prosecution are necessary (*ibid.*).

Applying this interpretation of the ESR regulations to the instant case, the Licensing Board perceived in PEC's December 5, 1980, letter to the Director of NRR a certain "ambiguity" about PEC's intent. To resolve the ambiguity the Board searched the record for evidence of PEC's motives. It found "no statement since 1975 by Applicant that it had a *firm plan* to construct nuclear facilities on the site" (*id.* at 7; emphasis added). Rather, the Board found "a clear statement of Applicant's position" in the NRC staff's "summary minutes" of a May 1978 meeting between the staff and PEC (*ibid.*). In the Board's view, those minutes revealed that PEC had made no decision on either the use of the Fulton site or the type of facility, and that PEC's "motive in seeking an Early Site Review was to maintain the uncertainties as to possible use of the site until a decision should be reached at some future time, possibly in 1983" (*id.* at 8). From this the Board concluded that PEC's purpose was to prevent termination of the proceeding, not to expedite licensing. The Board therefore held PEC's ESR request to be "outside of [*sic*] the purpose and intent of the pertinent regulations" (*ibid.*). It also held that the period of suspension and inactivity on this application — "since 1975" — was too long, and, accordingly, it dismissed the application with prejudice (*id.* at 8-9).

PEC has appealed the Board's decision, arguing that it is arbitrary and not supported by the Atomic Energy Act, the NRC's regulations, or the record. PEC also contends that it has been denied due process and other constitutional protections. The NRC staff and the State of Maryland, as an "interested state,"⁴ support PEC's appeal. Intervenors York Committee for a Safe Environment, Central Pennsylvania Committee on Nuclear Power, and Committee for Responsible Energy Sources jointly oppose the appeal.⁵

⁴ See 10 CFR 2.715(c).

⁵ Although it previously joined in the filings of the York and Central Pennsylvania Committees, as it does now on appeal, the Committee for Responsible Energy Sources — perhaps inadvertently — did not join in the request for dismissal with prejudice.

As discussed below, we find that the Licensing Board erred in its analysis and that its conclusions are therefore unwarranted.

II.

An initial problem in the Licensing Board's decision is its failure to define dismissal "with prejudice."⁶ The intervenors' request for this action similarly provides no clue as to the scope of this restriction. Thus, PEC is left in the undesirable position of knowing neither the full legal effect of the Board's action nor the range of permissible future activities in which PEC may engage.

Ordinarily, a dismissal "without prejudice" signifies that no merits disposition was made; a dismissal "with prejudice" suggests otherwise. See *Jamison v. Miracle Mile Rambler, Inc.*, 536 F.2d 560, 564 (3d Cir. 1976); 5 Moore's Federal Practice ¶41.05[2] at 41-75 (2d ed. 1981). Applying this principle to the instant case yields several possible limitations on applicant's future activities. PEC could be barred from: (1) refiling an identical application to construct an *HTGR* at the *Fulton* site; (2) filing a new application to construct *any* type of nuclear reactor at *any* site; or (3) filing a new application to construct *any* type of nuclear reactor at *Fulton*.

If the Board contemplated the first alternative, then this appeal may be much ado about nothing. Given advances in technology and additional regulatory requirements, it is extremely unlikely that this same application could serve as a viable proposal in the future. Because we presume that the Board intended its dismissal with prejudice to have some effect, we can thus eliminate this first alternative interpretation. The second suggestion is also unlikely because effectively eliminating a utility's nuclear option is well beyond the Licensing Board's jurisdiction over a particular construction permit application. We therefore are forced to assume, for purposes of this opinion, that the third alternative was what the Board had in mind, but neglected to articulate. The Board's heavy reliance on the ESR regulations as support for its action further suggests that the Board intended to preclude PEC from ever using the *Fulton* site for a nuclear facility.

Having "defined" the scope of the order here at issue, we now turn to the Board's underlying reasoning and findings.

⁶ It is clear, however, that the dismissal of PEC's application is distinguished from those dismissals subject to "conditions" requiring site rehabilitation. The Board explicitly found no such conditions were warranted in this case (slip op. at 2, 9).

A.

There is no doubt that a licensing board is vested with the power to dismiss an application with prejudice. Indeed, 10 CFR 2.107(a) authorizes a licensing board to permit withdrawal of an application "on such terms as the [board] may prescribe."⁷ On its face, this provision gives the boards substantial leeway in defining the circumstances in which an application may be voluntarily withdrawn. But as in all other areas, the boards may not abuse this discretion by exercising their power in an arbitrary manner. See *LeCompte v. Mr. Chip, Inc.*, 528 F.2d 601, 604 (5th Cir. 1976); 5 Moore's Federal Practice ¶41.05[1] at 41-58. The terms prescribed at the time of withdrawal must bear a rational relationship to the conduct and legal harm at which they are aimed. And, of course, the record must support any findings concerning the conduct and harm in question. See *LeCompte, supra* at 604, 605.

In the case at hand, the effective prohibition against PEC's future use of the Fulton site for any type of nuclear reactor (see p. 973, *supra*) is a particularly harsh and punitive term imposed upon withdrawal. The conduct and harm for which dismissal with prejudice is intended to serve as the remedy, therefore, must be of comparable magnitude. The Licensing Board has failed to make that showing.

B.

As noted above, the Board found, with little elaboration, that "there has been a period of suspension and uncertainty since 1975" (when PEC's reactor supplier withdrew from the project) and that this period "is too long to justify a dismissal without prejudice" (slip op. at 8). It reached this conclusion by determining that PEC's request for early site review was beyond "the purpose and intent of the pertinent regulations" (*ibid.*).⁸ In our view, however, the Board has imparted to those regulations an unduly burdensome meaning that neither the regulations themselves nor the Commission's Statement of Consideration permits.

The ESR regulations, adopted in 1977, are reasonably clear and unambiguous on their face. 10 CFR 2.101(a-1) permits any applicant for a reactor construction permit to request an early site review by submitting certain specified information in four parts and within a described time frame. This information must include merely "a range of postulated facility design and operation parameters that is sufficient to enable the

⁷ See note 2, *supra*, and 10 CFR 2.721(d). Section 2.107(a) is similar to Rule 41(a)(2) of the Federal Rules of Civil Procedure, which permits a court to dismiss an action at a plaintiff's request "upon such terms and conditions as the court deems proper."

⁸ In fact, although PEC sought to withdraw its entire construction permit application, the principal focus of the Licensing Board's decision was on PEC's request for early site review.

Commission to perform the requested review of site suitability issues.” 10 CFR 2.101(a-1)(1)(ii) (emphasis added). Subpart F of the Commission’s Rules of Practice, 10 CFR 2.600 *et seq.*, sets forth the early site review procedures with greater particularity. The only apparent limitation on when the ESR procedure can be invoked is that it be “in connection with an application for a permit to construct a utilization facility which is subject to §51.5(a) of this chapter and is of the type specified in §50.21(b)(2) or (3) or §50.22 of this chapter or is a testing facility.” 10 CFR 2.600.⁹ The regulations themselves contain no reference to an applicant’s “intent,” except perhaps for the requirement of a brief description, in part one of an ESR application, of “the applicant’s *long-range* plans for *ultimate* development of the site.” 10 CFR 2.603(b)(1) (emphasis added). There is no mention of an applicant’s “firm plans” for the site. In 10 CFR 2.605, the regulations describe the circumstances in which the Commission may “decline” an ESR request, but no reference is made to any other method of termination — such as dismissal of the entire construction permit application with prejudice.

The Statement of Consideration provides some elaboration on the purpose of the ESR regulations, but we are unable to draw from it the same conclusions that the Licensing Board does. At the outset, the Statement notes that “these procedures are expected to increase the effectiveness of the licensing process in resolving legitimate public concerns and to enhance the effectiveness of the nuclear facility planning process.” 42 Fed. Reg. 22882. See also *id.* at 22883. Further, the ESR procedures are “designed to *encourage* and facilitate early consideration of site suitability issues.” *Id.* at 22882 (emphasis added). The Commission expressed its

intent that the procedures for early review, hearing and partial decision of site suitability issues provided in these regulations for construction permit applicants shall be *available to all qualified construction permit applicants, including applicants who did not request early review of site suitability issues at the time of their initial application but who later decide, following postponement of the target date for actual construction of the facility, that this procedure would be advantageous.*

Id. at 22883 (emphasis added). We conclude from these passages and the Statement of Consideration as a whole that the ESR procedures were simply designed to enhance the licensing process by providing an opportunity — particularly to an applicant who, as a result of a construction

⁹ 10 C.F.R. Part 50, Appendix Q, sets forth the procedures available to any interested person for seeking early review of site suitability issues “separately from and prior to the submittal of applications for construction permits.”

date postponement, considers it "advantageous" — to resolve siting issues "well in advance of any substantial commitment of resources." *Id.* at 22882. See also *Commonwealth Edison Co. (Carroll County Site)*, ALAB-601, 12 NRC 18, 26 (1980). Again, we see no hint that the Commission intended an ESR applicant to have "firm plans" for the proposed facility.

It cannot be disputed that PEC was, in fact, an applicant for a permit to construct a reactor and thus satisfied the sole requirement for invoking the involved ESR procedures. Presumably, PEC, having had to postpone its construction date due to the contractor's withdrawal from the project, considered such a filing "advantageous" or it would not have expended the effort to submit it. Hence, by requiring more than that — *i.e.*, additional evidence of a "present intention" to construct a nuclear facility, manifest in "a firm plan" (slip op. at 6, 7) — the Licensing Board erroneously imposed a standard that exceeds what the regulations themselves and their Statement of Consideration contemplate.

The Board's opinion, however, seems to acknowledge PEC's literal compliance with the ESR procedures but implies that PEC's actions were nevertheless not in good faith, thus justifying dismissal with prejudice. We find the necessary factual predicate for such a conclusion missing from the Board's opinion.

The Board first considered PEC's December 5, 1980, letter informing the Director of NRR of its desire to withdraw its construction permit application. The Board found the letter ambiguous. In its view, the letter could imply both (1) that PEC had just decided *for the first time* whether or not to construct a nuclear plant at Fulton, and (2) that PEC had revoked a prior firm plan to construct the facility.¹⁰ In an effort to resolve this perceived ambiguity the Board conducted a *sua sponte* search of the record. It discovered: (1) "no statement since 1975 by Applicant that it had a firm plan to construct nuclear facilities on the [Fulton] site," and (2) "a clear statement of Applicant's position ... in summary minutes of a [May 1978] meeting between Applicant and the Staff" (slip op. at 7). The Board concluded from those minutes alone that PEC had made "no

¹⁰The Board cited the following excerpt from PEC's letter:

PE has recently concluded that there are no longer significant benefits to maintaining the Fulton application before the Commission. This fact, plus the pendency of proposed regulations (45 Fed. Reg. 74493, November 10, 1980) which as proposed would impose substantial additional fee liability for applications withdrawn after they become effective, has induced PE to withdraw its application before the regulations' effective date.

We note that the proposed regulations to which PEC refers are now final, in the form of an "interpretative rule," and appear to require the payment of fees for review of applications, like PEC's, that are ultimately withdrawn. 46 Fed. Reg. 49573 (October 7, 1981). Thus, whatever incentive existed to avoid "additional" fee liability, through the withdrawal of an application, may well have evaporated.

decision as to whether or not to use the Fulton site for a nuclear facility" and "no decision as to the type of facility it would construct, if it decided to use the site" (*id.* at 8). Accordingly, the Board held that PEC's request for early site review was beyond the purpose of the ESR regulations and implied an abuse thereof.

As we have already determined, the ESR regulations do not require a "firm plan" to construct a nuclear plant at the involved site. Thus, the Board's failure to uncover such a plan is not fatal to PEC's case.

With regard to the summary minutes, which purportedly reflect "a clear statement of Applicant's position," this sole item cannot possibly provide a proper basis for the Board's conclusions. First, the reliability of this informal account of the meeting is subject to question. The summary minutes were prepared by a member of the NRC staff some 13 days after the subject meeting and transmitted to PEC's president one week thereafter. The minutes bear no oath or other form of verification, reflecting the informal, nonadjudicatory nature of the document and meeting. Further, these minutes have not been formally tendered and admitted into evidence and, consequently, they have not been subject to examination. In these circumstances, therefore, it was wholly inappropriate for the Licensing Board to take the summary minutes "as accurate" (*id.* at 7).

Second, in our view, the summary minutes do not provide the "clear statement of Applicant's position" that the Board finds.¹¹ The staff — which authored the minutes — considered [PEC's] expressions of continued, although not unqualified, interest in constructing a nuclear plant at the Fulton site sufficient to warrant the continuation of the Fulton proceeding." Staff Br. at 18. Far from providing a clear statement to resolve the asserted ambiguity in PEC's December 5, 1980, letter, the minutes themselves are clouded with uncertainty about what PEC represented at the May 1978 meeting.

¹¹The Board relied on the following portion of the minutes, in particular:

In response to questions on whether PEC had already decided that the Fulton site is only suitable for nuclear units, and what type of plant would be constructed at the site, PEC stated that it was not clear that a nuclear unit would be put at the Fulton site, and that the type of plant would be decided in about 1983. PEC noted their [*sic*] motivation to seek ESR and approval for the Fulton site because there is not an abundance of suitable nuclear sites. PEC additionally stated that it was clearly possible that the Fulton site could be utilized for a gas cooled reactor, as contemplated in the original application. PEC also stated that it is possible that the Fulton site would be shared with another utility, in return for site sharing by others, to keep costs low. Dr. Johnsrud noted that Pennsylvania does not presently have a law which permits "site banking".

The Board specifically referred to the statement regarding "site banking" (*slip op.* at 8), but did not define this phrase, explain its relevance here, or indicate whether Pennsylvania law prohibits the practice.

Thus, the "evidence of record" upon which the Board relied simply does not support the Board's conclusions. If the Board's findings that PEC violated the purpose of the ESR process, and that review of its application had been suspended for "too long," are to stand, they must be footed elsewhere. And more importantly, the parties themselves must be given the opportunity to produce relevant, material, and reliable evidence to support their respective positions and to discredit that of their opponents. See *LeCompte, supra* at 605.¹² The Board should not engage in what appears to be its own independent and selective search of the record.¹³

C.

Even assuming *arguendo* that the portions of the record cited by the Board demonstrated PEC's bad faith prosecution of its ESR request, the Board's decision fails to show what harm resulted to either any party or

¹² We do not suggest that an oral hearing is necessarily required for such a pursuit. The matter might lend itself to summary disposition on written pleadings, accompanied by appropriate affidavits. See 10 CFR 2.749.

In concluding that some sort of hearing is required, we do not mean to imply that intervenors' reasons for dismissing PEC's application with prejudice — merely asserted in their pleading before the Licensing Board without any evidentiary substantiation — necessarily rise to a level that should trigger further inquiry. We are reluctant, however, to interfere with a board's exploration of matters that, in its view, involve a possible compromise of the Commission's adjudicatory processes. Thus, in the circumstances of this case, we accept the Licensing Board's implicit finding that intervenors have made a threshold showing, adequate to justify further consideration.

¹³ The Board's conclusions are even more troubling in light of a prior order entered in this very case — which the Board curiously fails to mention in the decision here on appeal. In May 1979, an intervenor requested termination of PEC's application because, *inter alia*, no specific reactor type had been proposed in the ESR application. The Board declined that request, noting the absence of any allegation that PEC failed to meet "required standards of conduct." LBP-79-23, 10 NRC 220, 223 (1979). The Board also observed that a ruling on this matter "would be premature and an infringement on the Staff's function." *Id.* at 224.

What is particularly interesting is that the Board then had before it the same information that it considered, albeit improperly, in reaching the decision before us — *i.e.*, the May 1978 summary minutes. Yet at that time the Board apparently saw no "period of suspension and uncertainty since 1975" so as to justify termination of the proceeding.

the public interest in general.¹⁴ Indeed, the Board made no link whatsoever to any harm or prejudice occasioned by PEC's pursuit of early site review, noting only intervenors' allegations "that the uncertainties as to the ultimate use of the proposed site have worked a hardship upon them, causing personal anxieties and preventing optimum uses of the land or sale thereof" (slip op. at 3).¹⁵ Mere allegations, of course, cannot serve as a basis for a finding of hardship or legal harm. We note also that it is well settled that the prospect of a second lawsuit — or, in this case, another application to construct a nuclear reactor at Fulton — does not provide the requisite quantum of legal harm to warrant dismissal with prejudice. *Jones v. Securities and Exchange Commission*, 298 U.S. 1, 19 (1936). In the absence of a demonstrated injury to a private or public interest, we cannot affirm the Board's dismissal of PEC's application with prejudice.

III.

For the reasons discussed above, we find that the Licensing Board abused its discretion in dismissing PEC's application with prejudice. We therefore vacate the Board's decision and remand this matter for further action in conformity with this opinion.¹⁶

¹⁴ In cases involving Fed. R. Civ. P. 41(a)(2) (see note 7, *supra*), courts clearly require some showing of "legal harm" for a dismissal with prejudice. *LeCompte, supra* at 604. Professor Moore suggests a showing of "substantial prejudice" is necessary, and licensing board precedent would appear to agree. See 5 Moore's Federal Practice ¶41.05[1] at 41-73; *Boston Edison Co.* (Pilgrim Station, Units 2 and 3), LBP-74-62, 8 AEC 324, 327 (1975). In any event, the circumstances of each case should be carefully considered, giving due regard to the legitimate interests of all parties. See *Selas Corp. of America v. Wilshire Oil Co. of Texas*, 57 F.R.D. 3, 5-6 (E.D. Pa. 1972); *Moore's, supra* at 41-59.

¹⁵ The Board stated that the intervenors represent the owners of approximately one-third of the land within the exclusion area of the proposed Fulton site, as well as other land nearby (slip op. at 2-3). It attributed to these intervenors the allegations of hardship noted above. The Board's statement, however, is somewhat misleading. The intervenors who urged dismissal with prejudice and alleged hardship "preventing optimum use of the land or sale" were the York Committee for a Safe Environment and the Central Pennsylvania Committee on Nuclear Power (see pp. 970-971 and note 5, *supra*). These groups' petition to intervene filed in January 1974, does not identify any members who are owners of property actually within the Fulton site. Another intervenor group, Save Solanco Environment Conservation Fund, does include such property owners, but Solanco did not file a response to PEC's motion to withdraw and is not a participant in this appeal. Thus, the intervenors who asserted concern about their property values as a justification for dismissal with prejudice do not appear to be the parties with the most direct interest in the parcels comprising the Fulton site.

¹⁶ In view of the basis for our decision, we need not reach PEC's constitutional arguments.

It is so ORDERED.

FOR THE APPEAL BOARD

Barbara A. Tompkins
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Gary J. Edles, Chairman
Dr. John H. Buck
Christine N. Kohl

In the Matter of

Docket No. 50-289
(Restart - Management Issues)

**METROPOLITAN EDISON
COMPANY**
**(Three Mile Island Nuclear
Station, Unit 1)**

November 19, 1981

Following a stipulation entered into by the parties and approved by the Special Master and the Licensing Board, the Appeal Board grants the unopposed requests of licensee and "three involved individuals" to withdraw their appeals from the Licensing Board's November 6, 1981 unpublished decision. That decision approved the special master's denial of the individuals' requests for confidential treatment of their identities in this inquiry into alleged cheating on NRC examinations (LBP-81-50). To avoid any residual inconsistency with the terms of the stipulation, the Appeal Board also vacates the memoranda and orders of the Special Master and the Licensing Board.

ORDER

Certain individuals requested confidential treatment of their identities in connection with the reopened phase of this proceeding, which involves allegations of cheating on NRC examinations. Administrative Judge Gary Milhollin, serving as a Special Master, issued a decision denying the request. LBP-81-50, 14 NRC 888 (1981). On November 6, 1981, the Atomic Safety and Licensing Board affirmed that decision (unpublished).

The Licensee and the "three involved individuals" filed appeals from the Licensing Board's decision on confidentiality, accompanied by motions to stay. We stayed the Board's decision and established an expedited briefing

and oral argument schedule. The appellants later filed requests to withdraw their appeals as an outgrowth of an agreement and stipulation reached by all the parties and approved by the Special Master.¹

In an order issued on November 13, 1981, we cancelled the briefing and oral argument schedule and lifted the stay, but decided not to dispose of the appeals until the Licensing Board had an opportunity to review the Special Master's approval of the stipulation. It did so, and endorsed it in a memorandum and order issued on November 17, 1981.

We now grant the unopposed requests to withdraw the appeals. Review would serve no purpose since the issues raised have been rendered moot by virtue of the subsequent stipulation of the parties, as approved by the Special Master and the Licensing Board. To avoid any residual inconsistency with the terms of the stipulation,² we also vacate the memoranda and orders of the Special Master issued on October 22, 1981 (LBP-81-50), and the Licensing Board issued on November 6, 1981. See, *Rochester Gas and Electric Corp.* (Sterling Power Project, Unit No. 1), ALAB-596, 11 NRC 867, 869 (1980).

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the Appeal Board

¹ The "three involved individuals" sought to withdraw their appeal except as to those portions of the Licensing Board's decision characterizing the conduct of counsel in the presentation of their Privacy Act arguments. We concluded that the portions of the Board's decision that the "three involved individuals" continued to appeal fell far short of satisfying the criteria for review of such interlocutory orders. Therefore, to the extent that these appellants continued to seek our review, via directed certification, of the identified portions of the Board's November 6 decision, we denied that request (unpublished order of November 13, 1981).

² The stipulation provides, among other things, that the testimony of the three individuals, if necessary, will be taken in non-public sessions and that the names of the individuals will not be disclosed to the general public.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL PANEL

Alan S. Rosenthal, Chairman

In the Matter of

**Docket Nos. 50-454 OL
50-455 OL**

**COMMONWEALTH EDISON
COMPANY
(Byron Nuclear Power Station,
Units 1 and 2)**

November 19, 1981

The Appeal Panel Chairman denies a motion by the applicant requesting (1) reconsideration of his unpublished order tolling the running of the period in which intervenors may file exceptions to a Licensing Board order (LBP-81-52, 14 NRC 901 (1981) dismissing them as a party to this proceeding, and (2) an order directing the briefing now, on an expedited basis, of exceptions which the intervenors had provisionally submitted earlier while seeking reconsideration by the Licensing Board of its dismissal order.

RULES OF PRACTICE: RECONSIDERATION PETITIONS

It is accepted appellate practice for the appeal period to be tolled while the trial tribunal has before it an authorized and timely-filed petition for reconsideration of the decision or order in question.

Messrs. Michael I. Miller, Paul M. Murphy and Alan P. Bielawski,
Chicago, Illinois, for the applicant, Commonwealth Edison
Company.

Messrs. Myron M. Cherry and Peter Flynn, Chicago, Illinois, for
the intervenor, Rockford League of Women Voters.

MEMORANDUM AND ORDER

On October 27, 1981, the Licensing Board entered an order in which it dismissed the Rockford League of Women Voters (League) as a party to this operating license proceeding for failure to comply with a Board discovery order. LBP-81-52, 14 NRC 901. On November 6, 1981, the League filed below a thirty page petition for reconsideration of that order. Simultaneously, it moved for an extension of the time within which to file exceptions to the order under 10 CFR 2.762(a). Alternatively, the League asked that, if required to file its exceptions at this juncture, the time for the filing of its brief be enlarged. The basis of the motion was, of course, the pendency of the petition for reconsideration before the Licensing Board.

On November 10, acting under the authority of 10 CFR 2.787(b), I entered an unpublished order tolling the running of the period prescribed by 10 CFR 2.762(a) for the filing of exceptions. The order provided that that period would commence to run "on the date of service upon the League of the Licensing Board's order on the petition for reconsideration * * *".

The applicant now moves for reconsideration of the November 10 order. It asks that we order that the exceptions which the League had provisionally submitted in connection with its motion be briefed now on an expedited basis. We are told that this will enable our prompt adjudication of the appeal when and if the Licensing Board denies the League's petition for reconsideration. Although the applicant professes the confidence that the appeal would be decided in its favor, it is concerned that, were we to order the League reinstated as a party after a prolonged appellate process, the proceedings below might not be concluded prior to the time the Byron facility will be ready for operation.

For the following reasons, the applicant's motion must be denied.

1. Leaving aside any possible attendant jurisdictional problems,¹ the applicant's suggestion that the briefing of the appeal proceed concurrently with the Licensing Board's appraisal of the pending petition for reconsideration does not commend itself. True, as the applicant stresses, were that petition to be granted by the Board below the only consequence would be that "the parties will have been inconvenienced by having to prepare briefs which, in retrospect, would not have been necessary". But the

¹ The applicant implicitly assumes that the filing of exceptions to a licensing board decision under 10 CFR 2.762(a) does not strip the Licensing Board of jurisdiction to entertain a petition for reconsideration of that decision. Although it is unnecessary to reach that question here, that assumption is not free from all doubt.

applicant seemingly has failed to take into account that, even if adhering to the result reached in its October 27 order, the Licensing Board might elect to elaborate upon or refine in some significant respect the basis assigned in the order for that result. Given the thrust of the petition for reconsideration, that possibility cannot be dismissed as insubstantial. And, were it to materialize, the League most likely would wish, and justifiably so, to recast the 44 provisionally-filed exceptions to meet the Board's rejoinder to its petition. In such circumstances, under the applicant's proposal, there would be both an unnecessary round of briefs and little, if any, time saved.

It was essentially this factor that induced the tolling of the appeal period to await the outcome of the petition for reconsideration. And that action was entirely consistent with accepted appellate practice. It simply is not customary for an appeal to proceed through at least the briefing process while the trial tribunal has before it an authorized and timely-filed petition for reconsideration of the decision or order in question.²

2. The applicant has provided insufficient cause to depart from the accepted practice in this instance. It may well be, as it insists, that the deferral of the League's appeal will occasion a delay in the ultimate disposition of the licensing proceeding below if (1) the Licensing Board denies reconsideration, but (2) we should thereafter overturn the October 27 order and reinstate the League as a party. That is, however, a normal litigation risk which the applicant fairly can be deemed to have assumed when it prevailed upon the Licensing Board to dismiss the League from the proceeding. More specifically, the applicant could not have failed to appreciate that, given the gravity of that dismissal, the League would likely resort to all remedies available to it under the Rules of Practice — *i.e.*, first a petition for reconsideration addressed to the Licensing Board and then, if necessary, an appeal to us.³ Likewise, the consequences of a possible eventual appellate reversal were reasonably to be anticipated. In short, there is nothing either obvious or suggested by the applicant to

² That the petition was authorized is beyond dispute. 10 CFR 2.771; *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-235, 8 AEC 645, 646 (1974).

³ In this connection, in *Midland*, ALAB-235, fn. 2 *supra*, we granted essentially the same relief which was provided in the November 10 order. Significantly, that relief was sought by the lawyer who represents the League here and was opposed by the same law firm (indeed the very same counsel) representing this applicant.

differentiate its current situation from that of any other litigant whose initial victory is subject to various, and consecutive, further reviews.

The applicant's motion for reconsideration of the November 10, 1981 order is *denied*.⁴

It is so ORDERED.

FOR THE APPEAL PANEL
CHAIRMAN

C. Jean Shoemaker
Secretary to the Appeal Panel

This action was taken by the Appeal Panel Chairman under the authority of 10 CFR 2.787(b).

⁴ Should the Licensing Board deny the League's petition for reconsideration, the applicant will be free, of course, to move for expedited briefing and consideration of any exceptions thereafter filed by the League.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Alan S. Rosenthal, Chairman
Dr. W. Reed Johnson
Stephen F. Ellperin

In the Matter of

**Docket Nos. 50-250 SP
50-251 SP**

**FLORIDA POWER & LIGHT
COMPANY**

**(Turkey Point Nuclear Generating,
Units Nos. 3 and 4)**

November 30, 1981

The Appeal Board affirms two orders of the Licensing Board (1) granting the staff's motion for summary disposition of intervenor's contentions opposing the licensee's proposal to repair the steam generators at Turkey Point Nuclear Generating, Units 3 and 4 (LBP-81-14, 13 NRC 677 (1981); and (2) authorizing the issuance of license amendments to effect the repairs after finding that the impact of a hurricane or tornado on low level waste to be stored at Turkey Point during the repairs would not endanger the health and safety of the public (LBP-81-16, 13 NRC 1115 (1981)).

RULES OF PRACTICE: SUMMARY DISPOSITION

A grant of summary disposition is proper where the pleadings and affidavits on file "show that there is no genuine issue as to any material fact and that the moving party is entitled to decision as a matter of law." 10 CFR 2.749(d). See generally *Virginia Electric and Power Co.* (North Anna Nuclear Power Station, Units 1 and 2), ALAB-584, 11 NRC 451, 453 (1980).

RULES OF PRACTICE: CONTENTIONS

A contention is inadmissible where, taking everything in the contention as true and provable, it nevertheless provides a legally insufficient reason for the proposition sought to be litigated.

NEPA: PURPOSE OF INQUIRY

The purpose of the Commission's NEPA inquiry is to determine whether a proposed action brings about changes in the environmental *status quo*, and to measure the justification for the proposed action against those changes.

NEPA: CONSIDERATION OF ALTERNATIVES

Where an environmental impact statement is required by NEPA the Commission is obliged to take a harder look at alternatives than if the proposed action were inconsequential. See *Portland General Electric Co.* (Trojan Nuclear Plant), ALAB-531, 9 NRC 263, 266 (1979); 40 CFR 1508.9.

NEPA: RULE OF REASON

NEPA's rule of reason establishes a continuum where more is expected and required of the agency depending upon the environmental significance of the proposal before it. See generally 40 CFR 1502.2, 1502.14.

NEPA: CONSIDERATION OF ALTERNATIVES

The Commission does not have the authority, under NEPA or any other statute, to reject an applicant's proposal solely because an alternative might prove less costly financially.

NRC: CONSIDERATION OF ECONOMIC MATTERS

The Commission's role in assessing financial matters regarding nuclear power plants is limited under the Atomic Energy Act to whether the company will be able to build and operate the plant without compromising

safety because of pressing financial needs. *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 162-63.

NEPA: CONSIDERATION OF ALTERNATIVES

If under NEPA the Commission finds there are environmentally preferable alternatives to a proposal for constructing and operating a nuclear power plant, then it must undertake a cost-benefit balancing to determine whether such alternatives should be implemented. *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 115, 162-63. Nothing in NEPA compels an agency to sift through environmentally inferior alternatives to find a cheaper (but dirtier) way of handling the proposal. Where there are no environmentally preferable alternatives, evaluation of the purely economic aspects of the proposal is left to the business judgment of the utility companies and the control of State regulatory agencies. *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 162-63 (1978).

NEPA: CONSIDERATION OF ALTERNATIVES

Applying NEPA's "rule of reason," *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519 (1978), the Commission need not examine solar power and energy conservation in connection with need for power in regard to an already operating power plant when the action initiating the NEPA inquiry is of minor environmental consequence, and the principal claimed advantage of the conservation alternative is an economic one.

NEPA: PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

The need for a programmatic environmental impact statement arises when several proposals for action "that will have cumulative or synergistic environmental impact upon a region are pending concurrently before an agency." *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976). It is the impact of the resolution not the commonality of the problem that is crucial. Even in that situation, so long as one action does not commit the agency to approval of other pending projects, "an agency could approve one pending project that is fully covered by an impact statement, then take into consideration the environmental effects of that existing project when preparing the comprehensive statement on the cumulative impact of the remaining proposals." *Kleppe v. Sierra Club*, 427 U.S. at 414 fn. 26.

NEPA: RECORD OF DECISION

The purpose of having a "record of decision" is to link the environmental review process with the agency's decision. The decisions of the Commission's adjudicatory tribunals on the licensing proposal before them provide the agency "record of decision." 40 CFR 1505.2; 43 *Fed. Reg.* 55985-86 (November 29, 1978).

NEPA: SCOPING

The purpose of "scoping" is to provide a means for early identification of what are and what are not the important issues deserving of study in an environmental impact statement. 40 CFR 1501.7; 43 *Fed. Reg.* 55982 (November 29, 1978).

ATOMIC ENERGY ACT: WASTE DISPOSAL

The Atomic Energy Act requires that the Commission be reasonably assured that wastes can be safely handled and stored as they are generated, and that permanent disposal can be accomplished safely when, from a public health and safety standpoint, it is likely to become necessary.

NEPA: SCOPE OF REVIEW (WASTE STORAGE)

The NEPA environmental review for onsite waste storage should cover the time-period over which it is foreseeable the wastes will remain on site. See generally *Minnesota v. Nuclear Regulatory Commission*, 602 F.2d 412 (D.C. Cir. (1979)).

NEPA: FINAL ENVIRONMENTAL STATEMENT

A Licensing Board decision based on the evidentiary record before it is deemed to modify the final environmental statement as prepared by the Commission staff. 10 CFR 51.52(b)(3); *New England Coalition on Nuclear Pollution v. Nuclear Regulatory Commission*, 582 F.2d 87, 93-94 (1st Cir. 1978); *Citizens for Safe Power Inc. v. Nuclear Regulatory Commission*, 524 F.2d 1291, 1294 and fn. 5 (D.C. Cir. 1975). However, the absence of discussion of an issue in a Final Environmental Statement

(FES) may be so fundamental an omission as to call for its recirculation. *Public Service Co. of Oklahoma* (Black Fox Station, Units 1 and 2), ALAB-573, 10 NRC 775, 785-87 (1979).

RULES OF PRACTICE: DISCOVERY RULINGS

An appeal board will generally examine a licensing board's discovery rulings only to entertain a claim that the licensing board abused its discretion. *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 188 (1978).

Mr. Harold Reis, Washington, D.C. (with whom **Mr. Norman A. Coll**, Miami, Florida was on the brief), for Florida Power and Light Company, *licensee*.

Mr. Joel Lumer, Miami, Florida (Mr. Neil Chonin, Miami, Florida, on the brief) for Mark P. Oncavage, *intervenor*.

Mr. Steven C. Goldberg for the Nuclear Regulatory Commission staff.

DECISION

We have before us for decision the consolidated appeals of intervenor Mark P. Oncavage from two Licensing Board orders which (1) granted the NRC staff's motion for summary disposition of Mr. Oncavage's contentions opposing Florida Power and Light Company's proposal to repair the steam generators at Turkey Point Nuclear Units 3 and 4; and (2) authorized the issuance of license amendments to effect the repairs after finding, on a question over which the Board had retained jurisdiction, that the impact of a hurricane or tornado on low level waste to be stored at Turkey Point during the repairs would not endanger the health and safety of the public. LBP-81-14, 13 NRC 677; LPB-81-16, 13 NRC 1115 (1981). The appeals require us to consider in the context of the grant of summary disposition, the scope of the Commission's duties under the National Environmental Policy Act of 1969 (NEPA), 42 U.S.C. 4321, the specificity with which contentions must be stated to raise an issue for adjudication, and the Board's discretion to control the course of discovery in its proceedings. For the reasons discussed below we affirm the Licensing Board.

I.

A. Background

In order to understand the nature of the problem that gave rise to the issues in this case it is useful to describe briefly the functions of a steam generator in a nuclear power plant. All pressurized water nuclear power plants, including the two units designed by Westinghouse Electric Corporation for Turkey Point, have two systems of piping to effect the transfer of energy from the reactor core to the turbines which produce electricity. The primary system pumps circulate primary coolant water around the hot fuel rods within the reactor core where the nuclear reaction takes place. The super-heated water then passes through large pipes to the steam generators. In each steam generator — heat exchangers approximately 70 feet high and fourteen feet in diameter — the primary coolant water passes from large pipes into about 3000 smaller tubes which are partially immersed in a separate system of water, the secondary coolant. Heat is transferred through the tube walls from the primary coolant to the secondary coolant which boils and, in the form of steam, passes through turbines to generate electricity. In order to prevent leaks of primary coolant and radiation from the primary system to the secondary coolant, it is necessary to assure the integrity of the entire piping system, including each of the thousands of small tubes inside each steam generator.

Since Turkey Point Units 3 and 4 began commercial operation on December 14, 1972 and September 9, 1973, the tubes of all six steam generators at those units have undergone a significant amount of degradation, including tube wall thinning and denting, stress corrosion cracking, and several instances of primary coolant leakage through cracked tubes.¹ The steam generator tube degradation problem has been seen in several Westinghouse designed pressurized water nuclear power reactors.² When the leakage from the primary to the secondary system exceeds a

¹ We have discussed steam generator degradation and its safety significance most notably in *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-427, 6 NRC 212 (1977), and ALAB-343, 4 NRC 169 (1976). The safety implications have also been noted in NRC Regulatory Guide 1.83 Revision 1, "Inservice Inspection of Pressurized Water Reactor Steam Generator Tubes" (July 1975), at 1, which states:

Failure of steam generator tubes, which can be caused by cracking, wastage, and fretting, will release radioactive materials to the secondary coolant system. Furthermore, serious weakening of these tubes from similar causes could, in the event of a loss-of-coolant accident (LOCA), result in tube failures that would release the energy of the secondary system into the containment. (footnote omitted)

² "Summary of Operating Experience with Recirculating Steam Generators," NUREG-0523 (January 1979).

specified limit, or when inspections reveal tubes degraded beyond a prescribed amount, FPL is required by the terms of its license to shut down the plant and remove the troublesome tubes from service by means of plugging the tubes. In the process, workers are exposed to some radiation. In recent years, workers at Units 3 and 4 have received doses of 335 to 600 person-rem during inspection and plugging of degraded steam generator tubes. About 20% of the steam generator tubes in Unit 3 and about 24% of the tubes in Unit 4 have been removed from service.³ If a still larger number of tubes were to be plugged, the reactor would be required to operate at reduced power.

In anticipation of the continuing nature of these problems, on September 20, 1977, FPL proposed to repair the six steam generators in Units 3 and 4 by replacing the lower assembly, including the tube bundles, of each generator.⁴ The units would be repaired in series: Unit 4 which had the larger number of plugged tubes would be repaired first over an approximate 9 month period, while Unit 3 conducted normal operations. In outline, the repair project would entail preparatory work of putting the reactor in condition for long-term layup, removing the fuel, and installing guide rails for transporting the steam generator lower assembly through the containment equipment hatch. Then the cutting of system piping would begin, including cutting and removal of sections of steam lines, feedwater lines, and miscellaneous smaller lines. The steam generator would be cut at the transition cone, the upper shell removed and refurbished inside containment. A second cut would free the steam generator lower assembly, including the tube bundles, from the channel head and attached primary system piping. The lower assembly would then be welded shut, lowered onto a transport mechanism, removed from the containment through the equipment hatch, and placed in the onsite steam generator storage facility. The same machinery used to remove the lower assemblies would be used to install each new assembly. The new lower assembly would be rewelded to the old channel head bottom, the piping reconstructed, and the system tested before startup.

On December 13, 1977, the NRC published in the Federal Register a notice of opportunity for hearing on the steam generator repair license amendment. 42 *Fed. Reg.* 62569. No timely intervention petition was filed.

³ The statistics on worker exposure cover the years 1975-1979; that on the percentage of plugged tubes is as of November, 1980. See "Final Environmental Statement Related to Steam Generator Repair at Turkey Point Plant Units 3 and 4," NUREG-0743 (March 1981) ["FES"] at 2-1, 4-5.

⁴ See FES, *supra* fn. 3, at 3-1 to 3-4. While the final repair proposal differs in several respects from FPL's initial proposal, the differences are immaterial for purposes of this overview.

B. The Proceedings Below

Mr. Oncavage's petition to intervene was filed on February 9, 1979. It was granted by a divided Licensing Board on August 3, 1979, based on an examination of the factors specified in 10 CFR 2.714(a) for considering late intervention petitions. LBP-79-21, 10 NRC 183. Six of Mr. Oncavage's proffered 19 contentions were admitted at that time, among them his claim that NEPA and the Commission's implementing regulations obliged the Commission to prepare an environmental impact statement prior to authorizing the repairs. The Licensing Board reserved ruling on the remaining contentions and urged the parties to reach agreement of them. *Id.* at 198-99.

On September 25, 1979, following a variety of filings, the Licensing Board entered an order ruling on the disputed contentions. It admitted ten, most of which were later withdrawn. Only two of the contentions are of any pertinence to an understanding of these appeals. As just noted, the Licensing Board admitted as a contention Mr. Oncavage's claim that the proposed steam generator repair was a major federal action significantly affecting the environment, requiring preparation of an environmental impact statement.⁵ Second, the Board admitted the contention that a hurricane would likely result in radioactive releases to unrestricted areas from one or more stored steam generator lower assemblies in violation of 10 CFR Part 20, and 10 CFR Part 50 ALARA principles. This latter contention came to be denominated contention 4A.

The claimed need for an environmental impact statement became moot when on March 6, 1980, the NRC staff informed the Licensing Board that an environmental impact statement would be prepared. The staff acted in response to a Commission memorandum and order directing the issuance of such a statement in connection with proposed steam generator repairs to be undertaken by the Virginia Electric and Power Company at its Surry nuclear power plant, repairs upon which the Turkey Point proposal had been modeled. See *Virginia Electric and Power Co.* (Surry Nuclear Power Station, Units 1 and 2) CLI-80-4, 11 NRC 405 (1980).⁶

⁵ At that time it had been the NRC staff's position that the environmental impact appraisal it issued June 29, 1979, satisfied its NEPA obligations.

⁶ At the time the Commission acted, repairs at *Surry* Unit 2 were essentially complete, while those at Unit 1 had not yet been started. The Commission's review in *Surry* focused on the occupational radiation exposure that the repair program would entail — 2070 man rem for the repair at each unit — because the Commission believed that adverse environmental impact to be "the only one associated with the repair program that might be considered significant." 11 NRC at 406. Given the controversy in the scientific community as to the effects of exposures of that magnitude, the Commission found itself unable to determine whether the impact was significant, and decided that the preferable course of action was to prepare an environmental impact statement on the repair. *Id.* at 407.

The draft environmental impact statement ("DES") for the Turkey Point repairs issued in December, 1980.⁷ Mr. Oncavage filed extensive comments arguing, among other things that the DES failed to address how low level waste generated by the repair would be protected from hurricanes for extended periods of time.⁸ He also claimed that erroneously, the DES had not examined the preferred alternative of operating Turkey Point on a derated basis, in tandem with a conservation program financed by the monies not employed in making the steam generator repairs.⁹

On March 24, while the FES was still in preparation, the Licensing Board held a prehearing conference to settle the contentions to be heard at the evidentiary hearing then scheduled to begin June 1. Because the FES was soon to be issued, the Licensing Board ruled that Mr. Oncavage's original contention which had argued the need for an FES could be rephrased to plead with specificity the respects in which the forthcoming FES was claimed to be deficient. The Board set April 20 as the due date for that filing. Memorandum and Order of April 2, 1981 at 4; see also Prehearing Conf. Tr. 43 (March 24, 1981). The Board also decided, at Mr. Oncavage's request and over the objections of the NRC staff and the licensee, to amend the previously admitted contention regarding the impact of hurricanes on the stored steam generators; to encompass more broadly the claim that radioactive releases above 10 CFR Part 20 and Part 50 ALARA limits would occur "as a result of a hurricane or a tornado striking the site during the steam generator repairs." Memorandum and Order of April 2, 1981 at 5; Prehearing Conf. Tr. 56-57, 60, 77, 99-100. The Board considered the expanded contention (which it denominated 4B) to be within its intent to hear evidence on the impact of a hurricane or tornado during the extended repair process, and Mr. Oncavage had argued that the impact of a hurricane while the repair was in progress was an

⁷ The parties then negotiated a schedule for completion of the proceedings and submitted it to the Licensing Board on January 28, 1981. The negotiated schedule called for comments on the DES to be submitted by March 2, 1981, final discovery requests and motions for summary disposition by April 15, responses to them by April 30 and May 11 respectively, prepared testimony filed by May 15, and the hearing to begin on June 1. The Licensing Board accepted the negotiated schedule on February 23, 1981.

⁸ See Comments to Draft Environmental Statement, Turkey Point Steam Generator Repairs by Mark P. Oncavage, Intervenor (February 26, 1981), ["Oncavage Comments"] at 15-18, 29-32. Mr. Oncavage noted that each unit's repair would generate between 38,830 and 81,190 cubic feet of low level waste. Given the volume restriction which Barnwell, South Carolina had imposed as to Turkey Point generated waste, Mr. Oncavage estimated that Turkey Point would have to store some 100,400 to 185,000 cubic feet of low level radioactive waste.

⁹ With regard to energy conservation, Mr. Oncavage claimed that the economic advantage of conservation over the repair program was clear cut, and would entail fewer health and environmental hazards. *Id.* at 32-33, 35-37.

issue he should be free to raise in any event in connection with his contention regarding the forthcoming FES. Prehearing Conf. Tr. 56-57, 73-76.¹⁰

The FES issued on March 30, 1981. It examined the environmental impacts of the proposed repair and a series of alternatives, among them the no action alternative, shutdown and replacement of the units with a generating plant of different design, decontamination of the steam generators before cutting, retubing the existing steam generators, installing tube sleeves in the existing steam generator, and complete replacement of the steam generators. FES, *supra* fn. 3, at 5-1 to 5-4. The FES also considered a series of alternatives with regard to disposition of the replaced steam generators. *Id.* at 5-4 to 5-7. It concluded that the proposed repair would not significantly affect the quality of the environment, that there were no preferable alternatives to the proposed action, and that any impact from the repair would be outweighed by its benefits. *Id.* at 6-1.

In responding to Mr. Oncavage's comments on the DES, the FES noted FPL's estimate that the repair effort would generate about 1100 cubic meters of solid waste per unit containing about 130 to 270 curies of radioactivity; that normal operation of Turkey Point generated an annual average of about 575 cubic meters of solid waste per unit containing about 170 curies; and that the impact from the solid wastes should therefore be about the same as that from normal operations and not environmentally significant. *Id.* at 4-11. The FES did acknowledge, however, given the scarcity of available acreage, that off-site disposal was a general problem. *Id.* at 8-17 to 8-18. With regard to Mr. Oncavage's comments about energy conservation, the FES noted the impacts of plant operation and alternatives to it (including alternative energy sources) had been fully

¹⁰ The day before the prehearing conference, the staff filed a motion for summary disposition of the unexpanded contention supported by affidavits of Richard B. Codell, Marshall Grotenhuis and Bernard Turovlin. The Codell and Grotenhuis affidavits showed the maximum flood which could reasonably occur at Turkey Point would result in wind driven waves less than 1 foot up the storage building where the steam generator lower assemblies (SGLA) would be stored, that the SGLA's would not float, and that there was no credible mechanism for the leakage of radioactivity to the environment from a liquid pathway. Even if released from the steam generator, liquid radioactive contamination would be inhibited from being released to the environment by the integrity of the storage building including a 6 inch thick reinforced concrete floor. Any radioactive leakage would be discovered well before radioactive groundwater could escape to the environment. The Turovlin affidavit concluded that the possibility of through wall corrosion of the steam generator lower assemblies was insignificant over the 30 year period during which they might be stored.

On April 17 FPL filed an answer supporting the staff motion for summary disposition with affidavits of Frederick G. Flugger and H. H. Jabali. Those affidavits gave further support to the staff's conclusion that there is no credible liquid pathway to the environment from the stored SGLA's. Intervenor did not file a response, and on May 7 the Licensing Board granted the unopposed motion for summary disposition.

evaluated in the operating license FES issued in 1972. At this stage the environmental review was said to be properly confined to a consideration of the extent to which the proposed action will lead to significant environmental impacts beyond those previously assessed. *Id.* at 8-13. See also *id.* at 8-19. The FES also noted that the option of not operating Turkey Point Units 3 and 4 was not feasible in light of the power demand in the FPL service area. While the units could be run in a derated mode, the economic cost of replacement power — put at \$840 million for the first ten years — and the continuing person-rem cost of occupational exposure during the inspection and plugging of derated tubes led the NRC staff to reject that alternative. *Id.* at 5-1.

On April 20, Mr. Oncavage submitted his amendment to contention 1. The proffered contention sparsely enumerated 17 respects in which the FES was claimed to be deficient.¹¹ Both the NRC staff and the licensee objected to it. The staff, supported by FPL, moved for summary disposition of the amended contention and of contention 4B which questioned the radiological effects of a hurricane or tornado striking the site during the proposed repairs. It was their position that the amended contention

¹¹The amended contention read as follows:

1. The EIS failed to follow section 1501.7 of the NEPA regulations in that the Staff failed to invite interested persons to participate in scoping process in which the scope of the EIS was to be decided.
2. No record of decision was prepared for the Turkey Point Project in violation of 40 CFR 1505.2.
3. The EIS is not a programmatic EIS and a programmatic EIS is required as a result of the steam generator repairs that would be required nationally.
4. The final EIS fails to comply with NEPA in that the EIS does not address (to the fullest extent possible) all environmental effects of proposed actions as well as all irreversible and irretrievable resources.
5. The EIS fails to look at the socio-economic effects upon Florida Power and Light rate payers. Such effects must be examined fully within the EIS because the project entails direct significant environmental effects which are intertwined with the socio-economic effects.
6. The EIS contains no glossary or table of definitions and consistently uses terminology beyond the ken of lay people.
7. The estimates of worker exposure provided for in the final are unreasonably low.
8. The analysis of deaths and health effects likely to result from the action is invalid because it is based on outmoded scientific information.
9. The economic analysis in the EIS is invalid in that it fails to consider the possibility that replacement or repair of the steam generators may be necessary a second time.
10. The entire EIS fails to comply with a good faith consideration as is required under NEPA.
11. The analysis of alternatives is inadequate under NEPA.
12. The final EIS as a whole fails to adequately address the impact of the steam generator repair on the human environment because it tends to explore the positive effects that the repair will have while down-playing the negative impact.

(CONTINUED)

failed to fulfill the Licensing Board's requirement to plead with specificity the respects in which the FES does not comply with NEPA, that there were no material facts in issue, and summary disposition was proper as a matter of law.¹²

The staff's motion for summary disposition of contention 4B was supported by an affidavit of Robert F. Abbey, a staff meteorologist. His affidavit explained that, depending upon support width, it would take a wind speed between 340 and 635 miles per hour to dislodge and overturn a steam generator lower assembly following its removal from containment and prior to its destined onsite storage. The probability of such an occurrence was put at one in ten billion per year. Even if the SGLA should be moved, it was considered unlikely to strike some other object with an impact as great as the 12 foot drop analyzed in the FES and found to be comparable to 10 CFR Part 20 limits governing normal reactor operation. The accident risk due to a hurricane or tornado-generated missile during the repair was considered to be similarly small. FPL filed an affidavit consistent with the staff position.¹³

Mr. Oncavage's response to the objections to amended contention 1 argued, in essence, that it had been pled with sufficient specificity, and that he would provide more detail regarding the FES defects in failing to consider the energy conservation and solar energy alternatives to the proposed repairs when he responded to the motions for summary disposition, and in pre-filed testimony.¹⁴ In later opposing the motions for summary disposition, Mr. Oncavage submitted 4 affidavits. The affidavits of Drs. Roger A. Messenger and John H. Parker examined the conser-

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13. The EIS fails to adequately discuss the alternatives to the proposed action.
 14. The EIS fails to adequately discuss the relationship between local short term use of man's environment and maintenance and enhancement of the long term productivity.
 15. The EIS fails to discuss the irreversible and irretrievable commitment of resources involved in the proposed action.
 16. The final EIS fails to adequately discuss the environmental impact of a hurricane if one occurs during the repair process.
 17. The final EIS fails to consider the long term effects of a nuclear waste building next to Biscayne Bay.

¹² See NRC Staff Objections to Proposed Amended Contention 1 and Third Motion for Summary Disposition (filed April 27, 1981); Licensee's Response in Support of NRC Motion for Summary Disposition of Amended Contention 1 and Objections to the Amended Contention (filed April 30, 1981); Licensee's Response in Support of NRC Staff Motion for Summary Disposition of Contention 4B (filed May 5, 1981).

¹³ Affidavit of Frederick G. Flugger, Habib H. Jabali, and Ping K. Wan on Contention 4B attached to Licensee's Response in Support of NRC Staff Motion for Summary Disposition of Contention 4B (filed May 5, 1981).

¹⁴ Response to NRC Staff Objections to Proposed Amended Contention 1 and Licensee's Motion to Dismiss Contention 1 (filed May 12, 1981).

vation strategies that could be used with money saved from not undertaking the steam generator repairs and derating Units 3 and 4.¹⁵

The affidavits of Messrs. Douglas King and Leonard G. Pardue spoke to the impact of severe storms on lower level waste stored onsite. Mr. King had observed several hundred drums in open areas exposed to weathering which contained low level radioactive waste. At some locations the drums were loosely stacked on top of each other. Mr. King was concerned that a hurricane could breach the drums which would be used to hold low-level waste from the steam generator repairs and cause a contaminating accident. In his view the practice of loose, outdoor storage of radioactive wastes in a hurricane prone area was unreasonable and an abandonment of the ALARA principle. The affidavit of Leonard G. Pardue, a meteorologist of extensive experience, saw a 5% per year probability of a major hurricane with winds in excess of 111 m.p.h. striking the 50 mile segment of southeast Florida coast in which Turkey Point is located.¹⁶ Winds of that force could be expected to scatter loosely stacked drums and subject them to shocks from collisions with other objects.

C. Licensing Board Decisions

On May 28, 1981, the Licensing Board issued its decision granting summary disposition of contentions 1 and 4B. LBP-81-14, 13 NRC 677. With regard to most of the 17 subparts of amended contention 1, the Board found the pleading did not meet the basis and specificity requirements of 10 CFR 2.714(b), and the FES itself provided sufficient answer to the proffered contention.¹⁷ As to other, purely procedural issues, such as the claimed failure to follow CEQ regulations on scoping and preparing a record for decision, the Board found that whatever legal duty the Commission owed had been met.¹⁸ In those instances where Mr. Oncavage had supplemented the generality of his contention with affidavits — the asserted need to consider conservation and solar energy in tandem with derating as a preferred alternative to the proposed steam generator

¹⁵ Dr. Messenger saw several opportunities for a 50-70% reduction in per capita consumption of energy over a 20 year period through replacement of inefficient air conditioners, water heaters, and refrigerators, with currently available high efficiency equipment. Dr. Parker emphasized his view that, given the fairly unique energy consumption patterns of a short heating season and long cooling season in FPL's service area, an aggressive residential conservation program to landscape residences, shade air conditioners, and install timers on hot water heaters, offered a cost effective alternative to the Turkey Point steam generator repairs.

¹⁶ A major hurricane was defined as categories 3, 4, or 5 on the Saffir/Simpson Hurricane Scale. Category 3 winds are from 111-130 mph. Winds generated during a category 5 hurricane could exceed 200 mph.

¹⁷ Subparts 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14 and 15 fall within this category. 13 NRC at 686-93.

¹⁸ Subparts 1, 2, and 6 fall in this category. *Id.* at 684, 689.

repair — the Licensing Board found it outside the scope of the proceeding. The Board reasoned that the need for the power generated by Turkey Point had previously been explored and settled in the prior construction permit and operating license proceedings, and the environmental analysis need focus only on changes arising from the license amendment rather than on plant operation itself.¹⁹ As to those aspects of contention 1 which dealt with the impact of hurricanes during the course of steam generator repairs, the Licensing Board found them to be disposed of on the basis of affidavits submitted in connection with contention 4B and previously disposed of contention 4A.²⁰ It granted summary disposition of both. Finally, with respect to the impact of a hurricane or tornado on low level radioactive waste stored on-site, a subject on which the Board had no information from the licensee or staff, the Board implicitly concluded that the subject fell outside the scope of Contention 4B, deemed the record inadequate for its disposition of the matter, and called upon the parties to file detailed information and a statement of position concerning the subject by June 15.

Both the licensee and staff submitted statements of position and affidavits in response to the Board's May 28 order. FPL filed an affidavit of Alan J. Gould, employed by it as a Power Resources Radwaste and Radiochemistry Specialist, which set forth detailed facts and commitments concerning the handling, storage, transportation and disposition of the wastes, supporting the conclusion that even if all the waste containers were breached by a hurricane or tornado, the resultant dose would be below 10 CFR Part 20 limits. The staff affidavit of Marshall Grotenhuis, project manager for the steam generator repair project reached the same conclusion.

Mr. Oncavage did not add to the information contained in the King affidavit. But he filed a statement of position arguing, among other things, that the environmental impact of the project's waste had not been adequately examined, FPL should be required to submit an application under 10 CFR 20.302 setting forth its proposed disposal procedures, the steam

¹⁹Subparts 11 and 13 fall within this category. *Id.* at 691.

²⁰Subparts 16 and 17 fall within this category. *Id.* at 693-94. The Board found there was no material issue of fact that (1) the proposed repair schedule did not substantially coincide with the historical hurricane season in southeastern Florida, and the probability of a tornado occurring at the site during the repair activity is remote, (2) the reactor building, in which the physical work associated with removal and replacement of the steam generator lower assemblies will be conducted, is designed to withstand a tornado or hurricane, (3) when outside the reactor building a steam generator lower assembly would be unmoveable in such a storm, (4) a tornado-borne missile could not penetrate the steel wall of a steam generator lower assembly, and (5) any storm related radioactive release from the steam generator lower assemblies would fall within the permissible radiation level of 10 CFR Part 20, levels which are applicable to normal reactor operation rather than accident conditions. The Board thereupon granted summary disposition of Contention 4B.

generator repairs should be prohibited because there is no legal manner in which to dispose of such low level wastes, and discovery on the waste issue should be reopened.

On June 19, 1981 the Licensing Board issued a final order authorizing the Director of Nuclear Reactor Regulation to issue appropriate license amendments to permit the proposed steam generator repairs of Units 3 and 4 in accordance with the commitments made by FPL in its application and further described in the Gould affidavit. LBP-81-16, 13 NRC 1115. The Board's opinion thoroughly canvassed the pertinent affidavits and the statement of positions filed by the parties.

On the basis of the Gould affidavit, the Board found that approximately 45,600 cubic feet of low level waste containing an estimated 23.2 curies of radioactivity might be retained onsite during the steam generator repairs.²¹ Compressible trash would be compacted into wooden boxes, lined, lidded, and banded with steel. The boxes would then be tied or banded together in blocks of four, providing a subassembly weighing approximately 16,000 pounds, and stacked no more than two high. Plastic covers and/or tarps would be used to protect the containers from storms. Tie downs would be used for groups of these subassemblies to hold them in place in the event of a hurricane or tornado. Noncompressible solid waste would normally be packaged in steel drums, lids clamped in place and held securely by a bolting ring. These too would be banded together in groups of four and stacked no more than two high providing a subassembly weighing approximately 4,000 pounds. The boxes and drums would meet pertinent DOT criteria. 49 CFR Parts 173, "Shippers-General Requirements for Shipments and Packagings" and 178, "Shipping Container Specifications." Those which could not be expeditiously shipped would be located within the Unit 3 and 4 radiation controlled area at elevation 17.5 mean low water and appropriately secured. Waste containing a higher concentration of radioactivity would be given priority of shipment and kept inside the radwaste building for the two or three month period prior to shipment.

The Board found that the protective measures noted above made it extremely unlikely that the packages would be breached during a hurricane or tornado. In the event there should be a breach, the radioactive

²¹This included the 1,312 drums on site viewed by Mr. King.

disposal consequences to the public were found to be insignificant.²² Lastly the Board reviewed each of intervenor's statements of position and found them to be without merit.

These appeals followed.

II.

In appealing from the Licensing Board's May 28 decision, intervenor argues that NEPA obliges the Commission to (1) consider the solar and conservation alternatives to the steam generator repairs, (2) prepare a programmatic environmental impact statement dealing with the fifteen Westinghouse designed nuclear power plants that have degraded steam generators and, (3) examine more thoroughly the impacts of extended onsite storage of low level waste. He also argues that the Commission must (4) abide by CEQ implementing regulations requiring a record of decision and public participation in deciding upon the scope of environmental impact statements. Mr. Oncavage's appeal from the Board's final order of June 19 reiterates his view that the environmental impacts of long term onsite storage of low level radioactive wastes have not been adequately examined. Additionally, he argues that (5) the extended onsite storage of low level waste requires new licensing approval, (6) the radioactivity of the stored wastes will be higher than the Board found, thus invalidating the Board's health and safety analysis, and (7) the Board erred in not allowing further discovery on the long term storage of low level radioactive waste.

More generally, as noted at the outset of this opinion, these appeals require us to consider in the context of the grant of summary disposition, the scope of the Commission's duties under NEPA, the specificity with which contentions must be stated to raise an issue for adjudication, and the Board's discretion to control the course of discovery in its proceedings. Our analysis proceeds by first examining the broad NEPA issues intervenor has raised, and then turns more particularly to those issues which arise from the onsite storage of low level radiation waste attributable to the steam

²² The affidavit of Marshall Grotenhuis, submitted by the staff, estimated a site boundary dose of 1.5 mrem could result from a hurricane which caused the release into the atmosphere of all of the radioactivity in the low level waste from the repair of one unit. This is well within the limits set forth in 10 CFR Part 50, Appendix I, governing the design objectives for yearly doses produced by the normal operation of a nuclear power plant. The consequences of a release onto the cooling canals also was small. If all the low level waste washed into the cooling canals, the staff estimate of $1.4 \times 10^5 \mu\text{Ci}/\text{cm}^3$ is within the limits set forth in 10 CFR Part 20, Appendix B, for releases to uncontrolled areas.

generator repairs. We conclude that the pleadings and affidavits on file "show that there is no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law." 10 CFR 2.749(d). The grant of summary disposition therefore was proper. See generally *Virginia Electric and Power Co.* (North Anna Nuclear Power Station, Units 1 and 2, ALAB-584, 11 NRC 451, 453 (1980)).

A. NEPA

1. Solar Power and Energy Conservation

On several occasions we have delineated the scope of the Commission's NEPA responsibilities in the context of a proposed license amendment for an already operating nuclear power plant. We have also spoken to the question whether the Commission is obliged to consider the asserted economic advantages of a proposed alternative. Those earlier analyses lead us to reject as a matter of law intervenor's argument that the Commission was obliged to consider the alternative and economic advantages of FPL's foregoing the steam generator repairs and operating Turkey Point on a derated basis, while adopting an aggressive conservation program with the savings effected from the foregone repairs. Our analysis of the governing standard was set forth succinctly in *Northern States Power Co.* (Prairie Island Nuclear Generating Plant, Units 1 and 2), ALAB-455, 7 NRC 41, 46 fn. 4 (1978), *remanded on other grounds sub. nom. Minnesota v. Nuclear Regulatory Commission*, 602 F.2d 412 (D.C. Cir. 1979), where we rejected the claim that the Commission was obliged to consider the environmental impacts of plant operation when passing on a license amendment to expand the capacity of a spent fuel pool necessary for continued power plant operation:

Because the practical effect of not now increasing the capacity of the Prairie Island spent fuel pool would be that that facility would have to cease operation, the MPCA appears to believe that what is being licensed is in reality plant operation. Therefore, according to MPCA, the license amendment could not issue without a prior exploration of the environmental impact of continued operation and the consideration of the alternatives to that operation (e.g., energy conservation). We do not agree. The issuance of operating licenses for the two Prairie Island units was preceded by a full environmental review, including the consideration of alternatives. See LBP-74-17, 7 AEC 487 (1974), *affirmed on all environmental questions*, ALAB-244, 8 AEC 857 (1974). Nothing in NEPA or in those judicial decisions to which our attention has been directed dictates that the same ground be wholly replowed in connection

with a proposed amendment to those 40-year operating licenses. Rather, it seems manifest to us that *all that need be* undertaken is a consideration of whether the *amendment itself would bring about significant environmental consequences beyond those previously assessed and, if so, whether those consequences (to the extent unavoidable) would be sufficient on balance to require a denial of the amendment application.* This is true irrespective of whether, by happenstance, the particular amendment is necessary in order to enable continued reactor operation (although such a factor might be considered in balancing the environmental impact flowing from the amendment against the benefits to be derived from it).²³ (emphasis added)

Our analysis in *Prairie Island* was essentially an application of the rule of reason to which NEPA is subject. *Natural Resources Defense Council, Inc. v. Morton*, 458 F.2d 827, 832, 837 (D.C. Cir. 1972). The purpose of our NEPA inquiry is to determine whether the proposed action brings about changes in the environmental *status quo*, and to measure the justification for the proposed action against those changes. Our *Prairie Island* decision was based first on the undisputed fact that there were no changes in the environmental *status quo* of any significance from increasing the facility's spent fuel pool capacity, and second on the ground that the justification for the license amendment — to allow the power plant to continue operation at full power — could be taken as concluded from the prior licensing proceedings.

In the present case there is no dispute among the parties that the Commission's NEPA inquiry should be directed to the impacts attributable to the steam generator repair itself, rather than to the impacts of continued plant operation. The argument pressed by intervenor goes rather to the second leg of our *Prairie Island* decision — whether the justification for the license amendment — to allow the power plant to continue operation at full power — can be taken as concluded from the prior licensing proceedings. Mr. Oncavage argues that it can not for two reasons: first, the energy conservation and solar alternatives were not explicitly at issue in the earlier proceedings so to examine it now would not be wholly reploting old ground; second, energy conservation has now evolved to the point where it should be considered a legitimate alternative to power plant operation, a proposition Mr. Oncavage asserts received the Supreme

²³ We have since adhered to this analysis several times. See most recently *Consumers Power Co.* (Big Rock Point Nuclear Plant), ALAB-636, 13 NRC 312, 326, 328-29 (1981); see also ALAB-584, *supra*, 11 NRC at 454-58; *Portland General Electric Co.* (Trojan Nuclear Plant), ALAB-531, 9 NRC 263, 266-68 and fn. 6 (1979).

Court's imprimatur in *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.* 435 U.S. 519 (1978).

The question whether some issue should be taken as precluded from one proceeding to another is not subject to easy or mechanical resolution. Again, we must take NEPA's rule of reason as our guide. The most straightforward case is one where the proposed action has no environmental consequences to speak of and the particular issue sought to be litigated has explicitly been litigated in an earlier proceeding. It is here that the Supreme Court's reminder in *Interstate Commerce Commission v. Jersey City*, 322 U.S. 503, 514 (1944), has the most force:

Administrative consideration of evidence . . . always creates a gap between the time the record is closed and the time the administrative decision is promulgated If upon the coming down of the order litigants might demand rehearings as a matter of law because some new circumstance has arisen, some new trend has been observed, or some new fact discovered, there would be little hope that the administrative process could ever be consummated in an order that would not be subject to reopening.

Prairie Island was a step removed from that hypothetical case. While the spent fuel pool expansion entailed no significant environmental consequences and the environmental impacts of power plant operation and need for power had received full exploration in the prior licensing proceedings, there had been no prior examination of the energy conservation alternative which intervenors sought to raise. We nevertheless concluded that NEPA did not require us to examine that alternative in connection with the requested license amendment. Energy conservation was viewed simply as another aspect of the more general need for power question, which the earlier proceedings had settled. *Consumers Power Co.* (Midland Plant, Units 1 and 2) ALAB-458, 7 NRC 155, 165 (1978).

The present case arguably takes us a step beyond *Prairie Island*. Unlike *Prairie Island*, where an environmental appraisal sufficed to fulfill the Commission's NEPA responsibilities, here at the Commission's insistence an environmental impact statement was prepared.²⁴ Where an environmental impact statement is in fact required by NEPA it seems plain to us the Commission is obliged to take a harder look at alternatives than if the proposed action were inconsequential. As we said in passing upon a challenge to a license amendment to expand the Trojan facility's spent fuel pool capacity,

²⁴ We noted earlier that the staff acted in response to a Commission directive in connection with the Surry steam generator repairs upon which the Turkey Point proposal had been modeled.

there is no obligation to search out possible alternatives to a course which itself will not either harm the environment or bring into serious question the manner in which this country's resources are being expended.

Portland General Electric Co. (Trojan Nuclear Plant), ALAB-531, 9 NRC 263, 266 (1979). And CEQ's regulations instruct us that where an action is not of such a consequence as to trigger an environmental impact statement, a brief discussion of alternatives will suffice. 40 CFR 1508.9. Thus, as we see it, NEPA's rule of reason establishes a continuum where more is expected and required of the agency depending upon the environmental significance of the proposal before it.²⁵

The principles we have just outlined guide our decision here. While an environmental impact statement was prepared for the Turkey Point repairs, the NRC staff has said its preparation was a matter of agency discretion not of statutory compulsion. The FES in fact reached the conclusion that the proposed steam generator repair will not significantly affect the quality of the environment. FES, *supra* fn. 3, at 6-1. Nor has the Commission taken the general position that an EIS is statutorily mandated for steam generator repairs. In *Surry* the only perceived environmental consequence — the occupational exposure (2070 person-rem) that the repair program would entail — was considered by the Commission to be of borderline significance.²⁶

We need not decide whether an EIS in the present case was mandated by statute or not. In holding that the Commission's NEPA review in this case need not extend to a reconsideration of the need for power from Units 3 and 4, or to the energy conservation and solar energy alternatives to full power operation of those Units, we only decide that the environmental consequences of the steam generator repairs are sufficiently small that the justification for Turkey Point operation need not be reopened. As we

²⁵ CEQ's regulations provide useful guidance in this regard. Thus 40 CFR 1502.2 states in pertinent part:

(b) Impacts shall be discussed in proportion to their significance. There shall be only brief discussion of other than significant issues. As in a finding of no significant impact, there should be only enough discussion to show why more study is not warranted.

The scope of alternatives to be considered is related to the environmental consequences of the proposed action. See 40 CFR 1502.14.

²⁶ The Commission stated that it was "unable to determine from the data and arguments presented . . . whether the occupational radiation exposure involved here is significant," and concluded "that the preferable course of action in the circumstances of this case is to prepare an environmental impact statement on the repair." CLI-80-4, *supra*, 11 NRC at 406, 407.

explain, 1010-1013 *infra*, the only impact urged by intervenor,²⁷ that of the low level radioactive waste which the repairs will generate, is quite minor and was properly disposed of by the Licensing Board on the basis of the affidavits before it. Indeed the main thrust of Mr. Oncavage's argument in support of the energy conservation and solar alternatives was not so much environmental as it was economic. He claims it makes better economic sense to operate Units 3 and 4 on a derated basis and to expend the monies saved thereby on an aggressive conservation program than to effectuate the repairs. But the financial pros and cons of the repair program as against a conservation program are not the Commission's concern at least where, as here, there has been no showing that significant environmental consequences attach to the utility's proposal. Neither NEPA nor any other statute gives us the authority to reject an applicant's proposal solely because an alternative might prove less costly financially.²⁸

²⁷ At oral argument intervenor also urged on us the adverse impacts of worker exposure and onsite storage of the steam generator lower assemblies (SGLA). Neither of the impacts was properly preserved for our review. Intervenor did not oppose the staff's motion for summary disposition of contention 4A regarding onsite storage of SGLA's and did not raise at all the impacts of worker exposure. As we noted earlier, worker exposure from inspecting and plugging defective steam generator tubes has accounted over the years for exposures comparable to that from the proposed repair.

²⁸ The Commission's role in assessing the financial pros and cons of nuclear power plant operation was explored by us in *Midland*:

In the Atomic Energy Act, Congress did not make this agency responsible for assessing whether a proposed nuclear plant would be the most financially advantageous way for a utility to satisfy its customers' need for power. Such matters remained the province of the utility and its supervising State regulatory commission. Antitrust issues to one side, our involvement in financial matters was limited to determining whether, if we license the plant, the company will be able to build and then to operate it without compromising safety because of pressing financial needs.

The passage of the National Environmental Policy Act increased our concern with the economics of nuclear power plants, but only in a limited way. That Act requires us to consider whether there are *environmentally* preferable alternatives to the proposal before us. If there are, we must take the steps we can to see that they are implemented if that can be accomplished at a reasonable cost; *i.e.*, one not out of proportion to the environmental advantages to be gained. But if there are no preferable environmental alternatives, such cost-benefit balancing does not take place. Manifestly, nothing in NEPA calls upon us to sift through environmentally *inferior* alternatives to find a cheaper (but dirtier) way of handling the matter at hand. In the scheme of things, we leave such matters to the business judgment of the utility companies and to the wisdom of the State regulatory agencies responsible for scrutinizing the purely economic aspects of proposals to build new generating facilities.

ALAB-458, *supra*, 7 NRC at 162-163 (footnotes omitted; emphasis in original). We think the reasoning in *Midland* is applicable as well to a proposal which does not entail significant environmental consequences.

Finally, we reject intervenor's argument that *Vermont Yankee* obliges the Commission to examine energy conservation and solar power alternatives. The Supreme Court's decision in that case gives its stamp of approval to a rule of reason interpretation of NEPA. While it may well be reasonable for the Commission to examine solar and energy conservation in connection with need for power when passing upon an application to construct a nuclear power plant, we find no hint in the Court's decision that the issue must be addressed in regard to an already operating power plant when the action initiating the NEPA inquiry is of minor environmental consequence, and the principal claimed advantage of the conservation alternative is an economic one.

2. Programmatic Environmental Impact Statement

We do not think extended discussion is warranted of intervenor's argument that the proposed steam generator repair in this case should have been the subject of a programmatic environmental impact statement. Mr. Oncavage's proffered contention on the subject was the barest of bare bones.²⁹ In his brief to us, the claimed need for a programmatic environmental impact statement was said to arise from the fact that steam generator degradation has occurred at 15 other Westinghouse-designed units. Whatever may have been the viability of intervenor's contention standing alone, a matter of considerable doubt,³⁰ nothing was offered in response to the staff's motion for summary judgment to dispute the factual material presented in the FES on the localized nature of the steam generator repair impacts.³¹ As we have indicated earlier, the principal impact of the repairs is to the workers who will effect the repairs.³² Even if we were to consider the affidavits later presented by intervenor on the risk from severe storms scattering repair-generated low level radioactive waste,

²⁹It simply reads:

3. The EIS is not a programmatic EIS and a programmatic EIS is required as a result of the steam generator repairs that would be required nationally.

³⁰ The contention does not even allege that repair of the degraded steam generators would have cumulative impacts, nor does it identify any impact of the repairs, cumulative or otherwise. As we explain in text, p. 1009, *infra*, the fact that steam generator degradation is a problem common to many nuclear power plants does not trigger a programmatic environmental impact statement. Thus, taking everything in the contention as true and provable, it nevertheless provides a legally insufficient reason for requiring preparation of a programmatic impact statement. For this reason the contention necessarily failed at the threshold. See *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 548-49 (1980).

³¹ As we have seen intervenor's response was directed to the energy conservation issue. See pp. 998-999, *supra*.

³²The FES gave an estimate of 2100 person-rem per unit. FES, *supra* fn. 3, at 4-3.

they too did not controvert the fact that impacts would be only local. See pp. 1011-1013, *infra*.

While intervenor correctly points out that steam generator degradation is a problem common to many nuclear power plants, it is the impact of the resolution not the commonality of the problem that engages the need for a programmatic environmental impact statement. *Kleppe v. Sierra Club*, 427 U.S. 390, 410 (1976), instructs that a comprehensive impact statement should be prepared when several proposals for action "that will have cumulative or synergistic environmental impact upon a region are pending concurrently before an agency . . ." Even in that situation, so long as one action does not commit the agency to approval of other pending projects, "an agency could approve one pending project that is fully covered by an impact statement, then take into consideration the environmental effects of that existing project when preparing the comprehensive statement on the cumulative impact of the remaining proposals." *Id.* at 414 fn. 26. Thus it is not compelling that, at the time the Turkey Point repairs were proposed, the Commission also had pending before it proposals for steam generator repairs at power plants in Virginia and Michigan. See *Virginia Electric and Power Co.* (Surry Power Station, Units 1 and 2), DD-79-19, 10 NRC 625 (1979), *reversed in part*, CLI-80-4, 11 NRC 405 (1980). The impacts of the Turkey Point repair are local in nature, not cumulative, and the repair of one power plant does not commit the agency to follow that course of action somewhere else. Intervenor has not made a factual showing of any impact from the Turkey Point repair that would exercise a restrictive influence on the choice of alternatives at another project, nor has he pointed out a cumulative impact, let alone one that has been overlooked in the Turkey Point FES. See *Minnesota v. Nuclear Regulatory Commission*, 602 F.2d at 416 fn. 5. Summary disposition of the proffered contention was properly granted.

3. Compliance with CEQ Regulations

Intervenor argues that CEQ regulations are binding on the Commission, and that as alleged in amended contention 1 those on scoping the environmental impact statement and preparing a record for decision, 40 CFR 1501.7 and 40 CFR 1505, have been violated. See fn. 11, *supra*.³³ While the Licensing Board's decision and the parties' briefs touch on the question whether the CEQ regulations are binding on this Commission, we prefer to

³³ At oral argument intervenor also argued that CEQ regulations governing consideration of alternatives had been violated. See, e.g., 40 CFR 1502.14. Because the regulations do not expand the statutory rule of reason NEPA requirement, we are content to rest that part of our decision regarding solar and energy conservation on the statutory analysis given earlier.

leave that issue to another day, and rest our decision on the alternative grounds reached by the Licensing Board.³⁴

Intervenor's complaint that no record of decision was prepared in violation of 40 CFR 1505.2 is frivolous. The Licensing Board was plainly correct that its decision, subject to Appeal Board and Commission review, provided the agency record of decision on FPL's steam generator repair proposal. Its decision (and now ours) have considered the FES in full satisfaction of the letter and purpose of 40 CFR 1505.2 to link the EIS process with the agency's decision. See 43 *Fed. Reg.* 55985-86 (November 29, 1978).

We also find the scoping requirement of 40 CFR 1501.7 satisfied. Its purpose is to provide a means for early identification of what are and what are not the important issues deserving of study in an environmental impact statement. 43 *Fed. Reg.* 55982. Here, on June 29, 1979, prior to issuance of the draft environmental impact statement, the staff published an environmental impact appraisal which went well beyond the brief description of the proposed action and possible alternatives called for by the CEQ regulations. See 40 CFR 1501.7 and 40 CFR 1508.22. By that time Mr. Oncavage had filed his petition to intervene in the proceeding. Through pleadings and prehearing conferences Mr. Oncavage had an opportunity to explain and in fact explained to the staff what he considered the important issues deserving of study in an environmental impact statement.³⁵ That process satisfied the requirements of 40 CFR 1501.7. Amended contention 1 was properly dismissed.

B. Low Level Waste ("LLW")

We also conclude that the Licensing Board properly granted summary disposition of intervenor's claim that extended onsite storage of low level waste generated by the repairs was unacceptable.³⁶ The overriding legal issue is much the same as it is with the prolonged onsite storage of spent

³⁴ We would note, however, the fact that the Commission has not yet adopted its own set of regulations implementing the CEQ regulations does not strike us as pertinent to the question whether, or to what extent, the Commission owes them adherence. The Commission's proposed rule was published on March 3, 1980. 45 *Fed. Reg.* 13739 *et seq.*

³⁵ See, e.g., "List of Contentions Presented to the Atomic Safety and Licensing Board," Prehearing Conf. Tr. fol. p. 122 (May 2, 1979) which listed, among others, the conservation and solar energy alternatives to the steam generator repairs.

³⁶ We treat intervenor's claim as if it were before the Licensing Board for summary disposition. In the rather perplexing procedural posture below, the Licensing Board implicitly ruled that intervenor's claim was not within Contention 4B, the expanded contention dealing with the impact of hurricanes or tornados during the steam generator repair process. Whether this ruling was correct or not is beside the point because the Licensing Board invited evidentiary submissions on the issue and the material facts not in dispute showed that summary disposition would have been proper.

fuel. While the volume limitations imposed by the low level burial site at Barnwell, South Carolina and the tightness of space elsewhere³⁷ are not nearly as troublesome a problem as the absence of a high level waste disposal facility, the legal issue under the Atomic Energy Act in both instances is whether the Commission has reasonable assurance that the wastes can be safely handled and stored as they are generated, and safely disposed of when, from a public health and safety standpoint, that is likely to become necessary.³⁸ The NEPA environmental review for onsite storage should cover the time period over which it is foreseeable the wastes will remain on site. See generally *Minnesota v. Nuclear Regulatory Commission*, 602 F.2d 412 (D.C. Cir. 1979).

Here we find the undisputed facts before the Licensing Board sufficient to conclude that the low level wastes generated by the steam generator

³⁷ The FES notes that the offsite disposal of low level waste is a generally acknowledged problem. Only three commercial LLW burial sites are currently in operation. These three are the sites at Beatty, Nevada; Richland, Washington; and Barnwell, South Carolina. While a State of Washington initiative precluding the disposal of out-of-state LLW was held unconstitutional, *Washington State Bldg. & Constr. Trades Council v. Spellman*, 518 F. Supp. 928 (E. D. Wash. 1981), *appeal docketed*, No. 81-3453 (9th Cir. July 27, 1981), both Washington and South Carolina have urged the development of regional LLW disposal sites in other parts of the country to reduce the need for continuing long-range shipments of high volumes of wastes to the sites in their states. The state of South Carolina has implemented a license condition at the Barnwell site that reduces the allowable monthly volume to be accepted for disposal. The remaining burial capacity at the Barnwell disposal site at the end of 1979 was 35 million cubic feet. See FES, *supra* fn. 3, at 8-17 to 8-18, App. C-10 to C-12.

³⁸ The Commission made this standard explicit in the high level waste context when denying a rulemaking petition of the Natural Resources Defense Council which sought a halt to nuclear power plant licensing until the Commission makes a finding that nuclear wastes can be permanently disposed of safely. It was the Commission's view that power plant high level wastes can be stored in a manner consistent with the public health and safety until a permanent waste disposal facility is in operation; and that in passing the Atomic Energy Act Congress did not intend that nuclear power plant licensing be postponed until a waste disposal facility was in operation, or until the safety of waste disposal was found to be assured. The Commission stated:

There is, we believe, a clear distinction between permanent disposal of wastes and their interim storage. The Commission must be assured that wastes generated by licensed power reactors can be safely handled and stored as they are generated. As part of the licensing process for an individual power reactor facility, the Commission does review the facility in question in order to assure that the design provides for safe methods for interim storage of spent nuclear fuel. But it is neither necessary nor reasonable for the Commission to insist on proof that a means of permanent waste disposal is on hand at the time reactor operation begins, so long as the Commission can be reasonably confident that permanent disposal (as distinguished from continued surveillance) can be accomplished safely when it is likely to become necessary. 42 *Fed. Reg.* 34391 (July 5, 1977).

The Commission's decision was upheld on judicial review. *Natural Resources Defense Council v. Nuclear Regulatory Commission*, 582 F.2d 166 (2d Cir. 1978).

repairs would be safely stored and disposed of when necessary. We have already detailed the evidence on the issue which was before the Licensing Board. To summarize, the Gould affidavit showed that, during a two-year period encompassing the repair project, Turkey Point would generate 8,395 cubic feet of higher activity low level waste which would be accorded priority of shipment and be disposed of within a few months of being produced. The Turkey Point allocation from Barnwell in that two-year period, 19,498 cubic feet, would allow for all but 35,755 cubic feet of waste to be shipped during that time. (At that rate all of the repair-generated waste would be disposed of within 6 years from the time repairs were first undertaken.)³⁹ This remaining onsite waste would contain approximately 23.2 curies of radioactivity and be securely packaged. While there was some factual dispute, or at least understandable imprecision, whether a major hurricane would breach a large number of low-level waste containers,⁴⁰ the consequences of a large scale failure were not disputed. Intervenor did not controvert the affidavits filed by the licensee and the staff. The Grotenhuis affidavit submitted by staff was to the effect that the site boundary dose due to all the low-level solid waste from one unit repair being released in one accident including the higher activity low level waste was 1.5 mrem. If washed into the Turkey Point cooling canals, the concentration would be within 10 CFR Part 20, Appendix B standards for effluents from normal reactor operations. Thus the Licensing Board was not obliged to try to particularize through an evidentiary hearing a more precise forecast of the number of containers that might be breached by a severe storm, or to establish the effects of long term weathering, or to settle upon a definite time when the repair generated waste in its totality would be shipped offsite. The evidence was sufficient to find that, even absent additional allocations of space at Barnwell or permits to ship to other low level waste disposal sites, the Turkey Point steam generator

³⁹ The Gould affidavit also related FPL's expectation of receiving an additional allocation of between 700-1,000 cubic feet per month from the "first come, first serve" pool at Barnwell, and the fact that FPL was seeking a permit for shipping LLW to an alternate waste disposal facility. At oral argument FPL counsel represented that the company had received a permit to ship LLW to Richland, Washington, and that LLW from the steam generator repairs is being shipped offsite on a current basis. See also fn. 41 *infra* and Licensee's Brief in Opposition to Intervenor's Final Exceptions (filed September 10, 1981) at 14 fn. 14.

⁴⁰ The King and Pardue affidavits filed by intervenor stated that the integrity of loosely stacked drums of low-level radioactive waste cannot be assured during the passage of a major hurricane and that the scattering of such drums can be expected. The Gould affidavit submitted by FPL explained that the drums and packages would not be loosely stacked, and that it was extremely unlikely that a large number of packages would be breached by a hurricane.

wastes would be disposed of within approximately 6 years of the repairs and would be safely stored onsite during that time.⁴¹

Intervenor's remaining arguments can be disposed of briefly. Mr. On-cavage argues that given the shortage of available offsite disposal acreage, FPL was obliged to seek new licensing authority for, in effect, converting Turkey Point into a low level disposal site. The argument is without any basis in fact as is plain from the preceding discussion. Moreover, even if there were no offsite disposal site available, that fact would not convert a site where wastes were stored into a disposal facility. The Seventh Circuit rejected just such an argument in the context of the storage of spent fuel. *Illinois v. Nuclear Regulatory Commission*, 591 F.2d 12 (7th Cir. 1979). Once again, the proper inquiry is to ask whether the wastes can be safely stored for their foreseeable stay on site, and then disposed of safely elsewhere. We are satisfied that standard has been met here.

We also reject the argument that NEPA has been violated because the Turkey Point FES did not treat the impact of severe storms on low level waste. While the FES may not have provided a sufficient response to

⁴¹ On June 27 intervenor submitted a second affidavit of Douglas King, this in support of a motion to stay the Licensing Board's final order. The King affidavit noted disparities between FPL's estimate of the amount of radioactivity a steam generator lower assembly would contain at the time of removal, 250 curies, and the Pacific Northwest Laboratory estimate of 400-1,000 curies per SGLA. Compare FES, *supra* fn. 3, at 4-12 with "Radiological Assessment of Steam Generator Removal and Replacement: Update and Revision" (PNL-3454), NUREG/CR-1595, (December 1980), p. 5. While no estimate was given of the amount of radioactivity that FPL would attempt to remove from the channel head and divider plate areas of each steam generator, it presumably was higher than FPL would estimate. The King affidavit also estimated that processing the primary coolant would result in an additional 270 curies of solid waste for storage. From this, Mr. King argued that the activity level of the stored low level wastes would be much higher than FPL had projected, and the consequences of a hurricane or tornado correspondingly more severe.

The licensee opposed the stay motion. The accompanying Gould affidavit disputed the King affidavit. Mr. Gould estimated only 40 curies of low level solid waste would be generated from processing the primary coolant of each unit and at most 45 curies of solid radioactive waste would be removed from decontaminating each of the six SGLA's. This waste would all be handled as indicated in the earlier Gould affidavit, which is to say that pending shipment the higher concentration low level waste would be kept inside the Turkey Point radwaste or auxiliary building, which are designed to withstand hurricanes, while the low concentration low level waste would be packaged in either LSA boxes or steel drums. The Gould affidavit also noted that FPL had received a permit to ship low level waste to Richland, Washington, and planned to minimize the amount of low-level waste temporarily retained at the Turkey Point site by utilizing both the Barnwell and Richland disposal facilities.

While the second King affidavit does create a factual issue as to the activity level of the low level waste that would be generated by the steam generator repairs it comes far too late to be judged by the standards applicable to a motion for summary disposition. We agree with the Licensing Board there "was abundant evidence in the record that under either normal or hurricane conditions, the onsite storage . . . would not pose a significant risk to public health and safety." Memorandum and Order of August 12, 1981 at 3.

intervenor's comments,⁴² the subsequent Gould and Grotenhuis affidavits did, and thus cured the defects in the FES. The Commission's regulations explicitly provide that a Licensing Board decision based on the evidentiary record before it shall be deemed to modify the staff prepared FES, 10 CFR 51.52(b)(3), and its practice in this regard has been specifically upheld by two courts of appeals. *New England Coalition on Nuclear Pollution v. Nuclear Regulatory Commission*, 582 F.2d 87, 93-94 (1st Cir. 1978); *Citizens for Safe Power Inc. v. Nuclear Regulatory Commission*, 524 F.2d 1291, 1294 and fn. 5 (D.C. Cir. 1975). We have noted that general practice with approval, cautioning however that there may be instances where the absence of discussion in an FES is so fundamental an omission as to call for recirculation of the FES. *Public Service Co. of Oklahoma* (Black Fox Station, Units 1 and 2), ALAB-573, 10 NRC 775, 785-87 (1979).

We do not think the failure of the FES in this case to discuss the impact of severe storms on low level waste rises to that level of major significance. The FES discussed the impact of the steam generator repairs and alternatives to it in some detail. See p. 996 *supra*. The impact of low level waste storage itself received a fair amount of attention. See FES, *supra* fn. 3, at 4-11 to 4-12, 8-17 to 8-18, App. C-10 to C-12. Indeed, the precise issue now raised by intervenor was not an explicit contention before the Board, and when the subject was more fully explored in response to the Licensing Board's call for further information from the parties intervenor did not avail himself of the opportunity to present additional information. In fact, the Grotenhuis and Gould affidavits submitted by the staff and licensee showed the consequences of a hurricane to be small. In sum, the FES did not disregard important alternatives or broad areas of environmental impact, nor fail to apprise the public of the nature of the project or its expected consequences. In these circumstances we hold that the omission of discussion from the FES of the impact of severe storms on low level waste was a minor failing which did not call for recirculation of the FES. It was cured by the evidentiary submissions to the Licensing Board and by the Board's decision.

Finally, we reject intervenor's argument that the Licensing Board erred in not affording discovery on the issue. Intervenor was aware of the issue at least since the time he submitted comments on the Turkey Point DES in February, 1981. At about the same time, the parties negotiated, and the Licensing Board accepted, an agreed upon schedule to govern the pre-trial course of the proceedings. That schedule called among other things for

⁴² Compare Oncavage Comments, *supra* fn. 8, at 15-16 with FES, *supra* fn. 3, at 8-17 to 8-18.

final discovery requests to be completed by April 15, 1981. We have remarked that:

[W]e enter the scheduling thicket cautiously. We are inclined to do so only to entertain a claim that a board abused its discretion by setting a hearing schedule that deprives a party of its right to procedural due process.

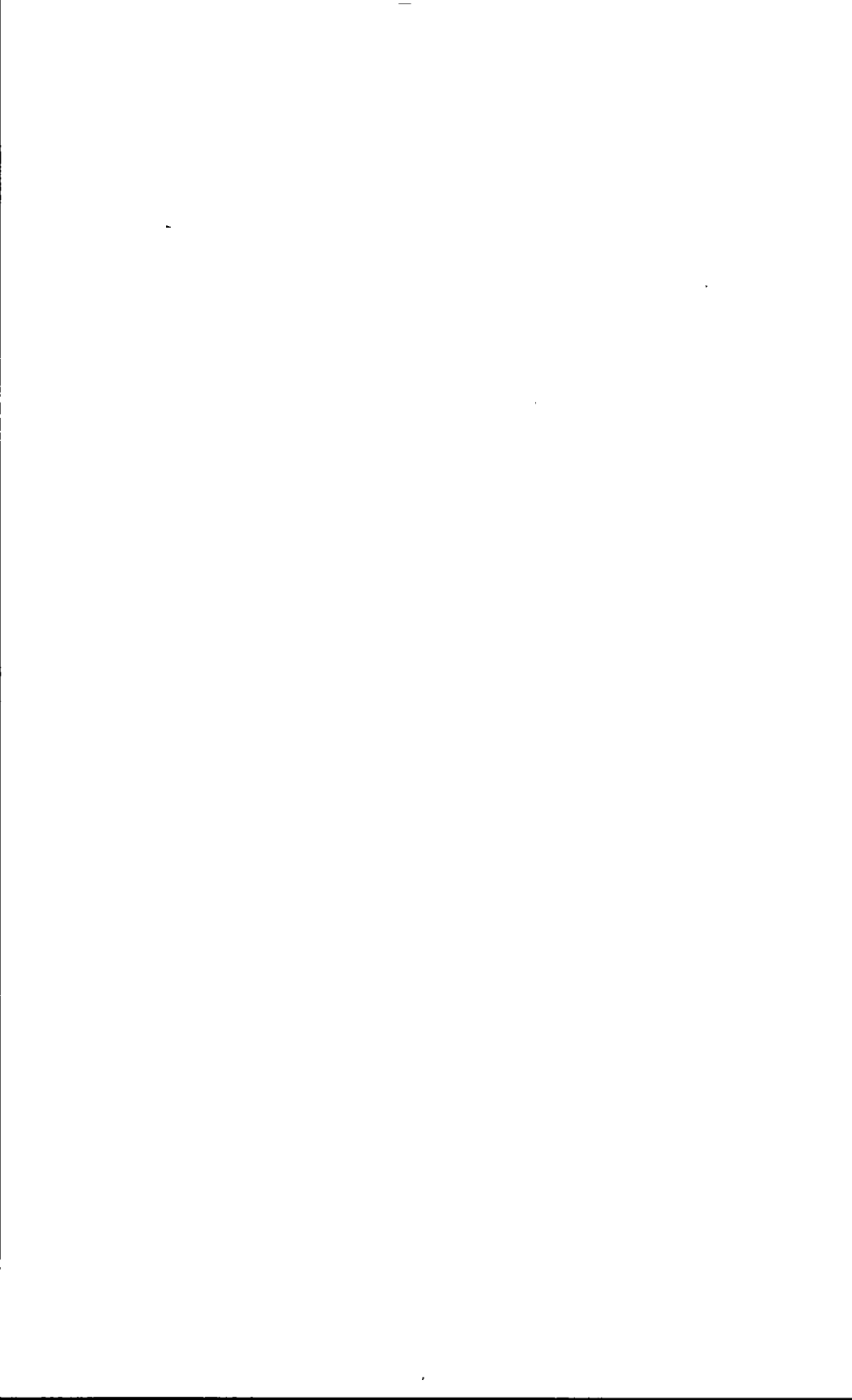
Public Service Co. of Indiana, (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 188 (1978) (footnote omitted). Whether or not we would take quite the same limited view of our reviewing powers over pre-trial discovery rulings as of the conduct of the hearing itself, we think it apparent that the Licensing Board did not abuse its discretion when its final order rejected intervenor's motion to put aside the schedule intervenor had previously agreed upon in order to reopen discovery on an issue that intervenor had not diligently pursued.

Accordingly, the May 28 and June 19, 1981 orders of the Licensing Board are *affirmed*.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the Appeal Board



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Peter B. Bloch, Chairman
Jerry R. Kline
Hugh C. Paxton

In the Matter of

Docket Nos. 50-266-OLA
50-301-OLA

WISCONSIN ELECTRIC POWER
COMPANY

(Point Beach Nuclear Plant,
Units 1 and 2)

November 5, 1981

The Board conducted a special show-cause proceeding to determine whether it was appropriate to grant to Wisconsin Electric Company a license amendment which would permit it to conduct a demonstration program in which it would return its reactor to power with up to six degraded tubes repaired by "sleeving" rather than being removed from service by plugging. The limited license amendment was granted because the Board found that Intervenor, Wisconsin's Environmental Decade, had failed to show the existence of an important genuine issue concerning the environmental or safety consequences of the proposed demonstration program.

RULES OF PRACTICE: SUMMARY DISPOSITION

When summary disposition is requested before discovery is complete, it may be considered by the Board but the standard used to evaluate the motion must be changed so that summary disposition will be denied either upon a showing of the existence of a genuine issue of fact or upon a showing that there is good reason for the Board to defer judgment until after specific discovery requests are made and answered.

RULES OF PRACTICE: SPECIAL EXPEDITED PROCEEDINGS

In a case in which an expedited decision is requested in order to suit Applicant's operational needs, special procedural advantages should be granted to the Intervenor in order to make it possible for it to act more rapidly. In this proceeding, Intervenor was granted discovery rights even before it was admitted as a party and its contentions were interpreted broadly so that it could raise any important safety or environmental issue without need to file for the admission of a late contention. In addition, the Board asked several technical questions in order to assist Intervenor in obtaining possibly useful information and to help the Board to satisfy itself that expedition would not cause an improper result.

RULES OF PRACTICE: CONFIDENTIALITY

Once an appropriate protective order is issued so that Intervenor can obtain useful information, the Board can defer ruling on further objections concerning the public's right to know until after it has considered the merits of the case. If Intervenor chooses not to participate in *in camera* sessions held to protect arguably proprietary information, it may create problems for itself but these problems cannot affect the Board's ruling on the merits of the case.

RULES OF PRACTICE: ADMISSIBILITY OF CONTENTIONS

General fears or criticisms of past practices of the nuclear industry or Applicant are not appropriate bases for contentions unless there is reason to suspect the specific procedures or safety-related tests used in a proposed demonstration program which requires a license amendment.

MEMORANDUM AND ORDER
(Authorizing Issuance Of A License Amendment
Permitting Return To Power
With Up To Six Degraded Tubes
Sleeved Rather Than Plugged)

[This memorandum and order was originally issued from the bench at the conclusion of a hearing held in Milwaukee, Wisconsin on October 29 and 30, 1981. The principal modifications of the oral order are editorial, including the addition

of explanatory text, citations to the record and to legal authority. When appropriate, additional reasons for the opinion also have been inserted.]

On September 28, 1981, Wisconsin Electric Power Company (WE) requested authorization for interim operation of Unit 1 with degraded steam generator tubes sleeved rather than plugged. Sleeving is a method of attempting to repair steam generator tubes which are suffering from corrosion. In this method, a new tube with a smaller diameter than the corroded tube is inserted inside the corroded tube, spanning the area in which corrosion occurred. Then the new interior tube, called a "sleeve", is bonded at its top and bottom to the exterior tube.

The reason WE needs a license amendment for sleeving is that it has been required to plug (and remove from service) tubes which are "degraded" because they have lost 40 percent of their design wall thickness due to corrosion. A license amendment is needed to permit operation of the reactor with sleeves rather than plugs in degraded tubes. WE now seeks permission to operate with up to six degraded tubes sleeved rather than plugged. WE asserts that this limited demonstration program will help it to evaluate a full sleeving program involving up to 2,500 tubes in the two Point Beach nuclear steam generating units which would be conducted at a later time. Further hearings could be required prior to authorization of the full scale program.

We have decided, after consideration of the entire record in this case, to authorize issuance of a license amendment to permit operation after the sleeving of six tubes which may be so degraded that they would have had to have been plugged if the amendment were not issued. (We note that licensee also plans to sleeve up to six additional tubes which have not been corroded to the plugging limit of 40% degradation. No license amendment is required for this activity since the original tubes have not been corroded beyond the plugging limit specified in the license.)

I. BACKGROUND

On July 2, 1981, WE filed a technical specification change request to permit it to sleeve tubes. Then, on July 20, 1981, Wisconsin's Environmental Decade (Decade) requested a hearing on the WE request. This request for a hearing preceded the issuance of a Notice of Hearing, which was published in the Federal Register on August 7, 1981. An Atomic Safety and Licensing Board was not appointed until August 25, 1981.

In the two months since its appointment, the Board has attempted to expedite this proceeding, consistent with the need to be fair to the parties. The Board's approach was first made known to the parties during an

on-the-record telephone conference held on September 16, 1981. The approach also was explained in our formal order of October 1.

When the Board learned that WE wished a ruling that would permit it to conduct a demonstration program on sleeving during its Fall outage, the Board sought expedition. It took steps to grant Decade extraordinary procedural rights to offset the time pressure and help it to be informed so that the Board could act in a responsible and fair manner within WE's expressed time requirements. During the September 16 telephone conference, even before Decade was admitted as a party, we ordered the parties to discuss "everything that is available and relevant." We also invited Decade to further particularize its contentions, with the understanding that we would act in a fair manner on the filing. Furthermore, we announced on page 5 of our memorandum and order of October 1 that:

In this case, we expect to be particularly sensitive to petitioner's procedural rights because we agree with Decade that the need for expedition has been created by WE, which delayed filing its amendment only because of its incorrect assumption that a hearing would not be necessary.

Because of the short time period involved, the Board asked extensive technical questions of WE, even though Decade had not yet availed itself of the invitation to seek discovery. Our first set of questions was issued in the October 1 Order, only two days after we had received the Westinghouse Sleeving Report which was furnished by WE to provide a technical basis for its sleeving request. Our second set of questions was asked on October 13, 1981.

On October 13, 1981, we formally admitted Decade as a party and granted it wide latitude for discovery. We interpreted its contentions to permit it to pursue any safety and environmental concerns it might develop concerning sleeving. We considered this wide scope for discovery necessary because it was not feasible to await and individually decide filings for the admission of late contentions.

We have found WE cooperative with Board requests. It answered our first set of questions in only eight days, on October 9. It responded to our second set of questions on October 16, after only three days. It responded to Decade's interrogatories, which were finally issued on October 24, in only three days.

By contrast, Decade chose not to avail itself of the procedural advantages given to it. This choice flowed in part from its allegation that the Westinghouse Sleeving Report contains information that should not be accorded proprietary treatment. This concern delayed its analysis of the Westinghouse sleeving report, even after the Board had expressed its view,

during an October 9, 1981, telephone conference, that procedures should be devised for Decade to use the disputed document in the preparation of its case. Tr. 87, 90. (We called confidentiality a "separate issue from whether or not we can arrange for you to immediately examine [these documents] . . . for the purposes of this case.") Indeed, in the course of that conference, the Board ordered that Decade notify the Board if it did not accept the terms of the protective agreement offered to it by WE. Tr. 92. Since it did not notify the Board, we were surprised to hear from Decade in an October 19 filing that an "impasse" had been created because WE would not agree to a condition it sought to attach to its signing of the protective agreement in the case.

Because of the interrelationship between Decade's disclosure concerns and the degree of fairness it was accorded in this case, this matter will be discussed further, below.

II. NATURE OF THE "SHOW CAUSE" PROCEDURE

A. What is a "show cause" procedure?

The Board styled the October 29-30 hearing as a "show cause" proceeding. The basic notion for this proceeding, which was agreed to by all the parties (see Tr. 79, where the Board expresses appreciation for this agreement), was that Decade would need to show some reason why a demonstration program should not go forward. Although the standards we have discussed were quite lenient, we stressed that Decade would need to show something "important". See Order of October 1 at 9.

The show cause proceeding also considered WE's October 8 motion for summary disposition with respect to the demonstration program. Summary disposition was requested with respect to contentions 3-6, which Decade had submitted. We explained at several times in the hearing that the standards for our show cause order were appropriate for determination of the motion for summary disposition. Motions for summary disposition generally are filed after discovery is completed. In the interest of fairness, the Board concluded that when summary disposition is requested prior to completion of discovery, it is only necessary for the opposing party to demonstrate that there is reason to inquire further. That is, it can either demonstrate the existence of a genuine issue of fact or can show that there is a good reason for the Board to defer judgment until after specific discovery requests are made and answered.

One other motion was determined by the show cause proceeding—WE's September 28 motion for interim operation of Unit 1 with steam generator tubes sleeved rather than plugged. Since WE never showed why any other standards were appropriate for determining the merits of its motion, we applied our show cause standards.

B. Standards for "showing cause"

We have discussed the standards to be applied to an order to show cause at several times in this proceeding. The most complete exposition, which summarized other explanations in the record, occurred at a telephone conference held on October 26, 1981. At that conference, we attempted to explain and make completely explicit the standards we would apply. See Tr. 219-224.

The shortest available summary of our standard is found at Tr. 221. There we said we were requiring a demonstration of "an important genuine issue."

We also have repeatedly compared our show cause standard to the threshold applicable to the admission of contentions in Commission proceedings. In that context, we have cited the standard applied to the admission of contentions in *Cleveland Electric Illuminating Company, et al. (Perry Nuclear Power Plant, Units 1 & 2)*, LBP 81-24, 14 NRC 175, 181-184, 189-192, 197 (1981). The *Perry* case stands for the proposition that the basis for contentions should be judged in light of the entire procedural context. In that case, the context included the filing of responses to contentions; and the Board held that there must be reason or authority supporting the proposition that the responses did not completely dispose of the contentions.

We recognize that the application of *Perry* standards to the admission of contentions may be somewhat controversial, as that decision was precedential. However, we are convinced that the application of the same standards to our show cause proceeding should be without substantial controversy.

By applying the *Perry* standards to this case, we initially admitted contentions on a liberal basis. (See LBP-81-45, 14 NRC 853, 855 (1981). Indeed, the contentions were admitted largely because of the fragmentary nature of WE's filings prior to Decade's filing of the basis for its contentions. (*Id.* at 855-57) This made it necessary for us to conclude that Decade had shown a basis for doubting the safety of the sleeving procedures. However, in the same decision, *id.* at 857, we made it clear that if we had considered later filings of WE to be relevant to the admission of contentions, we might well have reached a contrary conclusion.

We consider *Perry* standards appropriate for the admission of contentions. Even were they considered too rigorous for general application, they certainly are appropriate here. Consider that if we were to hold an evidentiary hearing on any of the contentions, the result of holding the hearing likely would be that the demonstration program involved in the application would be delayed. Consider also the wealth of opportunities Decade has had to establish a basis for its contentions. It has had the

Westinghouse Sleeving Report (and the sleeving report for San Onofre), and the opportunities to ask interrogatories, to receive and analyze answers to questions raised by the Board, to question witnesses at the show cause hearing, and to obtain consideration for some arguments it has made in an untimely fashion.

We have carefully considered possible prejudice that might exist to Decade as a result of this ruling.

The show cause hearing began by considering a motion for continuance filed by Decade. In ruling on this motion, after extensive argument by the parties, we found that the motion should be denied. Tr. 399-402. (Note that line 4 on p. 339 should say "illuminate", not "eliminate".) The argument had been in two parts: (1) the importance of the demonstration program, and (2) specific prejudice alleged by Decade.

We found that most of WE's objectives for its demonstration program could be accomplished without amending its license, because it could gain experience with the sleeving process and then plug the sleeved tubes. On the other hand, we noted that WE had both commercial and safety reasons for wishing not to plug the tubes. In particular, WE had stated (without contradiction) that the only kind of plugging which could be utilized on the sleeved tubes would be welded plugs, making it necessary to remove the tubes from service permanently and causing a continuing reduction of coolant flow. In addition, returning to service with sleeved tubes would implement WE's "lead tube" concept, giving it operating experience with the leak performance of a small number of tubes and permitting it to destructively evaluate a tube prior to commencing any full scale sleeving program.

As a result of our conclusions on the marginal safety significance of returning to power with tubes sleeved, we stated that the burden for demonstrating that the program should not go forward was less than if the safety benefits were more important. However, we found that the burden still existed.

We then discussed the possibility of specific prejudice calling for a continuance. We concluded, however, that the standard we would apply in the show cause proceeding was sufficiently lenient that no prejudice could be shown. In particular, we pointed out that application of the threshold requirement for the admission of contentions would leave Decade with many procedural advantages not generally available at that stage of the proceeding, including the availability of the Staff's Safety Evaluation Report and Environmental Impact Assessment.

III. REDUNDANT NATURE OF PROCEEDINGS ON LICENSE AMENDMENT REQUESTS

The role of an Atomic Safety Licensing Board is limited and is accompanied by other procedures within the Nuclear Regulatory Commission. The most important procedure is the review by the regulatory Staff, comprised of experts who are officials of the United States Government and whose responsibility is to assure themselves of the safety of the proposed amendment. They have done that in this case.

We have to decide whether there are contentions which have been presented to us which provide a reason for believing that there is a health, safety, or environmental problem with issuing the license amendment. We also are obligated to decide whether in the course of the proceeding we have learned of an issue of such important safety or environmental consequences that we should exercise our authority to consider such issues, even when they have not been raised by the parties.

IV. CONCLUSIONS AND GENERAL OBSERVATIONS CONCERNING THE PROCEEDING

We have carefully examined each of the contentions which has been raised and, for reasons that we will discuss below, have concluded that those contentions lack sufficient basis for conducting an evidentiary hearing.

In addition, we have pursued inquiries of our own somewhat more intensely than boards usually do in proceedings. We have done that because of the need to act promptly if we were to decide whether or not Applicant can begin its planned demonstration program. Our questions were designed to facilitate a decision which paid as much attention to the merits as is possible under the circumstances.

We have had a few problems in the course of this proceeding which bear discussion at the outset. Intervenor has taken a strong, principled stand concerning the right of the public to know about information which may be relevant to the decision of the Board, but which is claimed by Westinghouse to be proprietary. The Board has tried to divorce that confidentiality issue from the consideration of health and safety issues, believing that confidentiality is important but can be resolved separately and expeditiously, even prior to the time that WE plans to return to power with sleeved tubes. In our opinion, the public interest in open government can be resolved through the timely consideration of Decade's arguments about public release of information. However, challenges to the confidentiality of documents need not be resolved prior to the determination of safety and environmental issues.

Nevertheless, Decade's concern about confidentiality has on several occasions caused it to blindfold itself to some facts in this case by refusing to attend *in camera* sessions of the October 29-30 hearing. It also delayed Decade in its analysis of the Westinghouse Slewing Report. To the extent that these problems have existed, they are problems of Decade's own creation. They have made it extremely difficult to accept the legitimacy of Decade's quarrels with the speed with which this proceeding was conducted.

On September 16, even before Decade was admitted as a party, we gave it rights to ask questions of the other parties. That was an extraordinary step by this Board. Decade never used that right until Saturday, October 23.

Although Decade's familiarity with this case began in July and the Board was appointed in late August, the Board framed two full sets of questions before Decade framed any. Furthermore, our questions suggested areas in which Decade could have inquired in order to establish a basis for its safety and environmental concerns.

To this point Decade has been unsuccessful in obtaining even a single relevant expert to review the technical information contained in this record. It was unable to identify any expert that might appear if we were to hold an evidentiary hearing in this case immediately following the show cause hearing. In addition, Decade did not cite any source materials in support of its slewing contentions except sources supporting the proposition that defects in a steam generator, unrelated to slewing, could cause serious safety problems.

We could conclude that if Decade had far more time it would have been able to find a basis for its contentions, but that would be strict conjecture on our part. It is entirely consistent with our record that regardless of the time available, Decade could not have supported its allegations because there are no substantial reasons for doubting the safety of this demonstration program.

Before we begin the discussion of the individual contentions, we would point out that for the most part Decade has tried to rely on intuitive arguments. It has found situations in which some further testing is going to be done, in order to further improve the safety of the procedures that are being undertaken. It also has found questions that were asked by Staff, particularly in the San Onofre slewing procedure, and has said that if there was a question or that if there is a test undone then, of course, the demonstration program proposed by WE must be unsafe.

Decade also has complained that there have been errors in the past within the nuclear industry in anticipating specifically what corrosion mechanisms would take place within a nuclear reactor. It also identified some minor errors made in the operation of the Point Beach reactors.

We understand that Decade's safety concerns are deeply felt and that its suspicions of nuclear energy are strong. However, we do not consider general fears or criticisms as being the basis for holding an evidentiary hearing in this proceeding. It is first necessary to show that there is reason to suspect the specific procedures or safety-related tests being employed in this case.

Often, successful participation as an intervenor in Nuclear Regulatory Commission proceedings requires mastery of a complex technical record. In this case, involving a sleeving amendment, the record is less dense and difficult than in larger cases, but it still contains complex information related to chemistry, metallurgy, engineering, and the application of the experimental method in laboratory tests that have been performed. Decade has failed to show enough of an understanding of these materials to raise important issues for us to consider.

V. CONSIDERATION OF INDIVIDUAL CONTENTIONS

Despite our admission of a single, broad contention for consideration in this proceeding, Decade chose to concentrate its efforts on the contentions it had proposed and we had accepted. These were contentions 3, 4, 5, and 7, and each is discussed below. In addition, Decade sought to raise an issue concerning reactor vessel embrittlement. We excluded this issue because Decade failed to establish a basis for relating the request for a tube sleeving amendment to the issue of embrittlement. Tr. 598. We also excluded, because it was filed late without appropriate good cause, a contention concerning the sleeving of tubes previously plugged with explosive plugs. Tr. 598-599. However, we pursued this issue ourselves and invited Decade to ask questions of Staff and of a WE witness. Tr. 645-681.

A. Contention #3: Circumferential Rupture

Contention Number 3 is that during sleeving the braze or weld between the upper rim of the sleeve and the inner surface of the original tube will weaken the integrity of the tube even in laboratory conditions and in the field may fatally compromise its integrity. This, Decade alleges, may lead to a circumferential rupture of the tube under various operating and/or accident conditions.

We will attempt to summarize Decade's arguments. Initially, it relied on a portion of a statement by David K. Porter, Manager of the Nuclear Engineering Section of the Nuclear Power Department of Wisconsin Electric Power Company. Mr. Porter had stated that brazing or welding caused a 10 percent weakening of the tube material. He also stated that the strength of the material was not significantly affected and has since stated that the "sleeving will strengthen the tube and the joining process will not

increase the potential for circumferential rupture of the tube during operating and/or accident conditions." September 28 Affidavit at 4; Attachment 1 to WE's motion for authorization for interim operation.

Decade has stated that there is a new potential for a problem of tube rupture because the sleeve spans in an area above the tubesheet and if the sleeved tube were to collapse there would be no constraining effect from the tubesheet. Tr. 408-409. At page 409 of the transcript Decade said:

there will be weakening of the original tube and the corrosive resistance of it. On the other hand, there is the reinforcing effect of a sleeve in addition to the joint which may in fact provide additional strength, but I don't think the status of the record at this point in time can make it said to be conclusive such that there is no genuine issue of fact, and the proof of the pudding of that assertion is the statement that tests are in progress and it follows that you would not have tests in progress to establish the validity of the joints if there was no genuine issue of fact to be determined.

This passage consists of an assertion that the sleeve will cause a weakening of the original tube and an assertion that if there are tests to be completed then of course there must be an issue concerning the safety of the sleeved tube.

Decade also has cited a report of the American Physical Society, copies of which were distributed just prior to the delivery of the oral opinion in this case. However, that report deals primarily with the effects of rupture of generator tubes. It does not, however, deal at all with sleeving.

Applicant's position is that extensive laboratory testing has corroborated the strength of the upper bond. Extensive testing has been completed both for San Onofre and Point Beach. Westinghouse Sleeving Report §6.1.1; Licensee's Response to Licensing Board Questions (October 9, 1981) at 3-5, 8, 9, 12, 13; Licensee's Response to Second Round of Licensing Board Questions (October 16, 1981) at 3, 5-6, 6-7, 7-8, 8-9; Licensee's Supplemental Response to Board Questions on Deplugged Tubes (October 29, 1981), *passim*. These tests are documented in the Westinghouse reports that were submitted to us for our record. In addition, there has been limited operating experience with sleeving at San Onofre. The laboratory tests and engineering studies indicate that the upper joint is above applicable code standards in strength, and that there is no reason to believe that there is a weakening of the upper joint to a point where it is below code standards. Staff Safety Evaluation Report §§2.2, 3.1, 6.0.

Applicant argues that while there are a couple of tests outstanding there is no reason to believe that they are necessary to assure the safety of the demonstration program.

During this proceeding we offered to have Decade question a witness for Staff and for Applicant concerning the importance of the uncompleted tests in this case. Since the tests were alleged to be proprietary, we ruled that discussion would need to be held in camera. Decade then refused our invitation on the grounds that it would not go into a closed session because of the importance of the public's right to know.

We consider that there is a lack of logic to Decade's testing argument. We have examined reports of the tests that have been conducted and feel assured, as Staff has felt assured, that the strength of this joint has withstood appropriate laboratory challenges. SER at §§2.2, 3.1, 3.3 and 6.0. We also arranged for confirmation of these conclusions by obtaining the agreement of the parties, during an on-the-record telephone conference held on November 5, that WE will submit completed data analyses on compliance with the 3 Sm limit for primary plus secondary stress, and that the Staff must find these analyses satisfactory, before a license will issue. Cf. SER §2.2.

We are pleased that additional tests will continue even after licensing is approved. It is always desirable to obtain additional information. In matters affecting nuclear power reactors, it is important that the operator of a power reactor continue inquiring, learning and obtaining additional information. Consequently, we must reject Decade's argument concerning additional testing. Acceptance of its argument would create an incentive for companies to conduct only those tests necessary for licensing and to eschew further tests designed to improve safety margins still further.

In short, we have no reason to believe, either based on logic or on authority, that the joint in question is unsafe or has been weakened until it is below code strength. Although there appears to be some small reduction in the strength of the tube as the result of the joining process, the combined structure appears to be stronger than the tube alone and the structure together exceeds code standards.

B. Contention #4: Corrosive Environment in the Annulus

Contention 4 is that the annulus between the original tube and the sleeve may give rise to an unexpectedly corrosive environment if the tube should have or develop a through wall crack and secondary water impurities seep into the narrow space.

The contention relied initially on the fact that the staff asked questions of the San Onofre licensees concerning what would happen between the sleeve and the tube. At transcript page 494 Decade makes it clear that it

considers that it is intuitively obvious that the narrow space between the sleeve and tube gives rise to a potentially greater rate of corrosion than an open space.

There are laboratory tests contained in the reports submitted in this case that demonstrate that the risk of corrosion in the annulus is not greater than the risk of corrosion presently experienced in the corrosion area above the tube sheet and in the tube sheet crevices.

Nevertheless, we went into executive session, which Decade refused to enter. Tr. 498-515 (in camera). During that session we satisfied ourselves that destructive test have been conducted that corroborate the fact there is no special problem in the annulus between the sleeve and tube. That, combined with engineering judgments, persuades us that Decade's contention is unsubstantiated.

In addition, we accept assertions made in both the confidential and public sessions (Tr. 503-506, 518-520) by Mr. W.D. Fletcher, a Westinghouse nuclear engineering manager, that the thermally treated Inconel 600 metal tube (See September 28 filing by Mr. Porter, in which this material is described in this way without reservation of proprietary rights) is an order of magnitude (10 times) more resistant to corrosion than the tubes initially contained in the steam generator. We believe that this gives additional assurance that even were there some error concerning the corrosive environment between tube and sleeve that there still would be no reason to believe that the rate of corrosion would create any dangers during the course of the planned demonstration.

In short, on this contention as well, Decade has not provided any reason or authority for its concern that a specially corrosive environment will exist in the annulus between the sleeve and the tube and that this will lead to an unsafe condition.

C. Contention #5: The Sleeve Interferes With Eddy Current Testing

Contention 5 is that the presence of the sleeve will make the interpretation of eddy current test results extremely difficult and increase the probability that tubes with incipient failures may go undetected and rupture during a loss of coolant accident.

Decade's contention is derived from questions asked by Staff about San Onofre. There also is some support for the contention in the Staff's Safety Evaluation Report, which finds (p. 6):

Eddy current inspection of the sleeve joints will present some difficulties particularly for the "alternative" type upper joint. The sleeve joints contain a number of features which will produce competing ECT signals making it more difficult to discriminate sleeve or tube wall defects at these locations. The application of

the multifrequency techniques will provide enhanced capability to discriminate flaw signals from these competing signals. Westinghouse is currently investigating ECT procedures to further improve the inspectability of these regions including the use of magnetic bias techniques and alternate probe types such as the crosswound probe, the rotating pancake (PRC) probe, and the multicoil surface riding probe.

However, the Staff did not conclude that these problems with a single test—eddy current inspection—caused an important safety problem; and Decade has not given us a reason to doubt the Staff's conclusion.

The principal difficulties in eddy current testing appear to be limited to the joints, which are not in areas that are particularly susceptible to corrosion. SER §2.7, as typographically corrected on November 4, 1981. Applicant and Staff agree that multiple frequency eddy current testing improves the resolution of the test, that there are some experimental techniques with eddy current testing which are likely to give still better results, and that there are no safety problems as a result of these testing difficulties. There is continuous monitoring of leaks between the sleeved tube and the secondary system during operation. SER §3.1, 6.0. Furthermore, hydrostatic pressure tests are conducted to assure the integrity of the sleeved tube before it is returned to service. SER §3.5.

In short, Decade has not given us any reason or authority for the proposition that it has advanced in this contention.

D. Contention #7: Low Quality Work by Channel Head Workers

Contention 7 is that the large number of workers required to perform a full scale sleeving program in the radioactive environment of the steam generator will exceed the ability of the licensee or vendor to provide workers from their stable work forces. This, Decade argues, will necessitate the employment of untrained and transient "jumpers" to perform the bulk of the work, which may deteriorate as a consequence.

Decade argues that allegations were made in the course of the San Onofre proceedings that there had been serious problems with the quality of the work force working at the channel head.

These allegations included the use on the job site of marijuana and alcohol. WE submitted for our consideration the investigative report concerning these allegations. That report found no basis for concern about safety. Nevertheless, the report contained some findings which raise questions about the quality of work by the San Onofre channel head workers. Since those workers were hired by Atlantic Nuclear Services (ANS), which has responsibilities at Point Beach as well, this gave us some reason to inquire further before acting on the contention. Consequently, we cannot

reject allegations about performance solely on the basis of the enforcement report.

Applicant in this proceeding responded to a Decade interrogatory by describing the screening standards and training for workers in its demonstration program. It reports that:

[The 40 channel head workers] . . . currently in training are between the ages of 20 and 47 years and most have backgrounds in the mechanical or electrical field. All are high school graduates with many having college and technical school educations.

. . .

Westinghouse has set up a full-scale steam generator mockup, along with all of the sleeving equipment. The training program includes the operation of sleeving equipment and installation of production sleeves into the steam generator mockup The channel head worker training program consists of ten hours a day, seven days a week training in all facets of the sleeving operation.

Licensee's Response to Decade's First Interrogatories at 15-16 (October 27, 1981).

Based on this description of the hiring and training program, we do not believe that Decade's reference to allegations made about San Onofre are sufficient to raise serious doubts about the channel head workers' competence. Even though work on the channel head is of a temporary nature because employees must receive a radiation dose which prevents continuous employment at such tasks, the hiring criteria seem appropriate and the intensive full-scale mockup training should identify those workers lacking in seriousness of purpose.

Nevertheless, we inquired still further. We determined that channel head workers are closely supervised during sleeve installation, including the presence of TV monitors trained on the sleeve-insertion area and the use of communications equipment to give continuous verbal direction to workers. Tr. 614-616. In addition, we asked Decade to speculate whether there are any work defects which might occur in the course of sleeving which would not be detected in the quality assurance program or in the measurements which WE will implement to evaluate its demonstration program.

Decade was impeded in its ability to speculate about the difficulty of detecting hypothetical problems because it refused to participate in an *in camera* session which we considered necessary. Tr. 621-623. Decade did argue that there had been situations in the past where a tube which should have been plugged was not plugged and in which two tubes were plugged though they did not need to be. WE stipulated that these events may have

occurred. However, Decade could not suggest any specific kinds of defective work which would not be detected.

We find that the cited mistakes of Applicant, not leading to serious safety problems, do not cast sufficient doubt on its quality assurance program to provide a basis for Decade's contention. We are satisfied that hiring, training, supervision, quality assurance and measurement (for the demonstration on tube sleeving) programs appear to be appropriate, and Decade has not raised any serious question concerning safety or environmental hazards arising from the joint operation of these programs.

In short, Decade has not provided any reason or authority to relate its contention concerning channel head workers to any safety or environmental problem in the sleeving demonstration program.

We note that in considering this contention we decided that it was appropriate to interpret it to apply to a demonstration program even though on its face it does seem to apply only to the full scale sleeving program. We believe that in light of the fact that the contention was filed prior to the filing of WE's Motion for Interim Relief, addresses to a demonstration only, it is appropriate to consider that the contention would apply to a demonstration program.

E. Possible Board Issue: Sleeving of Deplugged Tubes

After completing our examination of Decade's contentions, the Board proceeded to explore the possibility that it would raise a *sua sponte* issue. The issue involved concerns possible safety problems related to the sleeving of tubes that were first deplugged. The reason for our concern was that sleeving of deplugged tubes was not done at San Onofre, and we noticed that in the Safety Evaluation Report prepared by Staff there had been no conclusion reached about the safety of sleeving deplugged tubes.

We called Staff witnesses on this question and interrogated them at some length. Tr. 644-668, 675-676. We then had Applicant call an expert witness, from whom we obtained some useful information concerning the nature of explosive plugs and special problems related to the possible removal of explosive plugs. Tr. 669-675. During the course of these inquiries, which were conducted in a public session, we offered Decade the opportunity to question the witnesses. Decade refused.

It is our conclusion after gaining a more complete understanding of the nature of explosive plugs and after obtaining an express judgment by Staff concerning the safety of the sleeving of deplugged tubes that there is no need for us to inquire further about this issue as a *sua sponte* matter.

VI. PROCEDURAL RULINGS

We announced at the hearing that our oral decision could properly be used as the basis for preparing appeal or stay papers, should Decade wish. We also explained to Staff, in response to a question, that it could treat the oral opinion as an authorization to the Director of Nuclear Reactor Regulation to issue a license amendment.

This Memorandum and Order is based on the orally delivered decision in this case. To the extent that it contains new or different material, appeal rights shall date from the date of issuance of this Memorandum and Order.

Given the current stature of this case, we also have decided to excuse the parties from one of the two monthly discovery progress reports that were previously required, in particular the first report required each month.

ORDER

For all the foregoing reasons and based on consideration of the entire record in this matter, it is this 5th day of November, 1981,

ORDERED:

- (1) In accordance with the Atomic Energy Act of 1954, as amended, and the rules and regulations of the Commission, the Director of Nuclear Reactor Regulations is authorized to issue a license amendment to Wisconsin Electric Power Company to permit it to return its Point Beach Nuclear Plant, Unit 1, to service after repairing by sleeving up to six tubes that are over 40 percent degraded.
- (2) In accordance with 10 CFR §2.764(a), this Order shall be effective immediately subject to review by the Commission upon its own Motion or upon exceptions filed within ten (10) days of service pursuant to 10 CFR §2.762. Exceptions may be filed with the Atomic Safety and Licensing Appeal Board pursuant to 10 CFR §§2.785ff.

Judge Hugh Paxton concurs in this memorandum and order but was unable to sign it.

**FOR THE ATOMIC SAFETY AND
LICENSING BOARD**

**Peter B. Bloch, Chairman
ADMINISTRATIVE JUDGE**

**Jerry R. Kline
ADMINISTRATIVE JUDGE**

**November 5, 1981,
Bethesda, Maryland.**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Hugh K. Clark, Chairman
Dr. George A. Ferguson
Dr. Oscar H. Paris

In the Matter of

Docket Nos. 50-461-OL
50-462-OL

ILLINOIS POWER COMPANY, et al.
(Clinton Power Station,
Units 1 and 2)

November 13, 1981

A motion for severance of Unit 2 of the Clinton Power Station from the proceedings for Unit 1 is granted because Unit 2 will not be completed until 1995.

ORDER

(Granting Motion for Severance and Stay of Proceedings)

Illinois Power Company, Soyland Power Cooperative, Inc., and Western Illinois Power Cooperative, Inc. (Applicants) have moved to sever the proceedings for an Operating License for Unit 2 of the Clinton Power Station (Docket No. 50-462 OL) from the proceedings for Unit 1 (Docket No. 50-461 OL) and to stay the proceedings for Unit 2 until further order of the Board. While construction of Unit 1 "is proceeding as rapidly as feasible", the estimated percentage of completion of Unit 2 is only 1.5%. Further, the scheduled completion date for Unit 2 is 1995, compared to 1983 for Unit 1. Applicants point out that 10 CFR §50.57(a)(1) provides for issuance of an Operating License only upon a finding by the Commission that "construction of the facility has been substantially completed." Applicants submit that there is no need to proceed with the application for an Operating License for Unit 2 at this time.

Applicants represent that they have been authorized to state that the other parties, Intervenors Prairie Alliance, the State of Illinois, and the NRC Staff, do not oppose the motion. The NRC Staff confirmed its

position on this issue in a telephone message to the Board on November 12, 1981.

For all the foregoing reasons and upon consideration of the entire record in this matter, it is this 13th day of November, 1981.

ORDERED

That Applicants' Motion for Severance and Stay of Proceedings in Docket No. 50-462 OL, dated October 28, 1981, *is granted*.

Judges Clark and Ferguson participated in rendering this Order but were unavailable to sign it.

**FOR THE ATOMIC SAFETY
AND LICENSING BOARD**

**Oscar H. Paris
ADMINISTRATIVE JUDGE**

**For Hugh K. Clark, Chairman
ADMINISTRATIVE JUDGE**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Peter B. Bloch, Chairman
Jerry R. Kline
Frederick J. Shon

In the Matter of

Docket Nos. 50-440-OL
50-441-OL

CLEVELAND ELECTRIC
ILLUMINATING POWER
COMPANY, et al.
(Perry Nuclear Power Plant,
Units 1 and 2)

November 30, 1981

Petitioner claimed that 10 CFR §50.13, which previously had been interpreted to exclude a contention concerning the effect of electromagnetic pulses, should be waived under 10 CFR §2.758(b). However, the Board found that many nuclear plants are vulnerable to electromagnetic pulses and that waiver, which requires special circumstances related to the particular proceeding, was not appropriate.

RULES OF PRACTICE: WAIVER OF RULES

Waiver of a Commission rule is not appropriate for a generic issue. Petitioner must demonstrate that there is a special circumstance related to the particular proceeding or waiver under 10 CFR §2.758(b) will be denied.

RULES OF PRACTICE: RULEMAKING

The proper avenue in which to seek a remedy for a problem which affects nuclear reactors generally is to petition the Commission to promulgate an amendment to its rules under 10 CFR §2.802. If the issue

is sufficiently urgent, the petitioner may request suspension of a licensing proceeding during the pendency of the rulemaking.

ORDER
**(Concerning Petition To Waive Commission Regulation,
So That Electromagnetic Pulse Contention Can Be Considered)**

On November 3, 1981, Ohio Citizens for Responsible Energy (OCRE) renewed its attempt to gain admission of an electromagnetic pulse contention into this proceeding by petitioning under 10 CFR §2.758(b) for waiver of 10 CFR §50.13. In our October 2, 1981 Order, we had excluded this contention from consideration because of the operation of §50.13.

An electromagnetic pulse can originate from the high altitude explosion of a nuclear device. If the explosion is of sufficient force and occurs at an altitude of approximately 150 to 250 miles above sea level, it can travel hundreds of miles, inducing electrical currents in solid state electrical components, thereby damaging or destroying them. OCRE alleges that this phenomenon could disable nuclear reactor safety systems, leaving operators with no control and leading to core degradation.

In its November 24, 1981 filing, the NRC Staff (Staff) correctly indicates that OCRE's petition is governed by 10 CFR §2.758, which states that "the sole grounds" for such petitions "shall be that *special circumstances* with respect to the *subject matter of the particular proceeding* are such that application of the rule . . . would not serve the purposes for which the rule . . . was adopted."

One of the grounds for OCRE's petition is that the purpose of 10 CFR §50.13 is to protect applicants for licenses from having to undertake *impractical* measures to defend their plants against nuclear attacks. As OCRE points out, this Board has already said that it may be practicable to defend against EMP. Furthermore, the Commission is undertaking studies about the effects of EMP on nuclear plants and methods of hardening these plants against EMP. (See SECY 81-641, included in our record by a notice of November 23, 1981.)

However, the standard for granting petitions such as OCRE's has two prongs. OCRE has addressed only one prong, dealing with whether the purposes of the rule would be served by its application. Staff have contested whether OCRE's argument on this single prong is correct, but we need not decide that issue because the other prong has not been addressed at all. As the Commission stated with respect to a serious safety concern raised in *Metropolitan Edison Company (Three Mile Island Nuclear Station, Unit No. 1)*, 11 NRC 674 (1980) at 675:

We are of course aware that the Three Mile Island accident resulted in hydrogen being generated far in excess of the hydrogen generation design basis assumptions of 10 CFR 50.44. This was because the operator interfered with actual ECCS operation with the result that the safety system did not operate as designed and as 50.44 assumed it would operate. However, *this is a safety issue that is not peculiar to Three Mile Island Unit 1 — it is an issue that is common to all light water power reactors because operators generally have the physical capability to interfere with automatic ECCS operation.* The proper response to this issue is not waiver of the rule under 10 CFR §2.758 because this case presents no “special circumstances,” but a rulemaking to either amend or suspend the present rule.

[Emphasis supplied.]

We are aware that OCRE will not be pleased that its second attempt to raise an important issue must be rebuffed by us, for the second time, on what may seem to it to be a narrow, procedural ground. However, Commission precedent is clear on this issue. OCRE must find its remedy pursuant to a petition for rulemaking under 10 CFR §2.802. Under subsection (d) of that section, OCRE may also move to suspend all or part of this proceeding during the pendency of the rulemaking it may propose.

ORDER

For all the foregoing reasons and based on consideration of the entire record in this matter, it is this 30th day of November 1981

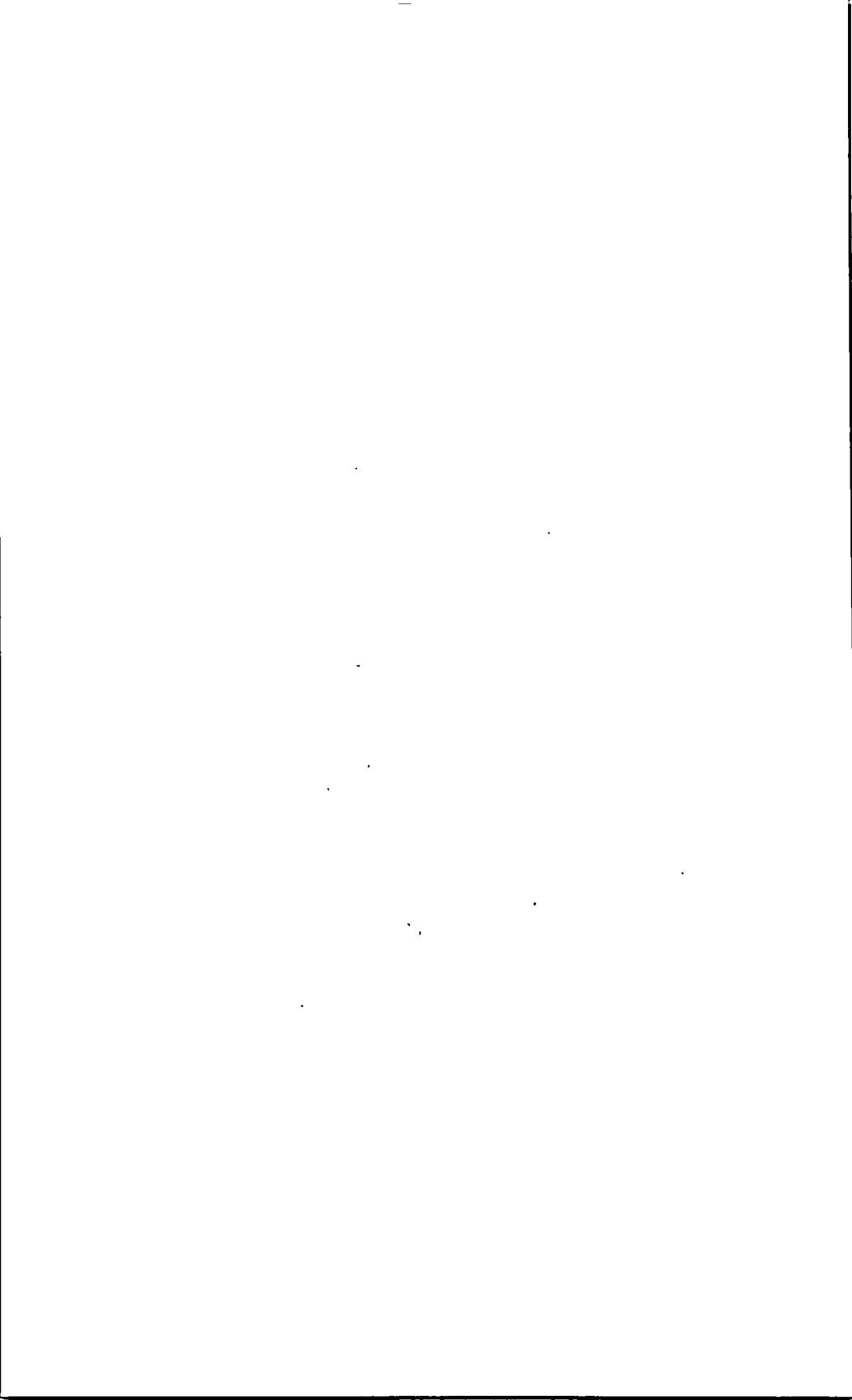
ORDERED:

- (1) Ohio Citizens for Responsible Energy's November 3, 1981 petition for waiver of 10 CFR §50.13 is denied.
- (2) This is an interlocutory ruling and is not subject to appeal.

FOR THE ATOMIC SAFETY AND
LICENSING BOARD

Peter B. Bloch, Chairman
ADMINISTRATIVE JUDGE

Bethesda, Maryland



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Harold R. Denton, Director

In the Matter of

**Docket No. 50-206
(10 CFR 2.206)**

**SOUTHERN CALIFORNIA EDISON
COMPANY**

**(San Onofre Nuclear Generating
Station, Unit 1)**

November 16, 1981

The Director of Nuclear Reactor Regulation denies petitions submitted by some 1500 California residents who requested suspension or revocation of the San Onofre Unit 1 license on the basis of seismic design deficiencies and emergency planning considerations.

DIRECTOR'S DECISION UNDER 10 CFR 2.206

By essentially identical petitions received since November 1979 (44 FR 75535, December 20, 1979), approximately 1560 residents of California requested that the Nuclear Regulatory Commission's (NRC) Director, Office of Nuclear Reactor Regulation, suspend or revoke the operating license for the San Onofre Nuclear Generating Station, Unit 1. By letter dated July 10, 1981, Mr. Ralph Nader also requested that operation of San Onofre Unit 1 be suspended pending completion of a "license review" for the facility. The petitions and Mr. Nader's letter have been considered under 10 CFR 2.206 of the Commission's regulations. However, we have responded to Mr. Nader's request in a separate decision under 10 CFR 2.206.

The asserted bases for the request by the petitioners are that San Onofre Unit 1 is not designed to withstand possible ground motion from earthquakes that may occur and that evacuation plans are inadequate to cope with a potential accident at the site. The licensee responded to the petition in a filing dated January 23, 1980. Also, in an updated version of the petition distributed by the Alliance for Survival in 1980, the petitioners expressed additional seismic concerns in light of the Livermore earthquake of January 1980. The updated petition also pointed out that the Rogovin Report to the Nuclear Regulatory Commission on the Three Mile Island

accident recommended that old reactors near major cities be shut down until realistic evacuation plans are available for use.

I have reviewed the information submitted by the petitioners and other relevant information bearing on the issues addressed in the original and updated petitions. For the reasons set forth below, the petitioners' request that the operating license for San Onofre Nuclear Generating Station Unit 1 be suspended or revoked is denied.

I.

With respect to the issues of the seismic capability of San Onofre Unit 1 the petitioners assert that: (1) San Onofre Unit 1 is not designed to withstand possible ground motions from earthquakes on the Newport-Inglewood and Christianitos (sic) faults and their branches which pass close to the reactor, (2) these ground motions could break cooling water pipes, cause a loss-of-coolant accident and lead to a meltdown of the fuel rods, (3) the addition of a concrete shell to the reactor dome and other modifications are inadequate to ensure against damages from possible ground motions during a maximum possible earthquake, (4) new and relevant information regarding ground motion potential was unavailable when the Atomic Energy Commission (AEC)* approved the design criteria for Unit 1 and these criteria were based on inadequate data on measurements for ground motions close to the source of the earthquakes, and (5) The Livermore earthquake of January 1980 made seismic focusing an issue relevant to San Onofre's earthquake hazards.

The San Onofre Unit 1 was licensed by the AEC on March 27, 1967. In the original seismic design, all components, systems and structures which were designated as important to the nuclear safety of the plant were designated Seismic Category A. The design basis used for Seismic Category A was what in today's terminology would be consistent with a 0.25g Housner Spectrum defined Operating Basis Earthquake (OBE) and a 0.5g Housner defined Safe Shutdown Earthquake (SSE). Specifically, structures, systems and components associated with the reactor coolant system, boron injection and residual heat removal were designed as Seismic Category A. Safety injection system components were also designed as Seismic Category A. The Turbine Building extensions were designated Seismic Category B and designed to a 0.2g static criteria.

Since the original plant was constructed, various structures and systems have been added to the plant. These new items were designed to higher seismic levels. Specifically, the sphere enclosure building and the diesel

* The NRC's predecessor.

generator and its associated structures, system and components were designed to a 0.67g modified Newmark response spectrum.

In 1973, Southern California Edison Company (SCE) (the licensee) initiated a program to reevaluate and modify as necessary the capability of San Onofre Unit 1 to withstand seismic events. The criterion for this program was the 0.67g Housner response spectrum. The first phase of this program consisted of reevaluating (1) systems to prevent a design basis accident, including the main reactor coolant loop, Nuclear Steam Supply System (NSSS) components and the reactor building and (2) the major structure in mitigating a design basis accident, the containment. Based upon its reanalyses, the licensee concluded for the containment sphere, the reactor building and structural steel framing that these structures have resistance capacities in excess of those required to meet 0.67g Housner Spectra. As a result, modifications were not necessary. While we have not completed our review of these reanalyses, our preliminary review indicates that these results appear reasonable and are consistent with results from audit analyses performed by NRC of similar structures at other Systematic Evaluation Program (SEP) plants. However, additional restraints were required for several of the larger NSSS components which were base supported. These modifications were implemented during an outage in 1976-1977.

Following initiation of the SEP in 1978, subsequent phases of the seismic reevaluation program were incorporated into the SEP. This program is proceeding in three phases: (1) reevaluation of balance-of-plant structures; (2) reevaluation of piping and mechanical equipment required to shut down the plant; and (3) reevaluation of piping and mechanical equipment required to mitigate accidents. The earthquake input being used for this program is the 0.67g Housner response spectrum.

Portions of the Turbine Building Complex were originally designed as Category B structures (0.2g Static) yet they contained systems and components necessary for safe shutdown and accident mitigation, i.e., Category A systems and components. As discussed in our attached Safety Evaluation Report (SER) two parts of the Turbine Building Complex (the North Extension and West Heater Platform) require upgrading on a priority basis. The licensee has agreed to implement appropriate modifications to these structures to increase their capacity to resist earthquakes or to shut down the plant if modifications are not complete by June 1, 1982. In the interim the staff concludes that the North Turbine Building Extension, based upon recent modifications to upper column to girder connections, has the capability to resist earthquakes of about 0.4g Housner.

The NRC staff issued letters dated August 4, 1980 and April 24, 1981 to SCE requesting details of the seismic reevaluation program including the scope of review, the evaluation criteria, the schedule for completion

and justification for continued operation in the interim until completion of the seismic reevaluation program. The licensee responded by letters dated September 24, 1980, February 23, April 24, July 7, August 11, September 28, October 5, 1981 and October 19, 1981. In addition, on June 1 through June 3, 1981 the NRC met with SCE at San Onofre Unit 1 to review the seismic analyses program for the auxiliary feedwater system.

The NRC staff has evaluated the licensee's responses and has prepared a Safety Evaluation Report of the Interim Seismic Adequacy for San Onofre Unit 1. This report addresses the licensee's conclusion that continued operation is acceptable in the interim until the seismic reevaluation, and any necessary upgrading, is complete. A copy of the Safety Evaluation Report of the Interim Seismic Adequacy for San Onofre Unit 1 is attached to this decision and is hereby incorporated by reference.

The response to the petitioner's allegations (issues 1, 4 and 5) concerning the ground motions from the maximum earthquake on the Newport-Inglewood and Christianitos faults, new information on ground motions, and near field effects are as follows:

The geologic and seismologic investigations and reviews for the San Onofre Nuclear Generating Station (SONGS) site are among the most extensive ever conducted for nuclear power plants. This effort has included seismologic and geologic studies of Southern California and Baja California in general and specific studies related to the immediate site vicinity. See NUREG-0712, "Safety Evaluation Report for San Onofre Units 2 and 3".

The Offshore Zone of Deformation (OZD) is about 8 km from the SONGS site at its closest approach to the site. The maximum earthquake on the OZD was determined from historic data and instrumentally recorded seismicity and from fault parameters, including slip rate, fault length, and fault area. The vibratory ground motion at the site due to the occurrence of the maximum earthquake on the OZD was determined by the use of empirical methods, theoretical models, and an examination of recent recordings of strong ground motion from earthquakes.

The seismic record in the Southern California region extends back to the 18th century. From 1932 to the present a relatively complete listing of instrumentally determined earthquakes is available. Listing of earthquakes of Richter Magnitude 5 or greater within 320 km of the site and all listed earthquakes within 80 km of the site, for which instrumental records are available, were reviewed. The spatial density of these events varies with location. The vicinity of the SONGS site (within approximately 30 km) appears to be one of relatively low seismicity.

The areas of Southern California which might be characterized as seismically active are the San Jacinto, San Fernando, White Wolf, and Imperial Valley faults. These faults are in the range of 80 km to 240 km

from the SONGS site at their closest approach and, therefore, are considered to present no significant seismic challenge to the plants.

The Newport-Inglewood Fault is approximately 35 km northwest of the SONGS site at its closest approach to the site. As a conservatism in estimating the maximum earthquake to be expected on the OZD, the staff considers the Newport-Inglewood fault, the Southcoast Offshore Zone of Deformation and the Rose Canyon fault as one continuous zone of deformation.

The licensee and the NRC staff have spent several years conducting exhaustive investigations and reviews of the geology and seismology of southern California and particularly the SONGS region to determine the proper earthquake parameters.

For safe-shutdown, the Category A systems, components and structures at SONGS Unit 1 are designed to a Housner spectrum anchored at zero period by an acceleration of 0.5g. This design significantly exceeds the ground motion expected from a magnitude 5 earthquake at a distance of 8 km. In addition, San Onofre Unit 1 is presently being backfitted to increase its margin of safety with respect to an M_s (surface wave magnitude) = 7 earthquake on the OZD.

Although not identified as the Cristianitos Zone of Deformation (CZD), a feature aligned along the CZD known as Fault E, which is not part of the present day mapped Cristianitos Fault, was identified and mapped in 1971 by Marine Advisors Associates, consultants to the Southern California Edison Company. The fault was removed from their 1972 maps because further interpretation did not substantiate a continuous fault, but rather a discontinuous zone of deformation.

A detailed investigation was made in 1980 by Southern California Edison at the request of the NRC, assisted by the U. S. Geological Survey (USGS), to determine the offshore extent of the Cristianitos Fault and to determine whether it is structurally related to the Offshore Zone of Deformation (OZD) of which the Newport-Inglewood fault is a part. The closely spaced, high resolution seismic reflection profiles taken offshore of the SONGS site revealed a zone of discontinuous, en-echelon faults and folds which were collectively referred to as the CZD. The CZD is not seen in the sea cliff exposure along its projected trend. Also, a Pleistocene erosion platform, which is believed to be 40,000 to 80,000 years old, can be seen in the seismic reflection profiles to overlie, undisturbed, the CZD. Since this would indicate that the CZD has not moved for at least that period of time, it is considered to be noncapable and does not present a hazard to the SONGS site. (See NUREG-0712, Section 2.5.1.12).

With respect to issues (2) and (3) concerning breakage of water pipes and damage from an earthquake, the petition failed to state specifically the basis for the allegations of the inadequacy of the Unit 1 facilities. To

address issues (2) and (3), the staff has examined information regarding the possible effects of seismic events on plant structures and safety systems. In its letter dated August 11, 1981, the licensee enclosed a summary of the performance of steel-framed structures in six past earthquakes dating from 1952 through 1979 and including the largest recorded earthquake in modern times. The licensee noted that, in general, the steel framed structures reviewed were designed for 0.1g or 0.2g static (the turbine building extensions are steel framed structures designed for 0.2g static) and experienced two to three times the design acceleration level without significant damage. In the large number of structures reviewed, which had experienced severe ground motion, no plastic collapse or other gross structural failure was found.

Our basis for allowing continued operation of the San Onofre Unit 1 facility, pending completion of the seismic reevaluation program, is described in detail in Section III. "Seismic Resistance of Structures, Systems and Components" Section IV, "Seismic Reevaluation Program", and Section V, "Conclusion", of the attached Safety Evaluation Report.

As discussed in the Safety Evaluation Report, significant seismic upgrading of the San Onofre Unit 1 facility is underway, much has been accomplished and more is scheduled. The staff also agrees with the licensee's April 28, 1980 basis for continued operation for those structures, systems and components which were originally designed to meet a 0.5g Housner Spectra as ground motion input.

However, not all safety related structures and systems were designed to this level of ground motion. In particular two critical areas of the Turbine Building complex (North Extension and West Heater Platform), several masonry walls and the Auxiliary Feedwater System are in this category. It is the NRC's judgment that the inherent seismic capability of the AFW system and the additional water supply that bypasses the normal suction piping provide an adequate basis for continued operation during the seismic reanalysis and upgrading of the Auxiliary Feedwater System. Based on our review to date, we consider the masonry walls have adequate seismic resistance, although spalling and rebar overstraining may be expected to occur at levels somewhat below the 0.67g Housner Spectra used by the licensee in his analyses. Our evaluation of the North Turbine Building Extension and the West Feedwater Heater Platform indicate an inherent capacity to withstand seismic events in excess of the original design (0.2g Static). The staff estimates that the North Turbine Building Extension would have the capacity to withstand an earthquake input level of 0.4g Housner.

The staff has concluded that certain modifications to (1) the North Turbine Building Extension and (2) the West Feedwater Heater Platform are necessary in the near term to increase the capability of certain plant

structures to resist earthquakes at SONGS 1 to assure that continued operation of the facility is not inimical to the health and safety of the public.

For the reasons discussed in Section II.B., Near-Term Seismic Hazard, of the attached Safety Evaluation Report the probability is low that ground motion at the reactor site greater than that characterized by 0.4g Housner Spectrum would be exceeded. Therefore, considering the plant's ability to resist strong ground motion, as discussed in Section III of the attached Safety Evaluation Report, Seismic Resistance of Structures, Systems and Components, and considering the low probability of the ground motion discussed above until June 1, 1982; the staff concludes that short term operation of San Onofre Unit 1 during the seismic reevaluation of the facility and the implementation of any modification shown to be necessary as a result of seismic reanalysis is acceptable under the following conditions:

- (1) Structural upgrading of the North Turbine Building Extension and West Heater Platform by adding diagonal steel bracing is to be completed by June 1, 1982, or the facility is to be shutdown, until such upgrading is completed;
- (2) Results of seismic analysis of structures are submitted for NRC review by January 31, 1982, and for all other items on the schedule specified in the licensee's November 3, 1981 letter;
- (3) Any modifications shown to be necessary as a result of the seismic analysis which are not implemented by January 1, 1983, are justified on a case-by-case basis with a schedule for implementation; and
- (4) Prior to upgrading of the North Turbine Building Extension and West Heater Platform, either the gantry crane is to be parked at the extreme south limit of travel or the reactor is to be shut down during periods when crane movement is required.

II.

With respect to the issue of the evacuation plans for San Onofre Unit 1 the petitioners assert: (1) because the population growth near San Onofre Unit 1 plant has been more rapid and extensive than could have been anticipated during the licensing of Unit 1, there are no adequate evacuation plans for the area's residents in the event of a loss of coolant accident; (2) there are about nine million people that live in the area that could be affected by accidental release of radioactive gases from Unit 1; (3) the

State and local governments are not prepared to evacuate the population within the short time between the accident and the spread of radioactive gases; (4) when the AEC issued the construction permit in March 1964, it was impossible to know that the population would increase so rapidly; and (5) the Rogovin Report to the NRC on the Three Mile Island accident recommended that older reactors near major cities (like San Onofre 1) should be shutdown until realistic evacuation plans are developed.

Presently, the licensee has in place an NRC approved (October 1976) emergency plan for San Onofre Unit 1, which includes planning provisions for both onsite and offsite and, contrary to the petitioners contentions 1 and 4, accounts for population growth since the issuance of the construction permit for Unit 1 in 1964. A new proposed regulation was published in the *Federal Register* (44 FR 7516) on December 19, 1979, to clarify, expand, and further upgrade NRC's emergency planning regulations in 10 CFR Part 50, Appendix E. After public comments were received, a new regulation was issued with an effective date of November 3, 1980. In compliance with this regulation, the licensee submitted an updated emergency plan for NRC review in January 1981. In addition, contrary to petition contention 3, the licensee submitted to the Federal Emergency Management Agency (FEMA), with copies to NRC, emergency plans for Orange and San Diego Counties, the cities of San Clemente and San Juan Capistrano, the U. S. Marine Corps at Camp Pendleton, and the California State Department of Parks and Recreation.

The new regulations require 10 mile radius emergency planning zones around nuclear power plants. The 10 mile radius area is referred to as the plume exposure pathway Emergency Planning Zone (EPZ) and applies to potential airborne exposure. Within the EPZ the resident population estimates are approximately 80,000 in 1980 and 98,000 in 1990 contrary to petitioners' contention 2. Its size is based on a conclusion that it is unlikely that any protective actions would be required beyond the plume exposure pathway EPZ, even for most core-melt accidents. In addition, for worst-case core-melt accidents, acute fatalities would not be expected outside 10 miles. The detailed planning basis for this EPZ is described in the NRC/FEMA Report, NUREG-0396, EPA 520/1-78-016, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants". The planning basis is also described in NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."

A report by Science Applications, Inc. (SAI) was done for the California legislature and is the basis for a recommendation by the California Office of Emergency Services (COES) for extended emergency planning zones larger than the 10 mile EPZ. The risk study performed for the State

of California is similar in many respects to those studies that were the basis for NUREG-0396, but one of the most important differences was the COES assumption that no protective actions would be taken offsite for seven days for those individuals in local areas of high radiation after cloud passage. The staff believes that a more realistic exposure time is considerably shorter and that correspondingly smaller planning distances should result from use of the COES Methodology. The staff, however, has no objection to offsite authorities laying explicit plans for distances farther than 10 miles if those authorities choose to expend resources for this purpose. The NRC's conclusion is that evacuation plans for the population beyond the 10 mile EPZ are not required and that evacuation plans within the 10 mile EPZ are adequate.

An emergency exercise was enacted May 13, 1981 to demonstrate the Emergency Plan at SONGS. This exercise was witnessed by the NRC and FEMA and in a June 3, 1981 memorandum from FEMA to the NRC, FEMA states, in part, that:

"A joint exercise was conducted on May 13, 1981, to evaluate the offsite capabilities of the State and local jurisdictions to respond to a nuclear emergency at the San Onofre station. The exercise reflected a general overall state of preparedness to implement general emergency plans."

In an enclosure to that memorandum, it is further stated that:

"On May 13, 1981, FEMA Region IX with support from FEMA headquarters, Regions VIII and X, and the RAC conducted an evaluation of the offsite capabilities of the local and State jurisdictions to respond to a nuclear emergency at SONGS. The evaluation preparation, conduct, and subsequent critique process, closely followed guidance provided by FEMA National Program Office. The findings of that evaluation reflected a general overall preparedness to implement their plans and to respond to the scenario from an operational standpoint, but significant shortfalls were observed in the ability to conduct radiological response operations. Further, the critical areas of ingestion pathway sampling and analysis, as well as Reentry and Recovery operations were not observed due to the restricted nature of the scenario. Communications, EOF facility, and general coordination were also considered to be weak and needed further address through training and drill efforts. The evacuation portion of the exercise was considered adequate but was felt it did not totally test the evacuation requirement and, therefore, reflected a need for further study, drill and exercise." . . . "A range of protective actions has been

developed for the plume exposure pathway EPZ for both emergency workers and the public. Guidelines for the choice of protective actions during an emergency are developed and in place. Protective actions for the ingestion exposure pathway EPZ, appropriate to the locale, are generally developed. Further development and testing of these guidelines is recommended, but do not impose an impediment to the total response capability."

In summary, FEMA found the state and local government emergency response plans "minimally adequate", but found the offsite capability for implementation inadequate pending taking of corrective actions. In a letter dated June 26, 1981, to the NRC, SCE stated that a series of meetings had been held with FEMA and with all local jurisdictions to develop a plan of action for the continuing development of emergency preparedness. The plan and its schedule for implementation are described in Appendix A. FEMA, in a July 14, 1981 memo from R. Jaske to B. Grimes of the NRC, states that they have confirmed with FEMA Region IX that SCE's letter of June 26, 1981, represents agreed positions concerning FEMA's major concerns, what needs to be done to correct them, and SCE's proposed actions to assist in correcting them. The NRC staff has reviewed the corrective action proposed by the licensee to address the FEMA determinations and concluded that when completed these actions will adequately resolve the expressed concerns. Accordingly, in an October 26, 1981 letter the NRC advised SCE that the deficiencies identified by FEMA must be resolved and SCE must clearly demonstrate that the deficiencies have been corrected before the staff can complete its assessment of the overall state of emergency preparedness with respect to Unit 1. SCE forwarded to FEMA a letter dated October 15, 1981, showing the completion of all items identified earlier. FEMA is reviewing this letter and expects to make a final determination in mid November, 1981. In view of the NRC staff's previous evaluation of the current emergency plan, the present efforts to further upgrade the emergency preparedness at San Onofre, and the schedule to meet FEMA's concerns in the near-term, there is no unacceptable risk to the health and safety to the public that would justify an order to shut down San Onofre Unit 1.

III.

On the basis of the foregoing, I have determined that no adequate basis exists for ordering the suspension or revocation of the operating license for the San Onofre Nuclear Generating Station Unit 1. Consequently, the petitioners' request is denied.

A copy of this decision will be filed with the Secretary for the Commission's review in accordance with 10 CFR 2.206(c). As provided in this regulation, the decision will become the final action of the Commission twenty-five (25) days after issuance, unless the Commission, on its own motion, institutes review of the decision within that time.

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland,
this 16th day of November, 1981

Attachment:

1. Appendix A - Corrective Actions Required to Address FEMA Determinations of 6/3/81
2. Safety Evaluation Report of the Interim Adequacy for San Onofre Unit 1

[Appendix A and the SER have been deleted from this publication. Appendix A can be found as Appendix B at DD-81-20, 14 NRC 1072. The Safety Evaluation Report of the Interim Adequacy for San Onofre Unit 1 can be found at the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Harold R. Denton, Director

In the Matter of

**Docket No. 50-206
(10 CFR 2.206)**

**SOUTHERN CALIFORNIA EDISON
COMPANY**

**(San Onofre Nuclear Generating
Station, Unit 1)**

November 16, 1981

The Director of Nuclear Reactor Regulation denies a petition filed by Ralph Nader which requested suspension of operation of San Onofre Unit 1 pending a "license review" on the basis of seismic design and other considerations. The Director found that suspension was not warranted during the conduct of the SEP review of the plant and that operation for a limited period pending plant upgrading would not pose an undue risk to public health and safety.

DIRECTOR'S DECISION UNDER 10 CFR 2.206

I

By letter dated July 10, 1981, Ralph Nader requested that the Nuclear Regulatory Commission (NRC) suspend the operating license for the San Onofre Nuclear Generating Station Unit 1 until a license review has been completed. His request is similar to the requests made in petitions received since November 1979 (44 FR 75535, December 20, 1979) from approximately 1560 residents of California which also have been considered under 10 CFR 2.206 of the Commission's regulations.

The asserted bases, in summary form, for the request by Mr. Nader were that:

- (1) San Onofre Unit 1 has been identified as having the highest probability of a meltdown of any California reactor.

- (2) San Onofre Unit 1 is designed to withstand a 5.0 magnitude seismic event, yet the Newport-Inglewood Fault 4 miles offshore is capable of a 7.5 magnitude earthquake.
- (3) Half of the population of California would be affected by a serious accident at San Onofre.
- (4) No workable or demonstrated evacuation plan exists for the immediate 10 miles surrounding the plant.
- (5) A review by the Federal Emergency Management Agency concluded that the demonstration of the evacuation planning is "woefully inadequate." The NRC's own analysis (NUREG-0490) states that a meltdown accident at San Onofre could cause up to 130,000 acute deaths and 300,000 latent fatalities.

In addition, Mr. Nader asserts that new seismic information underscores the gravity of the situation at San Onofre and that Unit 1 is externally and internally susceptible to any major ground motion.

The issue of seismic capabilities of the San Onofre Nuclear Generating Station Unit 1 and the adequacy of the evacuation plans are discussed in a separate decision (DD-81-19) in response to the petition by approximately 1560 Southern California residents. That decision is hereby incorporated by reference. This decision responds to the additional allegations made by Mr. Nader, paragraph by paragraph, in the following discussion.

II

Mr. Nader asserts in paragraph three, item 1 of his July 10, 1981 letter that:

"San Onofre Unit I has been identified as having the *highest probability* of a meltdown of any reactor in California, according to a study prepared by Science Applications, Inc., for the California Office of Emergency Services."

The staff has performed a brief review of the Executive Summary of the lengthy report. The report does not directly state that, but instead refers to the comparative probabilities of accident occurrences per year for each of the scenarios examined. As an example, Scenario 1 is containment failure by "energetic missile produced by steam explosion" and includes the assumption that containment sprays do not operate. The probability of this event is 5×10^{-7} per year for San Onofre Unit 1. This is approximately a factor of ten times the probability of occurrence of this scenario at the

WASH-1400 plant (Surry) and the factor of 10 difference is generally carried throughout the remainder of the accident sequences studied. However, the probability of the event is only one of a number of significant parameters with regard to implications of impact of an accident upon the health and safety of the public.

What is equally important in the study is the predicted consequences of the events under consideration. Table 3-1 of the study's Executive Summary shows that expected downwind whole body doses from the accident scenarios are less at San Onofre 1 than at any other California plant except Humboldt Bay (which is shut down). Table 3-2 of the Executive Summary shows that less than 0.1 early fatalities are expected from the three worst scenarios at San Onofre 1, using 1975 population figures and assuming no emergency protective actions. This information is consistent with the NRC staff's studies discussed below. The Executive Summary also states that "there is roughly a 50 percent probability that a release at . . . San Onofre . . . would be blown completely or partially in the direction of the Pacific Ocean." Two conclusions of the report are particularly germane:

1. The probabilities of occurrence of accidents at a nuclear power plant in California that threaten the health and safety of people residing near the site are generally lower than comparable values in WASH-1400 and are on the order of one chance in a million per year of reactor operation.
2. While the probability of serious hypothetical accidents is very low, the consequences can be substantial if effective evacuation and interdiction measures are not taken. The consequences for nuclear power plants in California are generally somewhat less than those reported in WASH-1400."

The NRC staff has recently completed conservative studies. These studies show that, under severe accident conditions, including containment failure (although not by vessel steam explosion), an accident at San Onofre 1 would not have nearly the consequences purported by Mr. Nader, who referenced conservative assumptions for San Onofre 2/3 from a supplement to draft NUREG-0490. The final NUREG-0490 is the Final Environmental Statement for Units 2 and 3 and was not intended to address Unit 1. Unit 1 has a smaller radioactive material inventory than Unit 2 or 3 and consequences would, therefore, be less.

Tables 1 and 2 of Appendix A are a summary of calculated consequences of various accident sequences at San Onofre 1; using the actual power level of 1347 MWt and assuming evacuation to 10 miles (Table 1) and 20 miles (Table 2). The assumptions for the Siting Source Terms (SST) 1, 2, and 3 are presented in Table 3 of Appendix A, where the type of accident and nature of containment leakage are explained. The consequences of SST-4 and SST-5 sequences are less severe than those of SST-1, -2, and -3 and therefore the -4 and -5 sequences are not included. The various evacuation scenarios used in the studies are presented in Table 4 of Appendix A.

There are several assumptions that must be highlighted. They are: (1) containment failure is assumed to occur in 1.5 hours for the SST-1 scenario, the worst-case accident considered in the study; (2) population densities and distributions utilized are from 1970 census data which is a nonconservative factor by perhaps as much as 30%; 1980 census data are not available in computerized form and the 30% nonconservatism is insignificant when compared to other conservatisms and nonconservatisms in the analysis; (3) meteorological assumptions were gleaned from regional meteorology, since continuous sampling was available over longer periods. However, the site-specific wind rose was used. Although the use of regional meteorology may appear to be nonconservative and there is uncertainty associated with the use of any one year's data, the NRC's studies have shown that accident consequences are relatively insensitive to regional meteorology; (4) peak and probability of peak values were derived from conservative assumptions involving dispersion of the radioactive cloud; and (5) evacuation is considered only out to 10 miles for Table 1, but peak values are generated conservatively from radioactive cloud deposition at a population center outside 10 miles.

Examination of Table 1 shows how overstated the values of the supplement to draft NUREG-0490 are as quoted by Mr. Nader in his assertions regarding San Onofre Unit 1. The ongoing NRC Siting Analysis study has provided some idea of the risk of operation of San Onofre 1. That risk is not as significant as Mr. Nader implies.

Table 1 presents results based upon an assumed evacuation to 10 miles but using the conservative radioactive cloud deposition beyond 10 miles, as noted in assumption (5) above. Table 2 utilizes the same conservative deposition assumption but includes evacuation to 20 miles. However, as noted below (response to paragraph 3 items 3, 4, and 5), the NRC requires only an evacuation plan to 10 miles because studies show that a plan beyond 10 miles is not generally necessary. Table 2 has been included here, only to show the conservatism of the assumptions that were included in Table 1. For the very low probability accidents having the potential for

causing radiation exposure above the threshold for acute fatality at distances beyond 16 km (10 mi), it would be realistic to expect that authorities would evacuate persons at all distances at which such exposures might occur.

The NRC staff is satisfied, based on their review of accident scenarios that there are no special or unique features about San Onofre Unit 1 that would warrant special or additional engineered safety features.

Mr. Nader asserts in paragraph three, item 2, of his letter:

“The Newport-Inglewood Fault, only four miles offshore, is capable of a 7.5 magnitude earthquake, according to the U.S. Geological Survey. A 7.5 magnitude quake is ten times greater than the 6.5 magnitude quake that San Onofre Units II and III are theoretically capable of withstanding. By comparison, Unit I is designed only to withstand a 5.0 magnitude seismic event.”

The geologic and seismologic investigations and reviews for the San Onofre Nuclear Generating Station (SONGS) site are among the most extensive ever conducted for nuclear power plants. This included seismologic and geologic studies of Southern California and Baja California in general and specific studies related to the immediate site vicinity.

The Offshore Zone of Deformation (OZD) is about 8 km from the SONGS site at its closest approach to the site. The maximum earthquake on the OZD was determined from historic data and instrumentally recorded seismic activity and from fault parameters, including slip rate, fault length, and fault area. The vibratory ground motion at the site due to the occurrence of the maximum earthquake on the OZD was determined by the use of empirical methods, theoretical models, and an examination of recent recordings of strong ground motion from earthquakes.

The seismic record in the Southern California region extends back to the 18th century. From 1932 to the present a relatively complete listing of instrumentally determined earthquakes is available. Listings of earthquakes of Richter Magnitude 5 or greater within 320 km of the site and all listed earthquakes within 80 km of the site, for which instrumental records are available, were reviewed. The spatial density of these events varies with location. The vicinity of the SONGS site (within approximately 30 km) appears to be one of relatively low seismicity.

The areas of Southern California which might be characterized as seismically active are the San Jacinto, San Fernando, White Wolf, and Imperial Valley faults. These faults are in the range of 80 km to 240 km from the SONGS site at their closest approach and, therefore, are considered to present no seismic challenge to the plants.

Based upon its evaluation for the SONGS Units 2 and 3 in NUREG-0712, the staff concluded that an appropriate representation of the maximum earthquake on the OZD to be used in determining the safe shutdown earthquake (SSE) at SONGS is M_s (surface wave magnitude) = 7.0. The SONGS Units 2 and 3 design actually exceeds a conservative representation of the ground motion expected from an $M_s = 7.0$ earthquake at a distance of 8 km.

The Newport-Inglewood Fault is approximately 35 km northwest of the SONGS site at its closest approach to the site. As a conservatism in estimating the maximum earthquake to be expected on the OZD, the staff considers the Newport-Inglewood fault, the Southcoast Offshore Zone of Deformation and the Rose Canyon fault as one continuous zone of deformation. Mr. Nader's allegations on San Onofre Unit No. 1 describe the Newport-Inglewood fault as being 4 miles offshore (it is approximately 35 km from the site) and as "being capable of a 7.5 magnitude earthquake, according to the U.S. Geological Survey." This characterization is based on the U.S. Geological Survey Open-File Report (OFR) 81-115, "Scenarios of Possible Earthquakes Affecting Major California Population Centers, with Estimates of Intensity and Ground Shaking." The context in which OFR-81-115 was written must be understood. The Preface of OFR 81-115 follows:

"Following the President's trip to review the destruction caused by the eruption of Mount St. Helens on May 18, 1980, he directed that an immediate assessment be undertaken of the consequences of, and state of preparedness for, a major earthquake in California. The review was conducted by an *ad hoc* committee of the National Security Council chaired by Frank Press, the President's Science Advisor.

This report was compiled by the staff of the U.S. Geological Survey Office of Earthquake Studies for use by government agencies in estimating casualties, economic losses, and overall disaster preparedness. The basic charge to the Office of Earthquake Studies was to develop scenarios of credible earthquake that would severely affect major California population centers, to estimate intensities for these events, and to indicate the approximate level

of strong ground motion in the affected regions. This report presents estimates of ground motion based on current data and methods and is thought to be accurate. Nevertheless, the information in this report was prepared in an extremely short period of time, solely for the purposes of the National Security Council review. This report should not be taken to represent either a comprehensive statement of earthquake hazard throughout California, or a definitive statement regarding the effects of any specific earthquake."¹

In contrast to OFR 81-115 which was "prepared in an extremely short period of time" and "should not be taken to represent either a comprehensive statement of earthquake hazard throughout California or a definitive statement regarding the effect of any specific earthquake," the SONGS applicants and the NRC staff have spent several years conducting exhaustive investigations and reviews of the geology and seismology of southern California and particularly the SONGS region to determine the proper earthquake parameters.

Mr. Nader misrepresents the design of SONGS Units 2 and 3 in that he states the San Onofre Units 2 and 3 are only capable of withstanding a 6.5 magnitude earthquake. SONGS Units 2 and 3 are designed for a site-specific spectrum with a zero period anchor of 0.67g acceleration. This ground motion exceeds a conservative representation of the ground motion expected at the site from an occurrence of an $M_s = 7.0$ earthquake on the OZD at a distance of 8 km.

Mr. Nader's allegations also understate the design of SONGS Unit 1 in stating that Unit 1 is designed to withstand a 5.0 magnitude seismic event. The SONGS Unit 1 design basis earthquake is a Housner spectrum anchored at zero period by an acceleration of 0.5g. This design significantly exceeds the ground motion expected from a magnitude 5 earthquake at a distance of 8 km. Details of the seismic capacity and program for upgrading SONGS Units 1 are found in the response to the petitions by approximately 1560 Southern California residents. The response is an enclosure to the transmittal letter for this decision.

Mr. Nader asserts in paragraph three, items 3, 4, and 5 of his letter:

¹ In his testimony in the operating license proceeding for SONGS 2 and 3, James F. Devine, Assistant Director for Engineering Geology, USGS, reiterated that this report was not intended as a detailed report on the seismicity of the San Onofre site. See Transcript at 5328-31, 5408, 5429-31 (Docket Nos. 50-361 and 50-362, July 28, 1981). Moreover, the report was not admitted as evidence of seismicity in the area. Transcript at 5444-47 (July 29, 1981).

- "(3) Half the population of California would be affected by a serious accident at San Onofre. 10-12 million people live within 100 miles of the plant.
- (4) No workable or demonstrated evacuation plan exists for even the immediate 10 miles surrounding the plant. Typically, 25,000 people populate the San Onofre State Beach during the summer months. These people would be stranded in the event of a serious accident, because the only evacuation road passes right by the plant.
- (5) A June review by the Federal Emergency Management Agency (FEMA) concluded that the demonstration of the evacuation planning is 'woefully inadequate.' By the NRC's own reckoning (NUREG-0490) a meltdown accident at San Onofre could cause up to 130,000 acute deaths, and another 300,000 latent fatalities. Property damages, according to Science Applications, Inc., could be as high as \$180 billion."

Presently, the licensee has in place an NRC-approved (October 1976) emergency plan for San Onofre Unit 1, which includes planning provisions for both onsite and offsite and accounts for population growth since the issuance of the construction permit for Unit 1 in 1964. A new proposed regulation was published in the *Federal Register* (44 FR 7516) on December 19, 1979, to clarify, expand, and further upgrade NRC's emergency planning regulations in 10 CFR Part 50, Appendix E. After public comments were received, a new regulation was issued with an effective date of November 3, 1980. In compliance with this regulation, the licensee submitted an updated emergency plan for NRC review in January 1981. In addition, the licensee submitted to the Federal Emergency Management Agency (FEMA), with copies to NRC, emergency plans for Orange and San Diego Counties, the cities of San Clemente and San Juan Capistrano, the U.S. Marine Corps at Camp Pendleton, and the California State Department of Parks and Recreation.

The new regulation requires 10-mile radius emergency planning zones around nuclear power plants. The 10-mile radius area is referred to as the plume exposure pathway Emergency Planning Zone (EPZ) and applies to potential airborne exposure. Its size is based on a conclusion that it is unlikely that any protective actions would be required beyond the plume exposure pathway EPZ, given for most core-melt accidents. In addition, for worst-case core-melt accidents, acute fatalities would not be expected outside 10 miles. The detailed planning basis for this EPZ is described in the NRC/EPA Report, NUREG-0396, EPA 520/178-016, "Planning

Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants." The planning basis is also described in NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants."

A report by Science Applications, Inc. (SAI) was done for the California legislature and is the basis for a recommendation by the California Office of Emergency Services (COES) for extended emergency planning zones larger than the 10-mile EPZ. The risk study performed for the State of California is similar in many respects to those studies that were the basis for NUREG-0396, but one of the most important differences was the COES assumption that no protective actions would be taken offsite for seven days for those individuals in local areas of high radiation after cloud passage. The NRC staff believes that a more realistic exposure time is considerably shorter and that correspondingly smaller planning distances should result from use of the COES methodology. The staff, however, has no objection to offsite authorities laying explicit plans for distances farther than 10 miles if those authorities choose to expend resources for this purpose. The staff's conclusion is that evacuation plans for the population beyond the 10-mile EPZ are not required and that evacuation plans within the 10-mile EPZ are adequate.

An analysis was prepared for the Southern California Edison Company by Wilbur Smith Associates, Traffic Engineers, entitled, "Analysis of Time Requirement to Evacuate Transient and Permanent Population From Various Areas Within the Plume Exposure Pathway Emergency Planning Zone, July 1981." This analysis, which considers the beach visitors, the number of cars and the routes, concludes that the evacuation time estimate for the general population of transient and permanent residents on a summer weekend is 2 hours for a radius of 2 miles from the plant, and 4.5 hours for a radius of 5 miles from the plant. The California State Department of Parks and Recreation has a revised "Nuclear Power Plant Emergency Response Plan for the San Onofre, San Clemente, and Doheny State Park and Beach Areas, December 1980" which details the evacuation routes and traffic control points. The Southern California Edison Company has installed sirens within the 10 mile emergency planning zone including all the beach areas. The sirens would be activated in the event of an accident at the plant that required people to take protective measures such as shelter or evacuation. With the traffic control, people to the north

of the plant would only be allowed to evacuate to the north, and people south of the plant would be required to evacuate to the south; therefore, it would not be necessary for evacuees to pass by the plant.

An emergency exercise was enacted May 13, 1981, to demonstrate the Emergency Plan at SONGS. This exercise was witnessed by the NRC and FEMA and in a June 3, 1981 memorandum from FEMA to the NRC, FEMA states, in part, that:

"A joint exercise was conducted on May 13, 1981, to evaluate the off-site capabilities of the State and local jurisdictions to respond to a nuclear emergency at the San Onofre station. The exercise reflected a general overall state of preparedness to implement general emergency plans."

In an enclosure to that memorandum (at pages 2 and 6), it is further stated that:

"On May 13, 1981, FEMA Region IX with support from FEMA headquarters, Regions VIII and X, and the RAC [Regional Assistance Committee] conducted an evaluation of the offsite capabilities of the local, and State, jurisdictions to respond to a nuclear emergency at SONGS. The evaluation preparation, conduct, and subsequent critique process, closely followed guidance provided by FEMA National program office. The findings of that evaluation reflected a general overall preparedness to implement their plans and to respond to the scenario from an operational standpoint, but significant shortfalls were observed in the ability to conduct radiological response operations. Further, the critical areas of ingestion pathway sampling and analysis, as well as Reentry and Recovery operations were not observed due to the restricted nature of the scenario. Communications, EOF facility, and general coordination were also considered to be weak and need further address through training and drill efforts. The evacuation portion of the exercise was considered adequate but was felt it did not totally test the evacuation requirement, and therefore, reflected a need for further study, drill, and exercise

A range of protective actions has been developed for the plume exposure pathway EPZ for both emergency workers and the public. Guidelines for the choice of protective actions during an emergency are developed and in place. Protective actions for the ingestion exposure pathway EPZ, appropriate to the locale, are

generally developed. Further development and testing of these guidelines is recommended, but do not impose an impediment to the total response capability."

In summary, FEMA found the State and local government emergency response plans "minimally adequate," but found the offsite capability for implementation inadequate pending taking of corrective action. In a letter dated June 26, 1981, to the NRC, the Southern California Edison Company (SCE) stated that a series of meetings had been held with FEMA and with all local jurisdictions to develop a plan of action for the continuing development of emergency preparedness. The plan and its schedule for implementation are described in Appendix B. FEMA in a July 14, 1981 memo from R. Jaske to B. Grimes of the NRC states that they have confirmed with FEMA Region IX that SCE's letter of June 26 represents agreed positions concerning FEMA's major concerns, what needs to be done to correct them, and SCE's proposed actions to assist in correcting them. The NRC staff has reviewed the corrective action proposed by the licensee to address the FEMA determinations and concluded that when completed these actions will adequately resolve the expressed concerns. Accordingly, in an October 26, 1981 letter the NRC advised SCE that the deficiencies identified by FEMA must be resolved and SCE must clearly demonstrate that the deficiencies have been corrected before the staff can complete its assessment of the overall state of emergency preparedness with respect to Unit 1. SCE stated in a letter to FEMA dated October 15, 1981, that they have completed all of the items of concern identified in the June 26 letter. FEMA is reviewing the October 15, 1981 letter and is expected to make a final determination on the adequacy of these actions in mid-November 1981. In view of the NRC staff's previous evaluation of the current emergency plan, the present efforts to further upgrade the emergency preparedness at San Onofre, and the schedule to meet FEMA's concerns in the near-term, there is no unacceptable risk to the health and safety to the public that would justify an order to shut down San Onofre Unit 1.

Mr. Nader quotes the values of acute fatalities (130,000) and latent fatalities (300,000) from a supplement to the Draft Environmental Statement (DES) for San Onofre Units 2 and 3. The calculations did not apply to Unit 1. In addition, the Final Environmental Statement for Units 2 and 3 (NUREG-0490) states that for serious accidents with the low probability of 10^{-8} , the values of acute fatalities is 30,000 and latent cancers for 80 km/total is 12,000/24,000. For the very low probability accidents having the potential for causing radiation exposure above the threshold for acute fatality at distances beyond 16 km (10 mi), it would be reasonable to

expect that authorities would evacuate persons at all distances at which such exposures might occur, even though planning for such a contingency is not required. Acute fatality consequences would therefore reasonably be expected to be very much less than the numbers shown. See Appendix A, Tables 1 and 2.

Mr. Nader quotes a "property damage" value of \$180 billion from a Science Applications, Incorporated study. This value is from Table 11-24 A, and is, as in the use of the values for health effects, also for a release from San Onofre Unit 2 or 3. The value is not appropriate for San Onofre Unit 1 because of the lower inventory of radioactive material in the Unit 1 reactor core.

Mr. Nader asserts in paragraph four of his July 10, 1981 letter that:

"New seismic information, unavailable in 1969 when Unit I was licensed, underscores the gravity of the situation. In 1980, a new fault zone, the Cristianitos Zone of Deformation (CZD) was discovered and mapped by the U.S. Geological Survey at the request of the NRC. Traces of both this fault and the Newport-Inglewood fault pass precipitously close to the plant. Had this information been known in 1969, it is doubtful that the AEC could or would have licensed the Unit 1 reactor."

Although not identified as the Cristianitos Zone of Deformation (CZD), a feature aligned along the CZD known as Fault E, which is not part of the present day mapped Cristianitos Fault, was identified and mapped in 1971 by Marine Advisors Associates, consultants to the Southern California Edison Company. The fault was removed from their 1972 maps because further interpretation did not substantiate a continuous fault, but rather a discontinuous zone of deformation.

A detailed investigation was made in 1980 by Southern California Edison at the request of the NRC, assisted by the U.S. Geological Survey (USGS), to determine the offshore extent of the Cristianitos Fault and to determine whether it is structurally related to the Offshore Zone of Deformation (OZD) of which the Newport-Inglewood fault is a part. The closely spaced, high resolution seismic reflection profiles taken offshore of the SONGS site revealed a zone of discontinuous, en-echelon faults and folds which were collectively referred to as the CZD. The CZD is not seen in the sea cliff exposure along its projected trend. Also, a Pleistocene erosion platform, which is believed to be 40,000 to 80,000 years old, can be seen in the seismic reflection profiles to overlie, undisturbed, the CZD.

Since this would indicate that the CZD has not moved for at least that period of time, it is considered to be noncapable and does not present a hazard to the SONGS site. (See NUREG-0712, Section 2.5.1.12)

In paragraph five Mr. Nader asserts:

“Furthermore, the Unit I reactor is plagued with very serious safety problems. In operation over 13 years, it was shut down in April 1980 due to severe leakage and corrosion in its steam generators. Pacific Gas and Electric (sic) claims that the damage has been corrected through the use of an unprecedented plugging and sleeving process, but even the NRC admits that the \$67 million operation was ‘highly experimental.’ This means that Unit I is not only externally incapable of withstanding a serious quake produced by the Newport-Inglewood fault, but that internally it is highly susceptible to any major ground motion. These conditions, in such a densely populated area, are clearly intolerable.”

The steam generator tube leakage at the time of the April 1980 shutdown was 270 gallons per day. This was considerably less than the allowable leak rate limit of 430 gallons per day permitted by the Plant Technical Specifications. Subsequent inspections revealed the cause of the leakage to be intergranular corrosion attack of the tubing at the top of the tubesheet elevation. The extent of intergranular corrosion attack was found to be general throughout the central regions of the tube bundles where substantial sludge had accumulated on the tubesheet. Approximately 60% of the steam generator tubes needed repair based upon the inspection results.

General industry practice for performing tube repairs has and continues to be the plugging of the affected tubes on both the inlet and outlet sides, thereby effectively removing these tubes from service. However, the plugging of each of the tubes requiring repair during the April 1980 outage would have resulted in excessive loss of available heat transfer area. For this reason, Westinghouse and Southern California Edison developed a sleeving repair technique as an alternative to plugging. The advantage of sleeving, as opposed to plugging, is that it allows the repaired tubes to remain in service. Similar sleeve repairs have been performed previously at other plants (Palisades in 1978 and R. E. Ginna in 1980), but for a much smaller number of tubes.

Sleeve repairs involve the insertion of a smaller diameter tube (i.e., the sleeve) into the tube to be repaired. The sleeve is inserted until it spans the affected region of the affected tube, and a sleeve to tube joint is formed at the upper and lower ends. The San Onofre sleeves were designed to

function as the primary pressure boundary, with no credit taken for the remaining strength of the affected tube wall. Like the original tubing, the sleeves have been designed and analyzed in accordance with Section III of the ASME Boiler and Pressure Vessel Code and applicable regulatory guides. The governing load conditions included the differential pressure loadings and differential thermal expansions (between tubes) associated with design, test and faulted [e.g., Loss-of-Coolant Accident (LOCA) or Main Steam Line Break (MSLB)] conditions. Seismically induced loadings are not a governing load condition for steam generator tubing except at the upper support plate and U-bends. The recent corrosion problems and sleeves are located at the tubesheet where the seismic-induced loadings are reported to be very small.² The structural integrity of the tubing at the more limiting upper support plate and U-bend locations has been verified previously by the licensee on the basis of the 0.67 g ground motion earthquake prescribed by the NRC.³

The steam generator repair programs implemented during the April 1980 outage at San Onofre Unit 1 has been evaluated by the staff and found to be acceptable.⁴

Southern California Edison has implemented a number of corrective measures to retard the rate of further corrosion. These include the use of secondary side hot and cold water soaks, stricter surveillance and control of the secondary water chemistry, and reduced temperature operation. The San Onofre steam generator tubes, including the sleeved tubes, will be inspected at regular intervals as required by the Plant Technical Specifications. San Onofre Unit 1 has a license condition to perform the first such inspection within six effective full power months following restart from the April 1980 outage.⁵ Any additional corrosion will result in additional repairs and other corrective measures as appropriate.

² Westinghouse Report No. SE-SP-40(80), Revision 1, "Steam Generator Repair Report for Southern California Edison San Onofre Unit 1," March 1981.

³ Southern California Edison letter to the staff dated February 14, 1977.

⁴ Safety Evaluation by the Office of Nuclear Reactor Regulation supporting Amendment No. 55 to Provisional Operating License No. DPR-13, Southern California Edison Company, San Onofre Unit 1, Steam Generator Repair Program and Restart, Docket Number 50-206, June 8, 1981.

⁵ See *id.*

III

On the basis of the foregoing, I have determined that no adequate basis exists for ordering the suspension of the operating license for San Onofre Nuclear Generating Station, Unit 1. Mr. Nader also requested that the Commission conduct a "license review" for Unit 1. The staff has been conducting a comprehensive review of Unit 1 under the auspices of the NRC's Systematic Evaluation Program (SEP). The SEP is a program begun in 1978 by the NRC to review the licensing basis of older operating facilities, including San Onofre Unit 1, in order to provide: (1) documentation regarding comparison of the facility with current criteria on significant safety issues (topics) and a rationale for acceptable departures from these criteria, (2) integrated and balanced decisions with regard to any required backfitting, and (3) a safety assessment suitable for use in considering a conversion of a Provisional Operating License to a Full-Term Operating License where applicable, as for San Onofre Unit 1. The SEP topic review for San Onofre Unit 1 was about 72% complete as of September 30, 1981. The draft safety evaluation providing the results of the review is presently targeted for summer 1982. I believe that the SEP review essentially meets Mr. Nader's concern that the Commission reassess the licensing basis for older plants like San Onofre Unit 1. However, I have not found that there is a basis to suspend operation at this time during performance of the SEP review. Consequently, Mr. Nader's request is denied.

A copy of this decision will be filed with the Secretary of the Commission for review in accordance with 10 CFR 2.206(c) of the Commission's regulations. As provided in 10 CFR 2.206(c), this decision will constitute the final action of the Commission twenty-five (25) days after the date of issuance, unless the Commission, on its own motion, institutes the review of this decision within that time.

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this 16th day of November, 1981

Attachments:
Appendices A and B

APPENDIX A

The following tables summarize some of the results relating to the calculated consequences of severe accidents postulated at the San Onofre Nuclear Generating Station Unit 1 site. The calculations were performed as part of ongoing siting studies in support of siting rulemaking.

The results, shown in Tables 1 and 2, were based on a number of assumptions that were used in the modified version of CRAC code. The definitions of accidents and the evacuation scenarios used in the calculations are shown in Table 3.

For San Onofre 1 site the calculations used: (1) closest meteorological station at Sante Marie, California, (2) 1970 census population data, and (3) 1347 MWt power level.

In Table 1 the model assumes evacuation to 10 miles only. In Table 2 the model assumes evacuation to 20 miles. In Tables 1 and 2 the Evacuation Scenario 1 is referred to as "best," Scenario 7 (30%, 40%, 30% weighing of Scenario 1, 2, and 3) is referred to as "Summary" and Scenario 5 (which is based on a 24-hour acute dose) is referred to as "No" evacuation. These scenarios are described in Table 4.

Figures for latent cancer fatalities in the row labeled "Initial" are due to whole body dose from initial exposure, while those labeled "Total" are an integral of latent cancers for all age groups exposed for their remainder of respective lifetimes.

Table 1: Calculated Consequences of Accidents at San Onofre Unit 1 Using Actual Power Level of 1347 MWt Evacuation Out to 10 Miles

	SST-1			SST-2			SST-3		
	Mean	Peak	Prob. of Peak	Mean	Peak	Prob. of Peak	Mean	Peak	Prob. of Peak
	"Summary"* Evacuation								
Acute Fatalities	0.0339	126	4.79×10^{-10}	0	0		0	0	
Acute Injuries	17.7	22,200	4.79×10^{-10}	0	0		0	0	
"Best"* Evacuation									
Acute Fatalities	0.0339	126	4.79×10^{-10}	0	0		0	0	
Acute Injuries	14.3	22,200	4.79×10^{-10}	0	0		0	0	
"No"* Evacuation									
Acute Fatalities	4.64	2,900	7.01×10^{-10}	0	0		0	0	
Acute Injuries	122	22,200	4.79×10^{-10}	0	0		0	0	
Latent Cancer Fatalities**									
Initial	152	2,260	2.20×10^{-8}	6.18	84.2	2.20×10^{-8}	0.0371	0.401	2.35×10^{-8}
Total	1490	14,100	1.52×10^{-8}	78.5	872	7.61×10^{-10}	0.219	1.66	7.61×10^{-10}

* See Table 4.

**Based upon "Worst" Evacuation of Table 4.

Table 2: Calculated Consequences of Accidents at San Onofre Unit 1 Using Actual Power Level of 1347 MWt Evacuation Out to 20 Miles

	SST-1		
	Mean	Peak	Prob. of Peak
“Summary”* Evacuation			
Acute Fatalities	0	0	-
Acute Injuries	2.3	1,700	3.2×10^{-9}
“Best”** Evacuation			
Acute Fatalities	0	0	-
Acute Injuries	5.2×10^{-2}	270	6.2×10^{-10}
“No”** Evacuation			
Acute Fatalities	4.64	2,900	7.01×10^{-10}
Acute Injuries	122	22,200	4.79×10^{-10}
Latent Cancer Fatalities**			
Initial	130	2,300	1.5×10^{-8}
Total	1,100	14,000	9.8×10^{-9}

*See Table 4.

**Based upon “Worst” Evacuation of Table 4.

Table 3: Assumptions for Siting Analysis

Release Category	Probability (reactor-yr) ¹	Time of Release (hr)	Release Duration (hr)	Warning Time (hr)	Release Height (meters)	Release Energy
SST 1	1×10^{-4}	1.5	2	0.5	10	0
SST 2	2×10^{-4}	3	2	1	10	0
SST 3	5×10^{-4}	1	4	0.5	10	0
SST 4	1×10^{-3}	0.5	1	-	10	0
SST 5	5×10^{-3}	0.5	1	-	10	0

	Accident Type	Nature of Containment Leakage
SST 1	Core Melt	Large, Overpressure failure
SST 2	Core Melt	Large, H ₂ Explosion or Loss of Isolation
SST 3	Core Melt	~1%/day
SST 4	Gap Release	~1%/day
SST 5	Gap Release	~0.1%/day

Table 4: Emergency Response Scenarios

		Distance Evacuated	Time before Evacuations	Rate of Evacuation
("Best")	1. Evacuation	10 Miles	1 hr Delay	10 mph
	2. Evacuation	10 Miles	3 hr Delay	10 mph
	3. Evacuation	10 Miles	5 hr Delay	10 mph
	4. Sheltering	10 Miles	6 hr Relocation	Regional Sheltering Facilities
("No")	5. No emergency response (24 hr acute dose)			
("Worst")	6. Evacuation	10 Miles	5 hr Delay	1 mph
("Summary")	7. Evacuation summary (30%, 40%, 30% weighting of 1, 2, 3)			

APPENDIX B

CORRECTIVE ACTIONS REQUIRED TO ADDRESS FEMA DETERMINATIONS OF JUNE 3, 1981*

FEMA CONCERNS FEMA RECOMMENDATION RESPONSE**
FEMA Region IX Evaluation of Plans and Capabilities

"Most Critical Concern"

- | | | |
|---|--|---|
| 1. The assessment and monitoring of actual offsite radiological consequences of a radiological emergency condition through methods, systems and equipment is considered to be weak and in need of improvement to meet minimum criteria. | Develop a multi-jurisdictional response capability to assure adequate coverage of plume pathway and standardized procedures which allow flexibility in response. | Continue to install the Health Physics Computer which will provide a prompt conservative assessment of the actual radiological consequences of an accident. This will be operational to a limited degree by fuel load with full operation expected by July 1982. Further develop standard radiological monitoring procedures (SOP's) for the local jurisdictions and the Offsite Dose Assessment Center (ODAC) by August 1981. SCE additionally will assess the local jurisdictions' current equipment against their needs and identify any deficiencies noted. SCE will provide staffing to assume a role of leadership in this function. SCE will provide training programs for personnel involved in use of the SOP's. |
|---|--|---|

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*The schedule for these actions is identified in pages 1076 and 1077.

**As a result of a meeting between FEMA and SCE on June 15, 1981, it is SCE's understanding that the significant concerns addressed in the FEMA Region IX Evaluation of the May 13, 1981 Exercise are covered in these planned actions.

FEMA CONCERNS

FEMA RECOMMENDATION RESPONSES

"Serious Concern"

2. The interim - EOF shows a lack of clear operating procedures, fragmentation of the facility, lack of management direction communications, size of the facility, and is a significant impedance to the San Clemente EOC operation.

Until the permanent EOF is completed, the interim EOF should be relocated to a single location separate from the San Clemente EOC and staffed with management, communicators and other support personnel necessary for EOF operations.

SCE will develop SOP's to make current EOF operations clearer and more manageable along the lines of the current planning arrangements. Limited physical improvements of the present facilities will be identified and accomplished.

"Major Concerns"

3. A need to clarify monitoring and assessment duties for both plume and ingestion pathways as they pertain to State OES, State Radiological Health and local jurisdiction.

Develop a joint standardized multi-jurisdictional response team.

(See item [1] above.) SCE will develop standardized procedures for the five involved counties to obtain samples, conduct analyses, and take necessary protective actions for the ingestion pathway emergency planning zone consistent with the State Radiological Health proposed ingestion pathway procedures. Develop an integrated radiological response team to be directed by the Offsite Dose Assessment Center (ODAC) to conduct field monitoring.

FEMA CONCERNS

FEMA RECOMMENDATION RESPONSES

"Major Concerns"

4. Means to provide early notification and clear instructions to the public within the plume exposure pathway EPZ have not been installed or tested.

Install sirens and provide warning dissemination capacity to remote areas where public address systems from surface or airborne vehicle is required.

SCE will proceed with current plans for siren installation. SCE will develop SOP's for public notification via the Emergency Broadcast System (EBS) and local stations identified in the plans. SCE will develop SOP's for coordination and decisionmaking in use of sirens.

5. Adequate emergency facilities and equipment to support the emergency response have not been provided.

SCE provide response equipment which was promised to the local jurisdictions, including sirens and additional communications equipment.

Agreements have been made between SCE and local agencies that specific equipment will be ordered by the local jurisdictions and billed to SCE. Equipment procurement has begun and is continuing. SCE will follow up with report on status of equipment received or on order. SCE will review equipment needs and status of equipment procurement activities.

FEMA CONCERNS

"Major Concerns"

6. Radiological emergency response training has essentially not been provided to those who may be called upon to assist in an emergency.

"Sufficient Concern to Remain a Major Issue"

7. SCE has not made information available about how the public would be notified or what the public's initial actions should be in an emergency.

FEMA RECOMMENDATION RESPONSES

SCE, in conjunction with the State of California, should develop the necessary training to meet the identified needs in the local jurisdictions.

Disseminate advance public information.

(See items [1] and [3] above.) SCE will develop and implement a program of training in the critical areas of radiation monitoring and assessment, communications, decisionmaking and coordination regarding protective actions, etc.

SCE will proceed with the public education program that includes an emergency response brochure and radiation information brochure mailer, preparation and distribution of flyers and posters, new ads, community meetings, etc.

SUMMARY OF PLANNED ACTION

SCHEDULE

1. Develop SOP's covering the following topics: Items (a) through (h):
 - a. Operation of the Offsite Dose Assessment Center (ODAC) 1st draft - 7/15/81
Final draft - 9/1/81
Implement - 10/1/81
 - b. Radiation surveys by field monitoring teams
 - c. Emergency Communications
 - d. Use of the siren alerting system and public notification
 - e. Coordination relating to protective actions
 - f. Acquisition, display and use of meteorological data
 - g. Operation of the EOF
 - h. Ingestion pathway monitoring
 - i. Existing SOP's covering other plan elements Item (i):
1st draft - 9/15/81
Final draft - 11/1/81
Implement - 12/1/81
2. Obtain equipment required to carry out radiation monitoring functions
 - a. Survey types and quantities of equipment actually in place 7/15/81
 - b. Initiate procurement of equipment shortages 8/1/81
3. Develop additional communications capability
 - a. Expand interagency phone network to include CHP 7/15/81
 - b. Provide speaker monitors at EOC's 7/15/81
 - c. Provide teletype message system network between all principal centers 10/15/81
 - d. Provide additional communication circuits 10/15/81
4. Make physical improvements to the EOF
 - a. Identify possible improvements 9/1/81
 - b. Obtain agreements to make improvements 9/1/81
 - c. Construct improvements 10/15/81

SUMMARY OF PLANNED ACTION

SCHEDULE

- | | |
|---|--|
| 5. Install Sirens | 50% by 7/1/81
90% by 9/1/81
100% by 10/15/81 |
| 6. Accomplish training in use of new and existing procedures, facilities, and equipment | |
| a. Develop training program (long and short term) | 7/15/81 |
| b. Develop training material (short term program) | 9/1/81 |
| c. Conduct training and drills (short term program) | 9/1/81 through
10/15/81 |
| d. Implement long term training program | 11/1/81 through
2/1/82 |
| 7. Public Information Program | Ongoing,
Initial program
complete 9/1/81 |

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Harold R. Denton, Director

In the Matter of

**Docket No. 50-251
(10 CFR 2.206)**

**FLORIDA POWER AND LIGHT
COMPANY
(Turkey Point Plant, Unit 4)**

November 5, 1981

The Director of the Office of Nuclear Reactor Regulation denies a petition under 10 CFR 2.206 which requested the Commission (1) to order an immediate shutdown of Turkey Point Plant, Unit 4, to inspect the steam generator tubes, and (2) to consider the suspension of the operating license of Turkey Point Plant, Unit 4, because of concerns over the safety of the reactor pressure vessel.

DIRECTOR'S DECISION UNDER 10 CFR 2.206

By a letter dated September 11, 1981, signed by Joette Lorion, the Center for Nuclear Responsibility (Center), which is located in South Miami, Florida, petitioned the Nuclear Regulatory Commission to take the following actions in relation to Turkey Point Plant, Unit 4 (Unit 4):

- 1) Immediately order a shutdown to inspect the steam generator tubes; and
- 2) Consider the suspension of the plant's operating license because of concerns over the safety of the reactor pressure vessel.

The petition was referred by the Commission to the Director, Office of Nuclear Reactor Regulation, for action in accordance with 10 CFR 2.206 of the Commission's regulations.

I. Requested Shutdown for Steam Generator Inspection

In summary, the background of the steam generator problem is as follows:

In the mid-1970's, a number of nuclear power plants, including Turkey Point Plant Unit Nos. 3 and 4, began to have problems with leaking steam generator tubes due to a corrosive process called "denting." On October 29, 1976, the NRC staff set forth minimum requirements to ensure that Units 3 and 4 would not, as a result of this denting phenomenon, operate with reduced integrity of the primary system pressure boundary. Since that time the plants have operated under strict requirements imposed by the NRC staff.¹

Under the terms of these requirements, Florida Power and Light Company (FPL) has received permission for short-term extensions of operation for Unit Nos. 3 and 4 in the form of license amendments. Following shutdown, inspection and plugging of tubes that were judged by the licensee to be in danger of leaking in the ensuing 10 months, and NRC staff analysis of the inspection and plugging, license amendments were granted to allow six months of full power equivalent operation. Subject to operating experience which indicated that further operation before shutdown and inspection would not endanger public health and safety, additional extensions have also been granted, for totals of up to 10 months of full power equivalent operation between inspections.

FPL reported on the last previous inspection of Unit 4, which they performed in November, 1980, in a letter to the Commission dated December 18, 1980. The letter also contained a request for continued operation of Unit 4. After reviewing the inspection results, NRC issued Amendment 54 to License No. DPR-41 on January 15, 1981. Amendment 54 allowed continued operation for six equivalent full power months, commencing January 13, 1981. Operation beyond the six-month period without further inspection was also anticipated and permitted in Amendment 54, but subject to the requirement that "an acceptable analysis of the susceptibility for stress corrosion cracking of tubing is submitted to explicitly justify continued operation of Unit No. 4 beyond the authorized period of operation."²

In response to a FPL request dated May 27, 1981 for a four-month extension of operating permission, the NRC staff again reviewed the status of the steam generators in Unit 4. Based upon this re-review, an extension for two equivalent full power months was granted in Amendment 62, dated July 6, 1981.

¹ Florida Power and Light Company (Turkey Point Plant, Unit 3), DD-80-28, 12 NRC 386, 388 (1980).

² Facility Operating License No. DPR-41, as amended by Amendment 54, paragraph D(1).

On July 30, 1981, FPL requested an additional two months operation for Unit 4. Again the NRC staff reviewed the status of the steam generators and based upon this re-review, an additional extension of two equivalent full power months was granted in Amendment 66, dated September 10, 1981. Amendment 66 allowed operation for ten equivalent full power months from January 13, 1981.

An important factor underlying the decision to grant the extensions authorized by Amendment 62 and 66 has been the continued essentially leak-free operation of the steam generators throughout the period in question.

Most recently, on October 19, 1981, FPL has shut down Unit 4 and commenced an inspection of the steam generators. Thus, the request in the petition for a shutdown to inspect the steam generators is now moot.

II. Petitioner's Allegations Concerning Steam Generator Safety

The Center in its petition makes a number of allegations concerning the safety of the steam generators in Unit No. 4.

The first is that Unit 4 is operating with "nearly 25 percent of its steam generator tubes plugged and removed from service. This reduction in heat transfer area could cause this unit to be more susceptible to overheating, necessitating emergency cooling." The Center also states that the steam generator tubes will continue to deteriorate.

FPL sought by application dated April 29, 1980, to operate Unit 4 with 25 percent of steam generator tubes plugged. The staff concluded that operation of Turkey Point Unit No. 4 with up to 25 percent of the tubes plugged is acceptable³ and issued Amendment 50 to the license, dated May 15, 1980, which permitted operation with 25 percent of the tubes plugged. A total of 23.8 percent of the tubes were plugged prior to Amendment 54 and the recently concluded period of operation.⁴

Subsequent safety analysis by the staff of FPL's application for Amendment dated March 5, 1981, showed that operation with 28 percent of the tubes plugged is acceptable. Operation with this level of tube plugging was permitted in Amendment 60, dated June 23, 1981.

The safety analysis supporting Amendment 60 does not imply that plugging of more than 28 percent of the tubes would be unsafe; the analysis was performed at the 28 percent level because it is expected that

³ Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendments 57 and 50 to Facility Operating Licenses Nos. DPR-31 and DPR-41. (May 15, 1980).

⁴ Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 54 to Facility Operating License No. DPR-41, page 4 (January 15, 1981).

the 28 percent limit will be fully sufficient to allow plugging of all tubes which the current inspection of Unit 4 will show might be susceptible to leaking in the foreseeable future.⁵ The plugging is, and has been, carried out by the licensee as a prophylactic program, and it has been successful in preventing leakage since mid-1978.⁶

The Center in its letter quotes the NRC to the effect that, "We do not have an adequate technical basis to predict steam generator performance for periods longer than six months." While the author of the letter does not identify the source of the quotation, a virtually identical statement was made in NRC, *Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 52 to Facility Operating License No. DPR-31*.⁷ The latter statement, however, continues, ". . . and that our consideration of extended operation beyond six (6) months would depend upon the operating experience at this and similarly degraded units." This last quotation reflects the consistent policy of the Commission in relation to Turkey Point Units Nos. 3 and 4. Thus statements concerning six-month maximum prediction period, such as the one quoted by the Center, must be taken in context. In context, it is clear the six-month initial period of operation after an inspection of steam generators may be followed by extensions, provided the technical basis supplied by the licensee, and the relevant operating experience, justify the extensions. This course of action has been followed in relation to Turkey Point Units No. 3 and 4 since 1977⁸ and satisfactorily protects the public health and safety.

The Center further asserts that the "steam generator tubes [of Unit 4] may be on the verge of leaking"; and that, according to a 1975 study by the Union of Concerned Scientists (study not further identified in the Center's letter), rupture of "a handful of tubes" would result in a core melt, with very serious public safety results.

The Staff, based on its studies, does not anticipate that a "handful of tubes" will rupture ("handful" is undefined in the petition), or that such an event, if it should occur, would cause a core melt. Neither does the

⁵ Safety Evaluation by the Office of Nuclear Reactor Regulation Relating to Amendment No. 68 to Facility Operating License No. DPR-31 and Amendment No. 60 to Facility Operating License No. DPR-41 (June 23, 1981). It is expected that approximately 2 percent additional plugging will be required in Unit 4 beyond the current 23.8 percent.

⁶ Safety Evaluation by the Office of Nuclear Reactor Regulation Relating to Amendment No. 66 to Facility Operating License No. DPR-41 (September 10, 1981).

⁷ Unit 3 has the same design steam generator as Unit 4 with substantially similar degradation experience.

⁸ Florida Power and Light Company (Turkey Point Plant, Unit 3), DD-80-28, 12 NRC 386 (1980).

petitioner advance any factual basis for anticipating such events. Isolated breaks of single tubes which could be described by the word "rupture" have occurred in steam generators similar to those of Unit 4. In these instances, however, the reactors have been shut down in an orderly fashion.

As indicated above, the steam generator tubes of Unit 4 are being regularly monitored. Moreover, the license for Unit 4 requires a cold shutdown if leakage exceeds the prescribed limit of 0.3 gpm per steam generator.⁹ Staff is of the view that the 0.3 gpm leakage limit, and actions required should this rate be exceeded (along with the monitoring previously described), are fully adequate to protect the health and safety of the public.¹⁰

Finally, the Center asserts in its letter that steam generator tube integrity is an unresolved safety issue. While it is true that the problem of steam generator tube integrity is not fully resolved, the problem has received careful ongoing review and analysis, as described above. Accordingly, and in view of the history of the steam generators of Unit 4, further action by NRC regarding Unit 4's steam generators is unnecessary at this time. The procedures and safeguards instituted in relation to that problem are sufficient to safeguard the public health and safety.¹¹

III. Requested Action With Reference to Reactor Pressure Vessel

The Center asserts that Turkey Point Unit No. 4 is one of a number of nuclear power plants "whose steel pressure vessel may be vulnerable to cracking or shattering caused by thermal shock in the event of an accident that requires high pressure injection emergency cooling." The petition further cites pressure vessel safety as an unresolved safety issue.

During the past few months the subject of reactor pressure vessel thermal shock has received increased attention by the NRC staff and industry representatives. The NRC staff has recently evaluated (1) the types of transients or accidents that could lead to overcooling of the reactor system; (2) experience to date with transients that have occurred in U.S. pressurized water reactors; (3) the probability that such overcooling events will occur; and (4) the capability of reactor vessels to withstand these transients.

As a result of its evaluations to date, the staff has concluded that the probability of a severe overcooling transient is relatively low. For Babcock

⁹ Facility Operating License No. DPR-41, as amended, paragraph D(2).

¹⁰ Safety Evaluations, footnotes 3 and 5, *supra*.

¹¹ NRC Regulatory Guide 1.83 contains the standard procedures for inspecting steam generators, which standards are considered adequate by NRC for protecting the public health and safety. The procedures which have been developed for Turkey Point and inserted in Unit 4's operating license as mandatory requirements are significantly more rigorous than the procedures in Regulatory Guide 1.83, and therefore provide an additional margin of safety.

& Wilcox designed reactors this probability is estimated to be about 10^{-3} per reactor per year, and for Westinghouse and Combustion Engineering designed reactors, it is lower, perhaps by an order of magnitude. The staff has also concluded that, based on present irradiation levels at operating reactors, reactor vessel failure from such an event in the near term is unlikely. Therefore, no immediate licensing action is required for operating reactors including Unit 4.¹²

However, the staff believes that additional action should be taken to resolve the long-term problem. Toward this end, the staff, the Pressurized Water Reactor (PWR) owners' group, and PWR vendors are working together to determine the scope of the generic pressure vessel problem. In addition, plants with the most limiting condition (in terms of assured period of continued safe operation) in each vendor's group have been selected for individual study. Unit 4 having been selected as one of the plants for plant-specific study, a letter dated August 21, 1981, was sent to require the licensee in accordance with 10 CFR 50.54(f) of the Commission's regulations to submit information for review. Based upon the generic and plant-specific studies and reviews, NRC will take timely action in relation to the reactor vessel problem.

IV. Request for "License Review"

The letter from the Center also asked:

that the Nuclear Regulatory Commission take steps to immediately initiate a license review of this nuclear reactor unit [Unit 4]. It is the responsibility of the Nuclear Regulatory Commission to protect the public health and safety, and this can only be accomplished if adequate safety systems exist to protect the public in case of an accident We hope at this point the NRC will derate the unit, so that it doesn't operate in an unsafe manner.

Requests for a "license review" and to "derate the unit" appear to be synonymous with the request that the NRC consider the suspension of the license of Unit 4. Other than the assertions which have been discussed above concerning the steam generators and reactor vessel, the petitioner advances no facts that relate to possible safety inadequacies.

¹² *Preliminary Assessment of Thermal Shock to PWR Reactor Pressure Vessels*, SECY 81-286 (May 4, 1981).

V. Conclusion

Based on the foregoing discussion, I have determined that the petitioner's request for an order to shut down the Turkey Point Plant Unit 4 to inspect steam generator tubes should be and is hereby denied. Further, based upon the staff analyses of the Reactor Vessel question, I have also concluded that the petitioner's request for consideration of suspension of the license of Turkey Point Unit No. 4 should also be denied.

A copy of this decision will be placed in the Commission's Public Document Room at 1717 H Street, N.W., Washington, D.C. 20555 and the local public document room for the Turkey Point Plant located at the Environmental Urban Affairs Library, Florida International University, Miami, Florida 33199. A copy of this decision will also be filed with the Office of the Secretary of the Commission for its review in accordance with 10 CFR 2.206(c) of the Commission's regulations.

**FOR THE NUCLEAR
REGULATORY COMMISSION**

**Harold R. Denton, Director
Office of Nuclear Reactor Regulation**

**Dated at Bethesda, Maryland
this 5th day of November, 1981.**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

Richard C. DeYoung, Director

In the Matter of

**Docket Nos. STN 50-546
STN 50-547
(10 CFR 2.206)**

**PUBLIC SERVICE COMPANY OF
INDIANA**

**(Marble Hill Nuclear Generating
Station, Units 1 & 2)**

November 30, 1981

The Director of the Office of Inspection and Enforcement reevaluates an earlier denial (DD-81-10) under 10 CFR 2.206 to determine whether additional concrete testing should be performed in light of a statistical modeling error regarding multiple-stage sampling in the original testing program. In view of the actual results of the testing program in the context of a single-stage sampling program, the Director declines to initiate an additional program.

SUPPLEMENTAL DECISION UNDER 10 CFR 2.206

On June 26, 1981, a decision was issued under 10 CFR 2.206 (DD-81-10, 13 NRC 1129) that denied a petition filed by Save the Valley which requested withdrawal of the authorization to Public Service Company of Indiana (PSI) to resume concrete work on the Marble Hill project. After considering the bases for Save the Valley's request and other information related to the examination of the quality of concrete in the project as well as the improvements made in PSI's construction program, Save the Valley's petition was denied. As part of the Commission's review of the decision, the Office of Policy Evaluation (OPE) was asked to review the comments of Dr. Michael Cassaro, a consultant to Save the Valley, regarding the statistical model which Sargent and Lundy had used in establishing a sampling plan for testing the quality of concrete in structures at the Marble Hill project. Dr. Cassaro stated that the sampling plan

contained an error which had not been identified by the staff. In its review, OPE confirmed that the sequential sampling plan devised by Sargent and Lundy was in fact in error. The staff concurs in OPE's analysis of Sargent and Lundy's sequential sampling plan. However, in effect a far more stringent sampling plan was implemented, with the result that the test findings (over 1400 readings in 60 areas with no observed defects) more than achieved the stated criterion.

OPE has therefore, determined that the results of the testing program performed achieved the desired assurance (95% assurance of 95% reliability) that the concrete quality meets NRC requirements. Because the Sargent and Lundy sequential sampling plan could have affected the staff's conclusions regarding the quality of the concrete, the Commission asked "whether the assurance achievable from the test and evaluation program at Marble Hill meets NRC criteria in light of Save the Valley's July Addendum [to its petition] and OPE's memorandum of September 10, 1981".¹

This supplemental decision reflects the results of the staff's review in response to the Commission's request. In conducting this review, the Staff has also considered, in addition to the two documents mentioned above, a letter dated August 5, 1981, from Save the Valley's counsel to the Commission. In response to the Commission's request, copies of the OPE evaluation and the Commission decision were transmitted to Save the Valley, and to PSI, soliciting their comment. PSI responded by letter dated November 2, 1981. Save the Valley provided a response dated November 4, 1981.

The content of these submissions has been considered in developing this supplemental decision. The conclusion is that had a single-stage sampling plan been implemented, the observed results would have provided the required 95% assurance of 95% reliability. Therefore, for the reasons stated in this supplemental decision, additional concrete sampling is not necessary or warranted to assure acceptable confidence in the quality of concrete in the Marble Hill structures.

Sargent and Lundy developed the testing program for PSI. PSI had committed to provide assurance through statistical sampling that the concrete's quality was acceptable. Region III had confirmed PSI's commit-

¹ Memorandum for W. J. Dircks, Executive Director for Operations, from S. J. Chilk, Secretary (Oct. 5, 1981). A copy of this memorandum and all other documents referred to in this decision are available for public inspection in the Commission's public document room in Washington, D.C., and the local public document room in Madison, Indiana.

ment in an Immediate Action Letter dated June 27, 1979. The Immediate Action Letter did not specify a particular sampling method or program, but asked that the testing demonstrate adequate quality of the concrete by achieving 95% assurance of 95% reliability. As stated above, the sample tested has verified that the concrete quality does achieve the stated goal.

The test results more than achieved the stated criterion. The Sargent and Lundy sequential sampling plan required a first stage of 59 statistically independent readings, a second stage (if necessary) of 34 additional readings, etc. As the plan was implemented 60 sample areas were tested at several overlapping locations for a total of over 1,400 separate microseismic tests for the 60 areas. Even though not all these may be statistically independent readings, there were clearly far more than the equivalent of 60 independent readings. Hence, with no observed defects, the acceptance criteria of 95% assurance of 95% reliability has been far exceeded.

In Save the Valley's July Addendum and its August letter to the Commission, Save the Valley argues that Sargent and Lundy's testing program is unable to achieve the required confidence level because the effects of instrument error and human error are not included in the test program. Region III has previously responded to this concern in letters dated March 20 and July 22, 1981, to Dr. Cassaro, Save the Valley's consultant.² The measurement techniques and methodology for performance of the microseismic testing provided adequate safeguards against human or instrument error to the extent that, if errors were present, they would have had negligible effects on the test results. Each of the test locations within the 60 areas was usually tested at least twice before they were accepted for record. Each test that indicated a reflector was independently analyzed to determine whether the reflector could be attributed to a planned as-built condition: e.g., to the presence of rebar, conduits, or pipe sleeves which would be detected as discontinuities in the concrete by the microseismic testing technique. If available data and drawings were inconclusive, the area was tested destructively, by coring or line drilling, for evaluation. Cores were also taken from at least four areas which had been reported to be homogeneous concrete. Three different organizations participated in the evaluations with separate responsibilities to minimize error during acquisition and evaluation of data. Equipment performance tests were conducted at the beginning and end of each testing day. Qualification tests for the program are documented in the Sargent and Lundy³ report and in

² See Attachment A, ¶3, of letter from J. G. Keppler to Dr. M. A. Cassaro (March 20, 1981); Attachment A, ¶¶1 & 3, of letter from J. G. Keppler to Dr. M. A. Cassaro (July 22, 1981).

³ Report SL-3753 Rev. 1, dated November 21, 1980.

NRC Inspection Report No. 50-546/79-07--50-547/79-07 dated September 18, 1979. An NRC inspector observed qualification of the testing procedure prior to its implementation. Moreover, 21 additional destructive tests (cores and/or line drilling) were performed at the request of the NRC's independent consultants. These additional tests did not identify any errors in the results that the previous microseismic testing had established. The NRC consultants also requested a test of the transducer (the equipment used in the microseismic testing). The test was performed on a one foot cube of concrete on February 9, 1981. After the instrument indicated a discontinuity in the concrete cube, the cube was sawed and the discontinuity was found. Dr. Cassaro as well as the NRC's independent consultants witnessed this test. Since adequately conservative procedural safeguards were implemented to preclude instrument and human error during the microseismic testing, errors that could be present would have had a negligible affect on the testing results.

In view of the foregoing information regarding the results of the tests that were actually performed, additional testing of the concrete quality is not necessary. The 60 areas that were tested were appropriately selected to include a large number of potentially defective areas, and the tests were performed in an appropriate manner. The NRC's independent consultants reviewed the test results and had additional destructive tests performed to confirm the results found in the Sargent and Lundy program. The consultants found as a result of their investigation that the concrete quality was acceptable at Marble Hill.⁴ Other efforts to evaluate concrete quality have included rigorous examination of exposed concrete surfaces and repair of any defects. Special constraints were imposed on continued construction work to ensure that surface areas were examined and repaired before they were covered by additional construction work. Upon consideration of the results of the testing that has been conducted, additional testing is not required. On the basis of available information, the concrete quality does provide the required assurance of 95% reliability. Based on the results of the described program, and information known to the staff, no further action is warranted at this time to assure that the Marble Hill structures contain concrete of acceptable quality.

In its July Addendum and its August letter to the Commission, Save the Valley asked that a hearing be held before the Commission concerning the acceptability of Marble Hill's concrete. The Commission is not required to hold a hearing to determine whether it should review a decision under 10

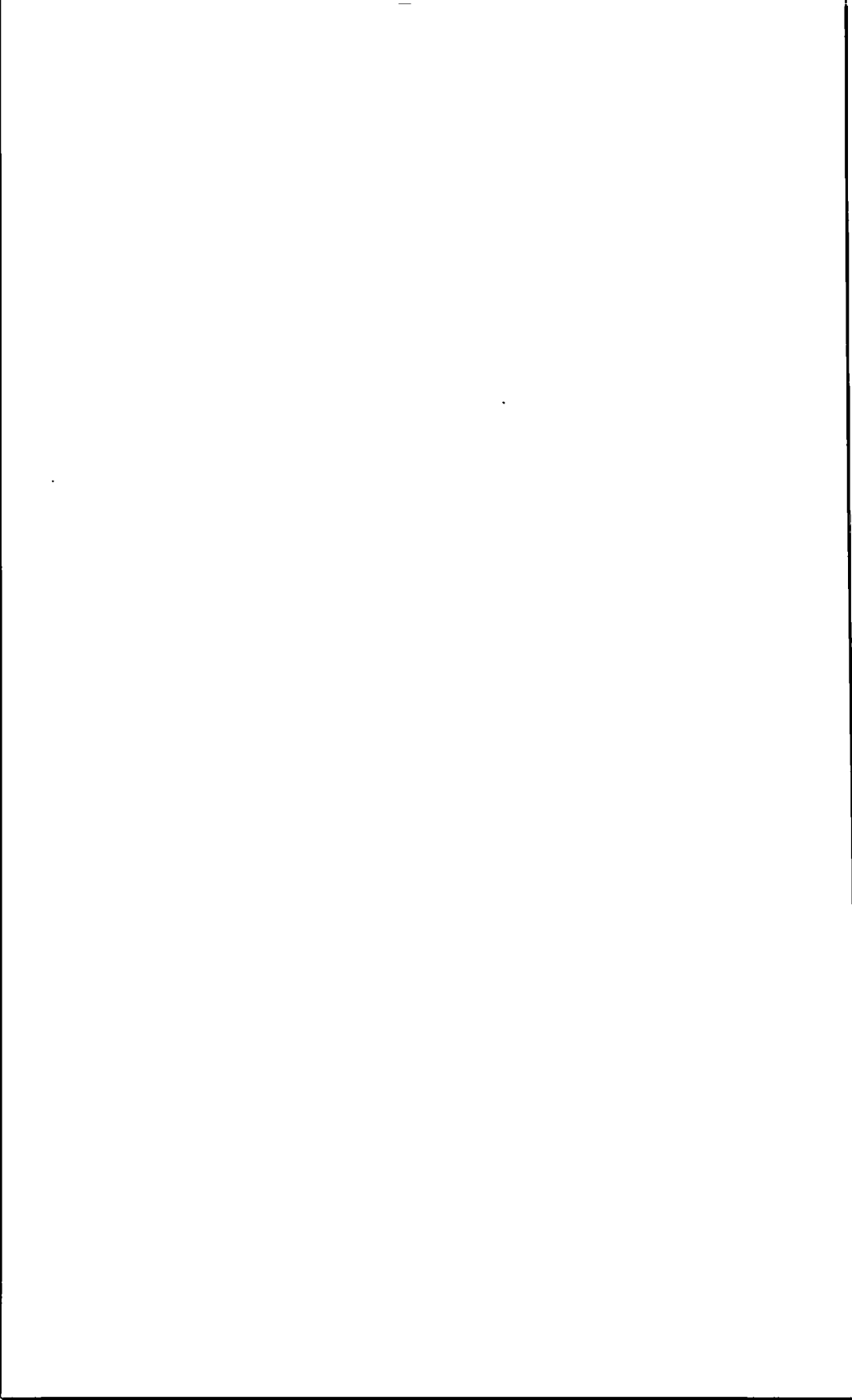
⁴ See Parme & Hamm, *Review of the Evaluation of Concrete at Marble Hill Nuclear Generating Station Units 1 and 2*, Report No. IE-124 (June 25, 1981).

CFR 2.206 or should grant a section 2.206 petition.⁵ The holding of hearings on a section 2.206 petition would be an extraordinary action and is not warranted in this case. The Commission has before it a substantial amount of information concerning the quality of Marble Hill's concrete. Save the Valley's views have been presented in its filings before the Commission and the technical analyses prepared by its consultants, Dr. Cassaro and Dr. Alexander. The licensee has submitted its comments on the OPE memorandum. The NRC Staff's views are set forth in this decision and in DD-81-10, and in its correspondence with Dr. Cassaro. The Commission also has the benefit of OPE's analysis and the report of the NRC's independent consultants. These various documents form a comprehensive basis from which the Commission can judge whether to review my determination not to require further concrete testing and my decision not to withdraw the authorization for PSI to resume construction. In light of these circumstances, I do not recommend that the Commission hold the requested hearing.

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland,
this 30th day of November 1981.

⁵ *People of the State of Illinois v. NRC*, 591 F.2d 12 (7th Cir. 1979).



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Victor Gilinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of

Docket Nos. 50-361 OL
50-362 OL

**SOUTHERN CALIFORNIA EDISON
COMPANY, et al.**
(San Onofre Nuclear Generating
Station, Units 2 and 3)

December 8, 1981

The Commission decides that its current regulations do not require consideration of the impacts on emergency planning of earthquakes which cause or occur during an accidental radiological release, and that the Commission will consider on a generic basis whether the regulations should be changed to address the potential impacts of a severe earthquake on emergency planning. The Licensing Board is directed not to pursue this issue, which it had raised *sua sponte*, in this operating license proceeding.

MEMORANDUM AND ORDER

By order dated September 18, 1981, the Commission took up on its own motion the issue previously raised *sua sponte* by the Atomic Safety and Licensing Board — whether emergency planning should be concerned with earthquakes approaching or beyond the safe shutdown earthquake occurring with a release of radiation offsite.¹ After consideration of this and related issues, the Commission has decided that its current regulations do not require consideration of the impacts on emergency planning of earthquakes which cause or occur during an accidental radiological release.

¹ By definition, in the event of a safe shutdown earthquake, the plant is required to be designed to be capable of safe shutdown or the prevention of the release of radiation in excess of levels specified in current regulations. 10 CFR Part 100, App. A, III(c).

Whether or not emergency planning requirements should be amended to include these considerations is a question to be addressed on a generic, as opposed to case-by-case, basis. Accordingly, the Licensing Board is hereby directed not to pursue this issue in this proceeding.

A review of the rulemaking file associated with the Commission's emergency planning regulations (see 45 FR 55402; 44 FR 75167; 44 FR 41483) reveals that the Commission did not address the question of how the consequences of a severe earthquake would influence emergency planning. Three commenters suggested that the NRC specifically require the occurrence of earthquakes or severe natural phenomena to be part of the basis for emergency response planning, but the comments were not accepted in the final rule. (See NUREG-0628, NRC Staff Preliminary Analysis of Public Comments on Advance Notice of Proposed Rulemaking on Emergency Planning; NUREG-0684, Summary of Public Comments and NRC Staff Analysis Relating to Rulemaking on Emergency Planning for Nuclear Power Plants; and NUREG/CP-0011, Proceedings of Workshops on Proposed Rulemaking on Emergency Planning for Nuclear Power Plants.) The current regulations are designed with the flexibility to accommodate a range of onsite accidents, including accidents that may be caused by severe earthquakes. This does not, however, mean that emergency plans should be tailored to accommodate specific accident sequences or that emergency plans must also take into account the disruption in implementation of offsite emergency plans caused by severe earthquakes.

The Commission will consider on a generic basis whether regulations should be changed to address the potential impacts of a severe earthquake on emergency planning. For the interim, the proximate occurrence of an accidental radiological release and an earthquake that could disrupt normal emergency planning appears sufficiently unlikely that consideration in individual licensing proceedings pending generic consideration of the matter is not warranted. The Commission will consult with the Federal Emergency Management Agency as it proceeds to determine a further course of action.

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.
this 8th day of December, 1981.

ADDITIONAL VIEWS OF COMMISSIONER AHEARNE

The San Onofre Licensing Board has identified two weaknesses in the NRC approach to emergency planning. The Commission should address these weaknesses on a generic basis.

The basic assumption in emergency planning is that radioactive materials are released into the area around the plant, i.e., emergency planning assumes failure of reactor safety systems. The board has suggested that we should also examine our assumptions about the impact of natural disasters occurring during a release on emergency planning capability.

Reactors are built in areas of differing natural hazards: earthquakes in California; tornadoes in Alabama; hurricanes in Florida, Texas, North Carolina and Connecticut; blizzards in Wisconsin. The NRC emergency planning rule accommodates operation under the worst *annual* conditions. The Board suggests that is correct for the basic plan, but that the plan should also be examined to see how much flexibility it has to provide some response capability for a once in a lifetime event. (The Board actually discussed a once in thousands of years event.)

In determining whether this issue should be included in the San Onofre operating license proceeding, several questions should be answered:

- (1) Will specific reactor design changes be required? I do not believe so. The types of changes that might be required to achieve flexibility relate to adequate preparation, i.e., thinking in advance about possible difficulties and developing procedures to assure the appropriate response. Consequently, changes with respect to the reactor itself would not be necessary.
- (2) Will local governments be required to spend sizeable funds in order to implement these modifications? I do not believe they will. Because of the very low probability of the basic events being discussed, it is not appropriate to impose major new requirements. Rather, the goal is to provide for graceful degradation of the plan under worse than planned for conditions.
The most likely result would be to require examination of a plan to see what kind of flexibility or stretch it has, and then perhaps to incorporate some where there is none through advance planning.
- (3) To what extent will resolution of the issue turn on expert judgment? Examination of plans for degradation will primarily be subjective, requiring expert knowledge.

- (4) Why should this not be done by FEMA? The issues involved are ones that relate primarily to the offsite planning by State and local governments. This area is reserved to FEMA in the emergency planning process.
- (5) Why should the requirements not be set generically rather than by an individual licensing board? The issues raised by the board affect all emergency planning and consequently are not unique to San Onofre.

These considerations provide additional support for the Commission's decision to address this issue generically rather than in the San Onofre proceeding:

- (1),(2) My expectation that reactor design changes and large expenditures by the local governments will be unnecessary supports my belief that resolution of the issue can wait for a generic proceeding. Otherwise it might be difficult to backfit any final decision concerning the need to incorporate flexibility.
- (3) Input from a Licensing Board is less useful for areas which turn primarily on expert judgment than for areas which can be resolved largely by using logic and general scientific principles.
- (4) The structure of the hearing decision process is not consistent with the need to have FEMA take the lead in resolution of this issue.
- (5) The fundamental question is how to approach this area of emergency planning. Issues of basic policy should be set by the Commission, not an individual Licensing Board.

Therefore, I conclude the Commission should (1) direct the Licensing Board not to take up this issue, (2) direct the staff to work with FEMA to develop an approach for checking the flexibility of plans and develop guidelines as to what should be included in those plans, (3) direct the staff to work with FEMA in examining existing plans for San Onofre and other appropriate reactors to determine whether adequate flexibility appears to be present, and finally (4) based on this work prepare and publish for public comment the necessary revisions to our emergency planning rule.

Having outlined my position as to why I recommend support of the Commission order, I believe I must respond to several points made by Commissioner Gilinsky.

I do not see us going to great lengths to avoid having a licensing board deal with a question. I strongly disagree with the implication in Commissioner Gilinsky's remarks that having a board examine and decide issues can be done simply and quickly. In fact, experience shows that putting complex issues into the adjudicatory system without adequate guidance

leads to a long drawn out process and a poor decision. What is all too familiar is the willingness of Commissioners to abdicate their responsibility to develop policy for the agency. The responsibility for long rulemakings resides with the people who run the agency, namely, the Commissioners. The Reorganization Act reserves formulation of basic policy to the Commissioners. Let us do it.

SEPARATE VIEWS OF COMMISSIONER GILINSKY REGARDING THE SAN ONOFRE *SUA SPONTE* ISSUE

It appears the Commission will go to any length to avoid having a Licensing Board deal with a question the Board itself has raised.

The San Onofre Board asked, in effect, whether the applicant and NRC staff had considered the possibility that an earthquake which damages the reactor might simultaneously disrupt evacuation routes and sever offsite communication. Such an earthquake need not necessarily exceed the limiting earthquake considered in the safety review process. It seems a reasonable question to ask about a nuclear plant in an earthquake-prone area.

A common sense approach would let the Board examine and decide the issue in the particular circumstances of this case. This could be done simply and quickly and the Commission would have a chance to review the result. Instead, to take the matter outside the adjudicatory process, the Commission has decided that the question affects all plants and that it should therefore be handled "on a generic basis". It will consult with the Federal Emergency Management Agency on the effects of earthquakes on emergency planning "as it proceeds to determine a further course of action".

If past practice is a guide: Interagency meetings will be held. Memoranda will be written. The Commission will be briefed. Contracts to study the question will be awarded to national laboratories. Increased budget requests will be received from our staff. The Commission will be drawn into ponderous rulemaking. But the most elementary steps to assure public protection will not be taken. An all too familiar story.

SEPARATE VIEWS OF COMMISSIONER BRADFORD REGARDING THE SAN ONOFRE *SUA SPONTE* ISSUE

I agree with the views of Commissioner Gilinsky. In addition, I would note that the Commission has had a number of opportunities over the last three years to review on-going proceedings to correct problems arising from Licensing or Appeal Board decisions or from staff 2.206 denials. When it has stepped into proceedings in progress, it has curtailed investigation of issues unfavorable to the applicant; the Commission has stayed its hand when that action upholds Board or staff conduct favorable to the applicant.¹ It has rarely required a Board or the staff to expand safety or environmental considerations.

This case presents an especially unfortunate manifestation of that tendency. Despite a recent demonstration of the value of *sua sponte* review,² the Commission is telling a Board that has had the foresight to uncover "a serious safety matter" within the meaning of 10 CFR 2.760a that it may not inquire into the matter further, even though the Board apparently doubts that it has "reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency (10 CFR 50.47)." The result of this action could easily be an inadequacy in San Onofre emergency planning that goes unremedied for a long time.

¹ See, e.g., *Metropolitan Edison Company* (Three Mile Island Nuclear Station, Unit 1), CLI-80-16, 11 NRC 674 (1980), restricting the manner of litigation of hydrogen control issues; *Metropolitan Edison Company* (Three Mile Island Nuclear Station, Unit 1), CLI-80-39, 12 NRC 607 (1980), foreclosing any consideration of psychological stress arising from the reopening of Three Mile Island; *Northern Indiana Public Service Company* (Bailly Generating Station, Nuclear-1), CLI-79-11, 10 NRC 733 (1979), refusing a hearing on a change in plant foundations, *reversed sub nom, People of the State of Illinois v. NRC*, No. 80-1163 (D.C. Cir., July 1, 1981); *Houston Lighting and Power Company* (South Texas Project, Units 1 and 2), CLI-81-28 (November 4, 1981), declining to review an Appeal Board order reversing a Licensing Board decision to furnish names of witnesses interviewed during an NRC investigation; and an unmemorialized 2-2 decision in May 1981, not to review errors by a Diablo Canyon Licensing Board, see *Pacific Gas and Electric Company* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-81-22 (September 21, 1981), Commissioner Gilinsky's Separate Opinion, at 603.

² *Florida Power and Light Company* (St. Lucie Nuclear Power Plant, Unit No. 2), ALAB-603, 12 NRC 30 (1980).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Victor Gilinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of

Docket No. 50-389
(Restart)

METROPOLITAN EDISON
COMPANY
(Three Mile Island Nuclear
Station, Unit No. 1)

December 23, 1981

The Commission revises its schedule for the receipt of comments on (1) whether the Licensing Board's December 14, 1981 decision on hardware/design issues, emergency planning and the separation of Units 1 and 2 should be made effective immediately and (2) whether the Commission should defer its own decision on restart after a Board decision on certain cheating incidents. The Commission withdraws Appeal Board authority to stay proceedings during the pendency of appeals in this case, and advises any party supporting or opposing a stay to so argue in its comments to the Commission on the two questions.

ORDER

On November 30, the Commission issued an Order establishing a schedule for the receipt of comments on whether the Licensing Board's decision on hardware/design issues, emergency planning and the separation of Units 1 and 2 should be made effective immediately if that decision is favorable to restart. On December 14, 1981, the Board issued its decision. The Board's decision is extremely lengthy and detailed. The schedule has been revised in light of this development. Comments on the decision and on whether the Commission should defer its own decision on restart until after a Board decision on the cheating incidents must be received by the Commission within 30, rather than 20, days after the issuance of the

Board's decision (i.e., comments are due in the Commission's hands by January 13, 1982). Reply comments must be received within 7 days thereafter (i.e., reply comments must be received by January 20, 1982). After considering the comments and replies described above, the Commission will either issue a decision regarding restart or advise the parties of the schedule that will be followed.

The Commission is the exclusive administrative body with the power to determine whether Unit One may restart during the pendency of any possible appeals of a Board decision before the Atomic Safety and Licensing Appeal Board. Parties may not file papers with the Appeal Board either supporting or opposing a stay of any such decision during the pendency of any such appeals. Therefore, any party which has a position on whether, in light of the Licensing Board's decision, Unit One should be allowed to restart during the pendency of any such appeals should so argue in its comments submitted to the Commission.

The Commission has decided against Appeal Board stay authority because this case differs significantly from normal initial operating license cases. Here, a decision by the Commission rather than granting effectiveness to a Licensing Board decision, would be determining, based on that decision and other factors, whether the concerns which prompted its original immediate suspension order of August, 1979, justify a continuation of that suspension. If they do not, and the Commission therefore can no longer find that the "public health, safety and interest" mandates the suspension, then the Commission is required by law — whatever the nature of the Licensing Board's decision — to lift that suspension immediately. This is a matter peculiarly within the Commission's knowledge and involving the most discretionary aspects of its enforcement authority.

Accordingly, we have decided that Appeal Board stay proceedings are not well suited to this case.

Commissioner Gilinsky's Separate Views and Commissioner Bradford's Partial Dissent follow.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.
this 23rd day of December, 1981.

COMMISSIONER GILINSKY'S SEPARATE VIEWS

(December 22, 1981)

I did not vote on this matter because the opinion drafted by the General Counsel for the majority, and the modifications of the Commissioners comprising that majority, were not circulated to my office until less than an hour before the Commission meeting at which this Order was affirmed.

I agree with the points made by Commissioner Bradford regarding the restrictions placed on the Appeal Board's review of this case.

The Commission decided recently (over the objection of Commissioner Bradford and myself) that it would reverse its earlier commitment to itself review the TMI-1 Licensing Board decision. Instead, it decided to treat this case much like any other and turned the review over to the Appeal Board. In these circumstances, I find it odd that the Commission has so little faith in the Appeal Board's judgment that it now deprives the Appeal Board of its normal authority to grant or deny requests for a stay.

VIEWS OF COMMISSIONER BRADFORD, DISSENTING IN PART

I had thought that the Commission's earlier decision to provide the normal Appeal Board review in this case (CLI-81-19, 14 NRC 304, August 20, 1981) was intended to put TMI on about the same appellate footing as all other adjudications. However, today's decision denying the Appeal Board the stay power that it has in all other such cases undermines the justification for the earlier decision for no apparent reason other, perhaps, than an unspoken fear that the Appeal Board might actually grant a stay.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Victor Gillinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of

Docket No. 50-537
(Exemption Request
Under 10 CFR 50.12)

UNITED STATES DEPARTMENT
OF ENERGY
PROJECT MANAGEMENT
CORPORATION
TENNESSEE VALLEY AUTHORITY
(Clinch River Breeder Reactor
Plant)

December 24, 1981

The Commission announces procedures and a schedule for the consideration of the merits of the request of the Department of Energy — a co-applicant for a construction permit for the Clinch River Breeder Reactor — for an exemption from 10 CFR 50.10, pursuant to 10 CFR 50.12, to conduct site preparation activities prior to the issuance of a construction permit or limited work authorization for the plant.

REGULATIONS: EXEMPTIONS

Neither the Atomic Energy Act nor NEPA dictates the form of proceedings on requests for exemptions from 10 CFR 50.10 pursuant to 10 CFR 50.12.

MEMORANDUM AND ORDER

Introduction

This Memorandum and Order establishes the Commission's procedures for considering the merits of the Department of Energy's (DOE's) request for an exemption from 10 CFR 50.10 pursuant to 10 CFR 50.12 in order to begin site preparation for the Clinch River Breeder Reactor. For the reasons discussed below, the Commission believes that an informal proceeding directed by the Commission itself is best suited for consideration of the merits of this exemption request.

Background

On November 30, 1981 DOE, for itself and on behalf of its co-applicants Project Management Corporation and the Tennessee Valley Authority, requested the Nuclear Regulatory Commission (NRC or Commission) to grant an exemption from 10 CFR 50.10 pursuant to 10 CFR 50.12 to conduct site preparation activities for the Clinch River Breeder Reactor (CRBR) prior to the issuance of a construction permit or limited work authorization. DOE's proposed site preparation activities include site clearing and grading; excavation and quarry operations; the construction of temporary construction related facilities, a barge facility, an access road and railroad spur; and the installation of services including power, water, sewerage and fire protection. None of the work appears to involve safety-related structures, systems, or components subject to the Commission's safety regulations in 10 CFR Part 50. Among the reasons advanced by DOE in support of its request are the claims that: (1) Congress has expressed the intention that the CRBR project be completed expeditiously; (2) procedural delays will cause undue hardship in the form of another 1-2 years of delay and \$120-240 millions of increased costs; and (3) the project is in an advanced stage of development and is ready to begin site preparation activities.

Views Of The Parties

DOE requested that the Commission itself rule on this exemption request because it raises substantial national policy considerations that only the Commission can address. These include cited Presidential and Congressional mandates to construct the CRBR in a timely and expeditious manner, the implications of alleged increased costs, and the alleged adverse

effects of delay on DOE's responsibility for developing the technology of the liquid metal fast breeder reactor (LMFBR).

DOE also contended that a hearing is not required on its exemption request. In its view, the Commission's requirements for a hearing prior to commencement of site preparation activities are not compelled by either the National Environmental Policy Act (NEPA) or the Atomic Energy Act of 1954, as amended. Moreover, DOE believes an informal proceeding will prove adequate for resolving any disputed matters. DOE is opposed to a referral of its request to an Atomic Safety and Licensing Board (Board) for adjudicatory hearings since, in DOE's view, such a referral only serves to further delay the project without providing the Commission with meaningful assistance in addressing the policy and other issues raised by the exemption request.

DOE's request was opposed by the Natural Resources Defense Council, Inc. and the Sierra Club, intervenors in the now suspended adjudicatory hearing on applicant's 1976 application for a construction permit. Intervenor agree that this request raises major issues of policy and law that should be decided in the first instance by the Commission itself based on oral argument and written comments. The issues identified by NRDC and the Sierra Club are: (1) the applicability of the exemption provisions in 10 CFR 50.12 to this unique project; (2) the existence of a Congressional mandate for expedition as argued by DOE; (3) the effect of granting the exemption on one of the CRBR's alleged purposes which is to demonstrate the licensability of breeder reactors; (4) the effect of an exemption on public confidence in CRBR; (5) the predetermination of intervenors' environmental contentions in the suspended proceeding; and (6) the completeness of the environmental record. NRDC and the Sierra Club believe that these are threshold issues that must be addressed by the Commission before it reaches the other merits of the exemption request. They contended that a consideration of these threshold issues will lead to denial of the exemption request. However if, contrary to their position, Commission consideration of these issues is not dispositive, then several factual issues require resolution before the exemptions can be granted. They believe that the Commission's practice has been to refer these kinds of factual issues to a Licensing Board for a formal adjudicatory hearing. They have conceded that neither the Atomic Energy Act nor NEPA requires such a hearing. Rather, the thrust of their argument appears to be that a formal hearing is required by Commission precedent. Moreover they argue that a formal hearing is the most effective way to elucidate the facts bearing on the exemption request. Finally, they believe that any adjudicatory hearing should be conducted by the Board for the now suspended LWA proceeding. Because that Board is familiar with the details of CRBR, NRDC and the Sierra Club believe it could provide timely review.

On December 16, 1981, we provided the parties to the suspended permit proceeding an opportunity to address the appropriate procedures for NRC consideration of the merits of applicants' exemption request. Appearances were made by representatives for the applicants and NRDC and Sierra Club.¹ Applicants presented a proposed procedure and schedule for direct Commission consideration of the exemption request. That procedure included an opportunity for comments by the public, responses to comments, and an oral presentation to the Commission on the merits of the exemption request. NRDC and the Sierra Club stated their arguments as summarized above, and urged the Commission to consider the so-called threshold issues under a procedure similar to that proposed by the applicants. They agreed that the applicants' proposed schedule not only was reasonable but could be compressed by several weeks, assuming that no formal adjudicatory hearings were to be held.

Procedures To Be Followed

Following the oral presentations, the Commission met in public to decide how to proceed with consideration of the exemption request. The Commission believes, and applicants and NRDC and Sierra Club agree, that neither the Atomic Energy Act nor NEPA dictate the form of proceedings on exemption requests of the type requested here. There is also agreement on all sides that the request presents several major and novel policy and legal issues that are best resolved by the Commission itself as the highest policy-making entity within the agency. The dispute focuses on whether several of the policy and legal issues must be resolved at the outset against the grant of the exemption and, if not, whether resolution of residual factual issues should entail a formal adjudicatory hearing.

We decline to reach the merits of any of the policy or legal issues at this time, since further presentations will be required before there has been fair opportunity to present opposing views. We agree with NRDC and the Sierra Club that the exemption request may present issues of fact relating to matters such as the environmental impact of the proposed work and the cost-savings from granting of the exemption. However, we cannot agree that a formal adjudicatory hearing will prove to be the only way for adequate ventilation and resolution of these issues, or that formal ad-

¹ A statement in support of the exemption request was also made by a representative for the Governor of Tennessee, who is not a party to the suspended proceeding. However, a representative of the Attorney General of Tennessee, who is a party to the proceeding, stated that the Attorney General had not yet taken a position on the exemption request or on the procedures for its consideration by the Commission.

judicatory hearings are dictated by past Commission practice.² It is quite common for such issues to be resolved by informal procedures falling short of formal examination and cross-examination of sworn witnesses. Even within the Commission itself, such issues are routinely and adequately dealt with in the informal Staff and ACRS review processes. There is no reason to believe that the informal procedures which follow will not prove adequate to the task. Moreover, we believe that the estimates of NRDC and the Sierra Club of the time required for the conduct of formal hearings by a Licensing Board are extremely optimistic. The one case cited

² Although intervenors acknowledge the Commission precedent is "split" on the issue of a need for a hearing on an exemption request, their analysis of Commission decisions on exemption requests leads them to conclude that the Commission's practice has been to consider adjudicatory hearings necessary in every contested case. We believe that this conclusion does not adequately characterize Commission practice.

Only 5 exemption requests have been considered by the Commission over the years, and in only two cases did the Commission hold a hearing. However, both cases arose under unusual circumstances. In *Carolina Power and Light Company* (Shearon Harris Nuclear Power Plant, Units 1, 2, 3 and 4), CLI-74-9, 7 AEC 197 (1974) (*Shearon Harris I*), the Deputy Director for Reactor Projects, Directorate of Licensing had granted the applicant's request for an exemption without notice to the intervenors or an opportunity for a hearing. Upon learning of the grant of the exemption, an intervenor petitioned the Commission for a stay of that exemption. The Commission referred the stay request to the Board having jurisdiction over the construction permit proceeding, and also determined that "under the circumstances of this case" the Board should conduct a hearing on the merits of the exemption request "even though the rule as written does not require adversary hearings in connection with applications for these exemptions." *Id.* at 198. Thus, the Commission's initiation of a discretionary hearing in *Shearon Harris I* must be viewed as a response to the Director's previous failure to notify interested parties of the grant of an exemption. In *Kansas City Gas and Electric Company, Kansas City Power and Light Company* (Wolf Creek Generating Station, Unit No. 1), CLI-76-20, 4 NRC 476 (1976) the Commission referred the applicant's request for an exemption to the Licensing Board already considering the application for a construction permit. This exemption request was filed after the United States Court of Appeals for the District of Columbia Circuit had decided *Natural Resources Defense Council v. NRC*, 547 F.2d 663 (D.C. Cir. 1976) which found inadequate the Commission's original rule on the environmental effects of the uranium fuel cycle (Table S-3). In response to that decision, the Commission decided that licensing could resume only if an examination of the revised values in Table S-3 showed that the cost-benefit balance would not tip against a proposed plant. 41 Fed. Reg. 49898, 49899 (November 11, 1976). Thus, the Commission's referral of the exemption request to the Licensing Board was primarily for the purpose of obtaining an assessment of fuel cycle impacts. The Licensing Board, having considered the cost benefit issue, was obviously in the best position to consider if fuel cycle impacts would change the decision.

The Commission has not initiated a hearing in the three other exemption requests it has considered. In *Louisiana Power and Light Company* (Waterford Steam Electric Generating Station, Unit 3), CLI-73-25, 6 AEC 619, 622 n.23 (1973) (*Waterford*) the Commission stated that in the "circumstances of this case" it would be inappropriate to circumvent normal adjudicatory procedures by granting the exemption. Among the circumstances referred to by the Commission was the presence of seriously contested environmental issues in ongoing

(CONTINUED)

by them³ involved relatively few disputed factual issues. It is not at all clear that few factual issues will be presented here. We conclude that formal hearings will likely produce little additional benefit to the process and yet will likely cost a great deal, both in elapsed time and resources of the Commission and the parties.

Accordingly, the Commission is establishing the following procedures for consideration of the merits of the exemption request:

1. The request will be considered in an informal proceeding involving written comments and oral presentations to the Commission itself. This informal proceeding will be kept separate from the suspended construction permit proceedings.
2. The participants to this proceeding will be the applicants, NRDC and the Sierra Club, and any other interested person who has filed written comments in accordance with the schedule set out below. The NRC staff will not participate as a party to this proceeding.
3. Applicants shall, within one week of the date of this Order, file⁴ with the Commission currently available documentation supporting the factual representations in its exemption request. If this date

adjudicatory proceedings which were actually ongoing at that time. The Commission did not specify the "construction" activities for which an exemption was sought. The Commission then denied the request without a hearing. In *Gulf States Utilities Company* (River Bend Station, Units 1 and 2), CLI-76-16, 4 NRC 449 (1976) (*River Bend*) the Commission granted an exemption request without a hearing before it or a Board. Here again, the Commission's decision was based on the particular facts of the proceeding. The exemption request was not contested, and the proposed action was considered not to have any adverse environmental impacts. *Id.* at 450. In *Washington Public Power Supply System* (WPPSS Nuclear Project Nos. 3 and 5), CLI-77-11, 5 NRC 719 (1977) (*WPPSS*) the Commission denied an exemption request without a hearing. In *WPPSS*, the Commission stated that it would not assume the function of an existing Board and scrutinize factual issues itself absent a showing of extra-ordinary circumstances such as emergency situations in which time is of the essence and relief from the Licensing Board is impossible or highly unlikely. *WPPSS* at 723. Such circumstances had not been shown in that proceeding. Thus, *WPPSS* addresses the question of when the Commission will preempt a sitting Board and conduct a hearing on an exemption request. The decision does not address the question of how the Commission will handle an exemption request when there is no Board currently immersed in a proceeding on the very same issues raised by that request.

This review of Commission precedent shows that there has not been a uniform Commission practice to require a hearing before a Board for factual issues associated with an exemption request. Rather, the Commission has tailored its procedures to the factual circumstances of each case.

³ *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant, Units 1, 2, 3 and 4), LBP-74-18, 7 AEC 538 (1974).

⁴ All dates in this schedule are dates by which the Commission must receive filings or other documents.

cannot be met, then Applicants shall advise when the materials can be provided.

4. Applicants shall by January 18, 1982 file with the Commission answers to the questions in Attachment A to this Order.
5. Applicants, NRDC and the Sierra Club, and any other interested person may file written comments with the Commission in support of, or in opposition to, the exemption request. The comments may include answers to the questions in Attachment A. Such comments shall be filed with the Commission by January 18, 1982.
6. The Commission is requesting government agencies (including the Governor and the Attorney General of the State of Tennessee) to file with the Commission any comments they may have on the request by January 18, 1982.

The remaining steps are set forth in the attached schedule. A separate statement by Commissioner Bradford is attached. It is so ORDERED.⁵

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.
this 24th day of December, 1981.

IEWS OF COMMISSIONER BRADFORD

Past Commission practice has invariably been to permit limited comments of this sort to run as footnotes in the Commission opinion for the convenience of the reader. The Commission majority has decided, in the Clinch River case for the first time, to exclude uncongenial thought from its order. With apologies to any who must now find their mental and physical way back into that document, I have the following two comments:

⁵Commissioner Gilinsky did not participate in this Memorandum and Order.

- 1) Pages 1104-1105, Footnote 2 (to be read as a last paragraph to that footnote)

“Commissioner Bradford notes that this labored history amounts to exactly the situation described in the first paragraph as an erroneous intervenor view: The NRC has never granted a contested 50.12 exemption without an adjudicatory hearing.”

- 2) Page:1105, (to be read as a footnote to the sentence reading, “It is not at all clear that few factual issues will be presented here.”)

“Commissioner Bradford notes that an increase in factual issues does not decrease the need for an adjudicatory hearing. Indeed, the discussion preceding this sentence sails breathtakingly counter to decades of administrative law, to say nothing of centuries of development of adjudicatory procedures as the best available method for resolving contested issues of material fact. He would keep open the possibility of adjudicatory hearings until the Commission has a clearer appreciation of the possible role of contested factual issues in determining the outcome of the proceeding.

ATTACHMENT A

1. Is there any indication in acts providing for CRBRP authorizations or appropriations or other applicable statutes that NRC licensing of the CRBRP could, or could not, include use of 10 CFR Sec. 50.12 as proposed by the applicants?
2. Is there any indication in the acts providing for CRBRP authorizations or appropriations, associated committee or conference reports, or legislative history that speaks to the licensing procedures to be used by the NRC?
3. Under what conditions would grant of an exemption be authorized by law? Would grant of an exemption endanger life or property or the common defense and security? Would grant of this exemption be in the public interest? If not, why not? With regard to the public interest criteria in 10 CFR Sec. 50.12(a) and (b)(4), what interpretation and weight should be given to Presidential and Congressional statements pertaining to the timing of construction of the CRBRP?
4. Is the available documentation adequate for the Commission to base its decision on the exemption request to authorize site preparation activities? The documentation includes the applicant's Preliminary Safety Analysis Report (PSAR), Environmental Report (ER), Schedule for and Description of Site Preparation Activities to be conducted pursuant to 10 CFR 50.10(e)(1) (received April 11, 1975), and Site Preparation Activities Report (SPAR) (November 30, 1981) as well as the staff's Site Suitability Report (SSR) and Final Environmental Statement (FES).*
5. Identify areas, if any, in various licensing documents (PSAR, ER, FES, SSR, etc.) that need to be updated, which would have a bearing on this exemption decision.
6. What, if any, further exemptions from regulatory requirements does that applicant plan to request if this 10 CFR 50.12 request is granted? If this exemption is granted, does the applicant plan also to request a Limited Work Authorization?

* Such documentation will also include the DOE documentation supplied in response to this Order (Sec, e.g., Order *supra* at 1106.)

7. Provide the updated overall CRBRP schedule, including (a) current estimate of when applicant expects to request resumption of ASLB proceeding, (b) key milestones of constructing and licensing the plant, (showing DOE assumptions regarding dates for NRC licensing action) and (c) current expected date of operation. The schedule should indicate points at which a negative NRC action could adversely affect the overall CRBRP schedule.
8. Identify and discuss any changes in the project scope from the scope originally evaluated (staff FES Chapter 4 - Environmental Impacts Due to Construction) that may have contributed to the changes in proposed site preparation activities (page 3-1 of the Site Preparation Activities Report, November 1981), particularly the substantial increase in the amount of excavation.
9. (a) Provide the documentation which forms the basis for projected cost of delay and environmental impact estimates referred to in the Site Preparation Activities Report and Secretary Edwards' letter. (b) Demonstrate the validity of the cost estimate.
10. Provide the documented basis, criteria and the project scope to support the cost estimates for redressing the site should the project be terminated.
11. At the December 16th meeting, Mr. Silverstrom stated that if the Commission does not approve the request, then the project will be dead in the water in March.
 - (a) Please explain, including showing what activities will be completed by March and what activities will be ready for the first time in March that were not previously ready.
 - (b) Why is March, 1982 to commence the site preparation activities so crucial to the whole project? Identify any special reasons (either of a technical or an economical nature) why this date is selected.

ATTACHMENT B

SCHEDULE

	Date
1. Commission (notice, request) asking for public and Government agency comments on the 50.12 request and providing specific questions to be answered	12/24
2. Due date for comments and answers to questions	1/18
3. Due date for responses to comments and answers	1/28
4. Commission staff report	2/8
5. Notice of opportunity for oral presentation by applicants and commenters*	2/12
6. Oral presentation	2/15
7. Commission decision	3/1
8. Commission Order announcing decision	3/8

* An additional three weeks may be required from this point on if an additional set of questions are asked. There will be a two week period for responses to any additional questions to be followed by a one week period for replies to the responses.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Victor Gillinsky
Peter A. Bradford
John F. Ahearne
Thomas M. Roberts

In the Matter of

Docket Nos. 50-445
50-446

**TEXAS UTILITIES GENERATING
COMPANY, et al.**

**(Comanche Peak Steam
Electric Station, Units 1
and 2)**

December 29, 1981

The Commission directs the Licensing Board to dismiss certain contentions of an intervenor from the proceeding which the board had retained pursuant to its *sua sponte* authority under 10 CFR 2.760a subsequent to the Board's dismissal of the intervenor.

**LICENSING BOARDS: AUTHORITY TO REGULATE
PROCEEDINGS**

A board's inherent power to shape the *course* of the proceeding, *Offshore Power Systems* (Floating Nuclear Power Plants), ALAB-489, 8 NRC 194, 201-208 (1978), should not be confused with its limited authority under 10 CFR 2.760a to shape the *issues* of the proceeding. The latter is not a substitute for or means to accomplish the former.

**LICENSING BOARDS: AUTHORITY TO REGULATE
PROCEEDINGS**

The apparent need to expedite a licensing proceeding or need to monitor the staff's progress in identifying and/or evaluating potential safety or

environmental issues are not factors which authorize a board to exercise its *sua sponte* authority under 10 CFR 2.760a.

OPERATING LICENSE HEARINGS: *SUA SPONTE* ISSUES

The mere acceptance of a contention, which only requires that the contention be set forth with reasonable specificity, *Mississippi Power & Light Co.* (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-130, 6 AEC 423, 426 (1973), does not justify a board's assuming that a serious safety, environmental, or common defense and security matter exists or otherwise relieve it of the obligation under 10 CFR 2.760a to affirmatively determine that such a matter exists.

ORDER

In an order issued July 24, 1981, the Licensing Board dismissed an intervenor from the proceeding but retained, pending completing of appropriate staff review, eight of that intervenor's eleven contentions pursuant to its *sua sponte* authority under 10 CFR 2.760a. Following review of that order, the Commission requested the Board to describe as to each of the eight contentions the "particular factors beyond the mere pendency of staff review [on] which [the Board] bases its determination of the existence of a serious safety, environmental, or common defense and security matter." *Texas Utilities Generating Company* (Comanche Peak Steam Electric Station, Units 1 and 2), CLI-81-24, 14 NRC 614 (1981).

In an order served September 28, 1981 ("Order"), the Board set forth the particular factors which it believed justified the exercise of its *sua sponte* authority. In the main, the Board's latter order pointed to two factors as supporting its action under 10 CFR 2.760a: (1) prevention of continued delays in the proceeding and (2) absence of any threshold information sufficient to justify dismissal of accepted contentions. For the reasons set forth below, the Commission finds that neither factor establishes "that a serious safety, environmental, or common defense and security matter exists." 10 CFR 2.760a. Absent such a finding, the Board improperly retained the eight contentions at issue.

In connection with the first factor, the Board noted that "[p]art of the reason for our *sua sponte* action results from serious delays in the hearing caused by frequent slippages in the issuance of staff-generated documents." Order at 2. By exercise of its *sua sponte* authority, the Board felt that it could better monitor resolution of outstanding safety issues related to the retained contentions and "prevent them from getting lost in the shuffle of

40 open items subject to slippage . . ." Order at 3. Further, while noting that a different procedure for handling delays had been endorsed by the Appeal Board in *Offshore Power Systems* (Floating Nuclear Power Plants), ALAB-489, 8 NRC 194, 207 (1978), the Board believed that retention of contentions 12-19 would "enable it to review the causes of delay and to make a reasoned judgment on the record, *whether or not to invoke the procedures described in Offshore Power, supra.* (emphasis added)." Order at 5.

The use of a board's *sua sponte* authority as a potential case management tool may be easily disposed of. The Board has confused its inherent power to shape the *course* of the proceeding, discussed at length in *Offshore Power, supra.* at 201-208, with its limited authority under 10 CFR 2.760a to shape the *issues* of the proceeding. The Commission wishes to make clear that the latter is not a substitute for or means to accomplish the former. Indeed, taken to its logical conclusion, the Board's proposition could lead to the routine supervision of the staff's safety review until such time as the Board could evaluate the adequacy of the results of that review. Where a situation arises necessitating affirmative action by a board to ensure an expeditious hearing, the appropriate board response is to institute the procedures outlined in *Offshore Power* or in our policy statement of May 20, 1981 on the conduct of licensing proceedings. However, the assertion of a board's *sua sponte* authority to monitor or otherwise manage the course of a proceeding is not an appropriate use of this power granted licensing boards. Accordingly, the apparent need to expedite a licensing proceeding or monitor the staff's progress in identifying and/or evaluating potential safety or environmental issues are not factors which authorize a board to exercise its *sua sponte* authority under 10 CFR 2.760a.

As to the second factor supporting the exercise of its *sua sponte* authority, the Board concluded that there was a significant difference between dismissal of an accepted contention and the assertion of a previously unraised issue *sua sponte*. In its view, once found to satisfy the threshold pleading requirements under 10 CFR 2.714, contentions achieve the status of cognizable issues before a board independent of their sponsoring intervenor. Thus, dismissal of an intervenor for reasons unrelated to the merits of the intervenor's contentions "should not necessarily compel the automatic rejection of otherwise viable issues involving significant health and safety consequences." Order at 7. Rather, "[i]n order to dismiss an accepted contention, . . . some threshold level of informational justification should be satisfied. Absent such threshold, the contention must be addressed directly by the Board . . ." *Id.* Because the SER contained 40 open items and the retained contentions related to the resolution of those

items, the Board concluded that it was without the necessary threshold information upon which an informed decision to dismiss could be based.

The Board's reliance on the admission of a contention as a factor mandating the exercise of its *sua sponte* authority is misplaced. The mere acceptance of a contention does not justify a board to assume that a serious safety, environmental, or common defense and security matter exists or otherwise relieve it of the obligation under 10 CFR 2.760a to affirmatively determine that such a matter exists. At present, all an intervenor need do to support admission of a contention is set forth the basis for the contention with reasonable specificity. *Mississippi Power and Light Company* (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-130, 6 AEC 423, 426 (1973). Moreover, given the availability of summary disposition procedures, the admission of a contention does not automatically require exploration of that contention at hearing. Thus, the act of admitting a contention, even one alleged to relate to an unresolved safety issue, does not relieve a board of its obligation under 10 CFR 2.760a to make an affirmative finding that "a serious safety, environmental, or common defense and security matter exists" prior to exercising its *sua sponte* authority over the contention.

For the above reasons, the Commission concludes that the Licensing Board has not set forth a sufficient justification supporting its retention of the contentions at issue under 10 CFR 2.760a. Accordingly, the Board is directed to issue an appropriate order dismissing the contentions from the proceeding.

The separate views of Commissioner Bradford and Commissioner Gilinsky are attached.

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 29th day of December, 1981

SEPARATE VIEWS OF COMMISSIONER GILINSKY

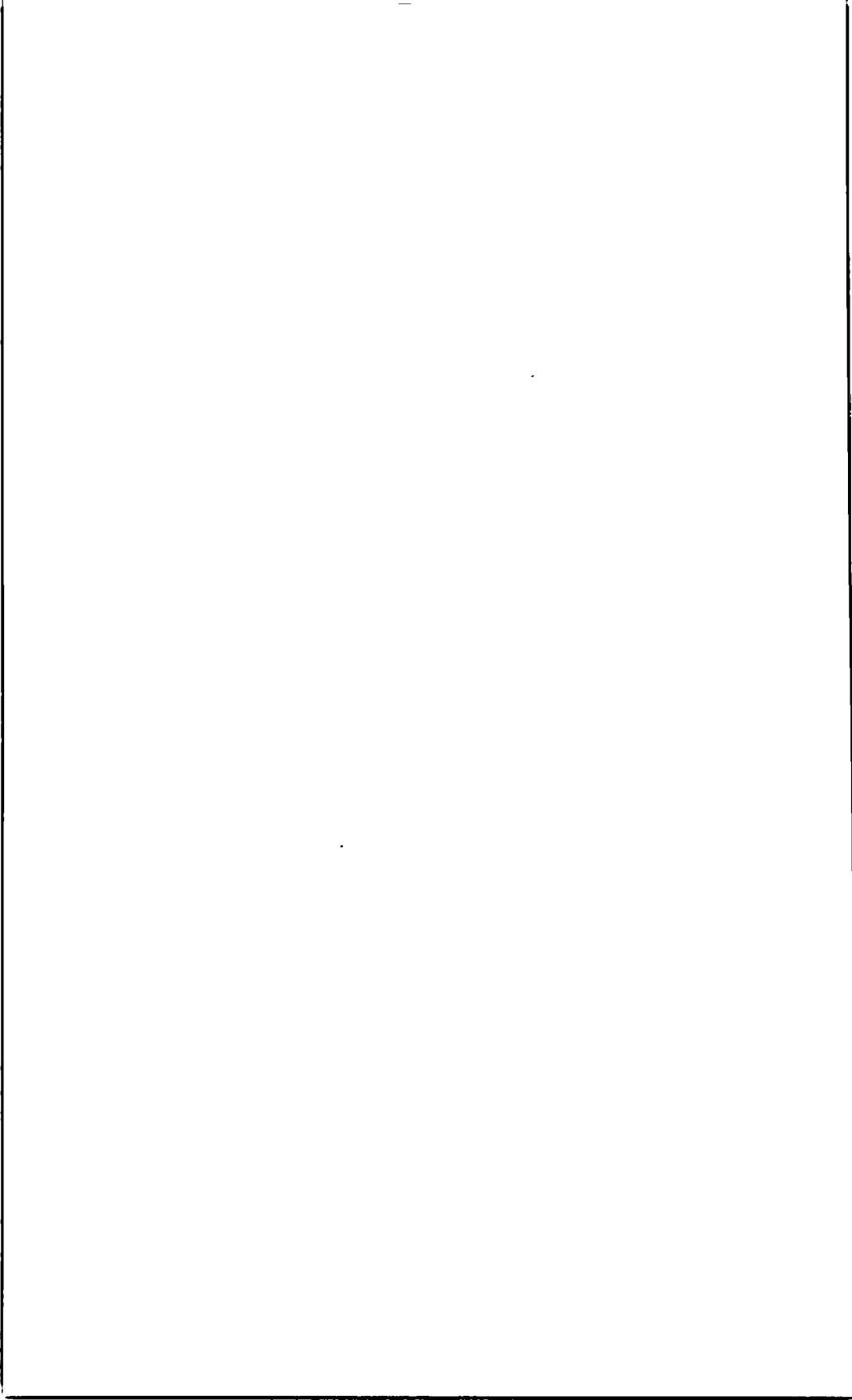
The amount of time which the Commission has spent on this interlocutory review is entirely disproportionate to the benefit or harm to the parties and to the licensing process of excluding or including these contentions. I would note that nothing in the Commission's order prohibits the Board from asking the staff to keep it apprised of the status of the eight open issues or

from later raising one of these issues *sua sponte* if it appears that a serious safety, environmental or common defense and security question exists.

SEPARATE VIEWS OF COMMISSIONER BRADFORD

The uninitiated might believe that only a major injustice or safety error would make the Commission reverse its longstanding reluctance to intrude into cases in progress instead of letting the issued be framed on appeal. Indeed, significant errors in both the *Diablo Canyon* and the *South Texas* proceedings in recent months have not moved the Commission from its restrained heights. Now, however, a rodent, errant *sua sponte*, has been spotted in our fields and for this the agency eagle unsheaths its talons and plunges from the clouds. A more neurotic set of appetities than the ones leading to this plunge is hard to imagine.

There are many more important possibilities if we want to start reversing errors as they are committed instead of on appeal. This action shows the agency's Supreme Court to share the dullwitted licensing process priorities of the American Nuclear Energy Council.



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Christine N. Kohl

In the Matter of

Docket No. 50-389 OL

**FLORIDA POWER & LIGHT
COMPANY**
(St. Lucie Plant, Unit No. 2)

December 3, 1981

The Appeal Board affirms, but for different reasons, an unpublished Licensing Board order denying two intervention petitions and requests for a "limited antitrust" hearing filed in this operating license proceeding, and deems final the Board's order dismissing this proceeding.

**CONSTRUCTION PERMITS: ISSUANCE (PENDING ANTITRUST
HEARING)**

Upon agreement of the parties, the issuance of a construction permit need not await the outcome of an antitrust hearing. *Louisiana Power and Light Co.* (Waterford Steam Electric Generating Station, Unit 3), CLI-73-25, 6 AEC 619, 621-22 (1973).

ATOMIC ENERGY ACT: ANTITRUST JURISDICTION

Section 105c of the Atomic Energy Act, as amended (42 U.S.C. 2135c), "establishes a particularized regime for the consideration and accommodation of possible antitrust concerns arising in connection with the licensing of nuclear power plants." *Houston Lighting and Power Co.* (South Texas Project, Unit Nos. 1 and 2), CLI-77-13, 5 NRC 1303, 1309 (1977).

ATOMIC ENERGY ACT: ANTITRUST JURISDICTION

The NRC must hold an antitrust hearing on a construction permit application if the Attorney General so recommends; however, the NRC is authorized to conduct an antitrust review at the operating license stage only if it finds changes in the licensee's activities that are both "significant" and "subsequent" to the previous Attorney General and Commission review (including any NRC antitrust hearing). *South Carolina Electric and Gas Co.* (Virgil C. Summer Nuclear Station, Unit No. 1), CLI-80-28, 11 NRC 817, 823 n. 11, 824-25 (1980).

ATOMIC ENERGY ACT: ANTITRUST JURISDICTION

Where a construction permit antitrust proceeding is under way, the antitrust provisions of the Atomic Energy Act effectively preclude the Commission from instituting a second antitrust hearing in conjunction with an operating license application for the plant.

RULES OF PRACTICE: ANTITRUST HEARINGS

There is a strong Commission policy of holding antitrust hearings separate from those involving health, safety, and environmental issues. *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-316, 3 NRC 167, 170-174 (1976).

RULES OF PRACTICE: NOTICE OF HEARING

A notice of opportunity for hearing necessarily corresponds to the agency's statutory authority over a given matter; it cannot confer or broaden that jurisdiction to matters expressly proscribed by law.

APPEARANCES

Mr. George R. Kucik, Washington, D.C. (with whom **Ms. Ellen E. Sward**, Washington, D.C., was on the brief), for the petitioners, **Parsons and Whittemore, Inc.**, and **Resources Recovery (Dade County), Inc.**

Mr. Robert A. Jablon, Washington, D.C., for the petitioners, **Gainesville Regional Utilities, et al.** (Florida Cities).

Mr. J. A. Bouknight, Jr., Washington, D.C. (Messrs. Douglas G. Green and Herbert Dym, Washington, D.C., on the briefs), for the applicant, Florida Power & Light Company.

Mr. James H. Thessin for the Nuclear Regulatory Commission staff.

DECISION

This operating license proceeding comes before us on appeals under 10 CFR 2.714a from an unpublished Licensing Board order denying petitions for leave to intervene filed by Parsons and Whittemore, Inc. (P&W),¹ and a group of municipalities owning and operating electric power systems (collectively, "Florida Cities"). Citing *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-316, 3 NRC 167 (1976), the Board found that it lacked jurisdiction to consider those petitions because they raised "solely . . . antitrust concerns." We affirm the Board's order denying the petitions but disagree with its reasoning.

I.

This Commission's consideration of the antitrust aspects of the licensing of Unit 2 of the St. Lucie facility began when Florida Power & Light Company (FPL) filed its application for a construction permit in September 1973. As required by subsection 105c(1) of the Atomic Energy Act of 1954, 42 U.S.C. 2135c(1), the Commission referred the application to the Attorney General of the United States for his antitrust review. On November 14, 1973, the Attorney General advised the Commission by letter that he did not, at that time, recommend holding an antitrust hearing. The Commission published the Attorney General's advice in the Federal Register, but nonetheless invited interested parties to petition to intervene and request a hearing on the antitrust aspects of FPL's construction permit application. 38 *Fed. Reg.* 32159 (November 21, 1973). No such petition was filed during the time specified in the notice, and, thus, no antitrust hearing was instituted.²

¹ Resources Recovery (Dade County), Inc. (RRD), a wholly owned subsidiary of P&W, joined in the petition.

² A separate hearing, of course, was held on the health, safety, and environmental aspects of FPL's construction permit application. See note 3, *infra*.

Four years later, however, Florida Cities requested such a hearing. Having demonstrated good cause for failing to do so in a timely manner, they were granted an antitrust hearing before a specially convened licensing board. LBP-77-23, 5 NRC 789, *affirmed*, ALAB-420, 6 NRC 8 (1977), *affirmed*, CLI-78-12, 7 NRC 939 (1978). That hearing is still in progress.³

On March 9, 1981, the Commission published a notice of opportunity for hearing on FPL's recently filed application for a license to *operate* Unit 2. 46 *Fed. Reg.* 15831. On April 7, P&W filed a petition to intervene and request for a "limited antitrust" hearing.⁴ Florida Cities filed a similar petition on the same date. The Licensing Board below was subsequently established to rule on these and other petitions in the instant operating license proceeding.

P&W's petition concerned primarily the antitrust implications of a proposed settlement agreement negotiated in the still ongoing construction permit antitrust proceeding. The petition set forth claims under the antitrust provisions of the Atomic Energy Act and general antitrust law. In addition, P&W argued that the proposed settlement agreement will impair its rights as a "qualifying facility" under the Public Utility Regulatory Policies Act of 1978 (PURPA).⁵ The Florida Cities petition essentially paralleled the antitrust claims it has advanced in the pending construction permit proceeding.

Both the NRC staff and FPL argued principally that the Licensing Board had no jurisdiction over the asserted antitrust claims. The Board agreed and denied both petitions. It found "no question" that both petitions raised "solely . . . antitrust concerns." Therefore, relying on our holding in *Marble Hill*, 3 NRC 167, that "a [l]icensing [b]oard convened to consider environmental, health and safety issues lacks jurisdiction to grant a petition to intervene which seeks to raise only antitrust issues," the Board

³ The parties to that proceeding agreed that the issuance of a construction permit need not await the outcome of the antitrust hearing. See *Louisiana Power and Light Co.* (Waterford Steam Electric Generating Station, Unit 3), CLI-73-25, 6 AEC 619, 621-622 (1973). Thus, on the basis of a separate licensing board's decision in LBP-77-27, 5 NRC 1038 (1977), the Commission issued FPL a construction permit on May 2, 1977. 42 *Fed. Reg.* 24127 (May 12, 1977).

⁴ On April 24, 1981, P&W, again joined by RRD, filed a petition to intervene in the ongoing construction permit antitrust proceeding as well. The Licensing Board in that case denied the petition on the grounds of untimeliness and the lack of a nexus to the proceeding. LBP-81-28, 14 NRC 333, *as modified*, LBP-81-41, 14 NRC 839 (1981). P&W's appeal of that decision is pending but presents issues that differ from those now before us.

⁵ Pub. L. No. 95-617, 92 Stat. 3117 (codified in scattered sections of Titles 15, 16, 30, 42, and 43 of the United States Code).

found no jurisdiction to consider the petitions in this proceeding. Order of June 3, 1981, at 4. P&W and Florida Cities now appeal.⁶

II.

Section 105c of the Atomic Energy Act, as amended (42 U.S.C. 2135c), "establishes a particularized regime for the consideration and accommodation of possible antitrust concerns arising in connection with the licensing of nuclear power plants."⁷ It effectively places this Commission's antitrust review into two distinct "tracks," depending on the stage of the licensing process. At the construction permit stage, subsections 105c(1) and (5) require the Commission to solicit and publish (in the Federal Register) the Attorney General's advice on the antitrust aspects of the application. The Commission must hold an antitrust hearing on a construction permit application if the Attorney General so recommends. If the Attorney General does not recommend or request a hearing, the Commission nonetheless offers interested parties an opportunity to intervene and request an antitrust hearing.⁸

As the Commission discussed in its decisions in *South Texas and Summer*,⁹ the Act sets out a wholly different procedure for obtaining antitrust review at the operating license stage. Subsection 105c(2) states explicitly that the antitrust review required at the construction permit stage "shall not apply"¹⁰ to an operating license application unless the Commission determines that

significant changes in the licensee's activities or proposed activities have occurred subsequent to the previous review by the Attorney General and the Commission under this subsection in connection with the construction permit for the facility.

Thus, the Commission must find changes in the licensee's activities that are both "significant" and "subsequent" to the previous Attorney General

⁶ Florida Cities believe they can "raise all issues and obtain all relief in the construction permit antitrust proceedings" in which they are participants. Br. at 2. Accordingly, while adopting many of P&W's arguments, they pursue this appeal, as they did their petition to intervene below, as a protective matter.

⁷ *Houston Lighting and Power Co.* (South Texas Project, Unit Nos. 1 and 2), CLI-77-13, 5 NRC 1303, 1309 (1977).

⁸ *South Carolina Electric and Gas Co.* (Virgil C. Summer Nuclear Station, Unit No. 1), CLI-80-28, 11 NRC 817, 823 n.11 (1980).

⁹ See notes 7 and 8, *supra*.

¹⁰ Emphasis added.

and Commission review (including any NRC antitrust hearing).¹¹ Only then is it authorized to conduct a further antitrust review at the operating license stage.

In the instant case, neither of these prerequisites for operating license antitrust review is present. Because the antitrust proceeding in connection with the construction permit for Unit 2 is still in progress, there has been no "previous" review subsequent to which any "significant changes" could have occurred.¹² Thus, as long as the construction permit antitrust proceeding is under way, the antitrust provisions of the Atomic Energy Act effectively *preclude* the Commission from instituting a second antitrust hearing in conjunction with FPL's operating license application. To that extent, the Licensing Board was correct in finding that it had no jurisdiction to consider P&W's and Florida Cities petitions.¹³

We recognize the anomaly created by the unusual circumstances of this case, where a construction permit has been issued and an application for the corresponding operating license is pending — all before the construction permit antitrust review is completed. The ordinary expectation is that the construction permit antitrust review is completed at least before any operating license proceedings begin. The statutory scheme, however, does not foreclose the situation before us. It simply requires, *inter alia*, termination of one antitrust review before commencement of another.

The fact that P&W's — and to some extent, Florida Cities' — concern is with the proposed settlement agreement negotiated in the ongoing construction permit proceeding lends additional practical support to what the statute mandates. Logically, that proceeding provides the more ap-

¹¹ *Sumner, supra*, 11 NRC at 824, 825.

¹² In *Sumner, supra*, the Commission noted that it has "delegated to [the Directors of Nuclear Reactor Regulation and the Office of Nuclear Material Safety and Safeguards] authority to make the significant changes decision for the Commission." 11 NRC at 821 & n.6. It therefore appears — but we need not decide — that even if there had been a "previous" antitrust review in this case, the Licensing Board would have lacked authority to make the "significant changes" determination that would trigger an antitrust hearing at this stage.

¹³ *Marble Hill*, upon which the Board relied for its lack of jurisdiction finding, at first blush appears dispositive of this case but is, in fact, inapposite. In that construction permit case, we held that, where a prior opportunity for a separate hearing on antitrust issues was offered but not taken, a licensing board later convened specifically to hear health, safety, and environmental issues does not have jurisdiction delegated from the Commission to entertain a petition raising antitrust issues. We took that occasion to reaffirm the Commission's strong policy of holding antitrust hearings separate from those involving health, safety, and environmental issues. 3 NRC 167, 170-174. By contrast, the issue in the instant case is not so much whether there should be *separate* hearings at any given stage, but rather *simultaneous* ones at both the construction permit and operating license stages.

propriate and direct forum for petitioners' challenge to the settlement agreement negotiated and proposed therein. Thus, if petitioners have a forum anywhere for their antitrust arguments, it must and should be in the context of the pending construction permit proceeding.¹⁴

On appeal, neither P&W nor Florida Cities address the requirements of subsection 105c(2) and its limitations on the Commission's authority. Instead, they argue that the notice of opportunity for hearing in the instant operating license proceeding was broad enough to encompass all licensing issues, including those based on the antitrust laws. The Licensing Board, in their view, perceived its role too narrowly. But this argument misses the point. A notice of opportunity for hearing necessarily corresponds to the agency's statutory authority over a given matter; it cannot confer or broaden that jurisdiction to matters expressly proscribed by law. Thus, petitioners come up short in their attempt to stretch the language of the notice in this case.¹⁵

Finally, P&W argues that the Licensing Board erred in failing to address its PURPA-based claim, which P&W contends was an independent ground for its intervention. We find that the Board's overall assessment of P&W's petition as raising only antitrust matters is reasonable and, in the circumstances, represents an adequate treatment of the arguments raised. PURPA deals with the economics of energy conservation, distribution, and production — not with protection of the public health and safety. Moreover, P&W expressly linked its PURPA concern to the settlement agreement proposed in the construction permit antitrust proceeding. P&W argued that that agreement will impair certain rights to which it is assertedly entitled as a "qualifying facility" under PURPA.¹⁶ Therefore, because P&W itself based its PURPA ground for intervention on an alleged infringement of economic rights by a proposed antitrust agreement,

¹⁴ As noted above, Florida Cities are already parties to the construction permit antitrust proceeding. P&W's appeal of the Licensing Board's denial of its petition to intervene in that proceeding is pending. See note 4, *supra*. Our comments here are not intended to reflect any opinion on the merits of that appeal.

¹⁵ In any event, the notice, similar to those published in other operating license proceedings, clearly refers throughout to the consideration of only health, safety, and environmental issues if a hearing were to be held. No mention of antitrust issues is made. See 46 *Fed. Reg.* 15832, and compare 38 *Fed. Reg.* 32159, the notice affording the opportunity for hearing on antitrust issues in the St. Lucie construction permit proceeding. Petitioners, therefore, had no reasonable basis for inferring from the notice itself an invitation to raise antitrust claims.

¹⁶ P&W Petition at 4. Counsel for P&W elaborated on this claim in oral argument before us, stating that he was not "asking [the Appeal] Board to enforce PURPA," but asking instead "to protect our rights under the Nuclear Regulatory Commission's settlement conditions that apply to qualifying facilities under PURPA." App. Tr. at 21.

In view of our disposition of this matter, we need not address whether and to what extent the NRC has jurisdiction to take any action pursuant to PURPA.

the Licensing Board did not err in characterizing P&W's interest as lying "solely in antitrust concerns."

One last matter requires our attention. On June 16, 1981, the Licensing Board entered an order dismissing this operating license proceeding on the ground that the only admitted intervenor had withdrawn. We essentially stayed the effectiveness of that order, pending disposition of the instant appeals, on June 18, 1981. In view of our decision here upholding the Board's denial of P&W's and Florida Cities' petitions to intervene, we now deem "final" the Board's June 16 order dismissing this proceeding.

The Licensing Board's June 3, 1981, order denying the petitions to intervene of P&W and Florida Cities is *affirmed*, and its June 16 order dismissing the proceeding is *deemed final*.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Stephen F. Elperin

In the Matter of

Docket No. 50-376

**PUERTO RICO ELECTRIC POWER
AUTHORITY**
**(North Coast Nuclear Plant,
Unit 1)**

December 7, 1981

The Appeal Board affirms a Licensing Board decision (46 *Fed. Reg.* 14099 (February 25, 1981)), issued without an evidentiary hearing, allowing the applicant to withdraw its construction permit application and granting its motion requesting termination of the construction permit proceeding without prejudice.

RULES OF PRACTICE: WITHDRAWAL OF APPLICATION

The Commission has the authority to condition the withdrawal of a license application on such terms as it thinks just. 10 CFR 2.107(a).

LICENSING BOARDS: DISMISSAL OF PROCEEDINGS

Dismissal of a construction permit application with prejudice is a severe sanction which should be reserved for those unusual situations which involve substantial prejudice to the opposing party or to the public interest in general. *Philadelphia Electric Co.* (Fulton Generating Station, Units 1 and 2), ALAB-657, 14 NRC 967, 978-79 (1981).

NEPA: NEED FOR POWER (STATE REGULATORY DETERMINATIONS)

Although the National Environmental Policy Act mandates that the Commission satisfy itself that the power to be generated by the nuclear facility under consideration will be needed, that statute does not foreclose the placement of heavy reliance on the judgment of local regulatory bodies which are charged with the duty of insuring that the utilities within their jurisdiction fulfill the legal obligation to meet customer demands. *Carolina Power and Light Co.* (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), ALAB-490, 8 NRC 234, 241 (1978); see also *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.* 435 U.S. 519, 550 (1978).

LICENSING BOARDS: DISMISSAL OF PROCEEDINGS

To trigger an evidentiary hearing on the question of withdrawal of a construction permit application with prejudice, the allegations of substantial prejudice must not only be serious, but also supported by a showing, typically through affidavits or un rebutted pleadings, of sufficient weight and moment to cause reasonable minds to inquire further.

RULES OF PRACTICE: CONTENTIONS (ADMISSIBILITY OF)

The contention requirement of 10 CFR 2.714(b) does not require an evidentiary showing, but only reasonably specific assertions. Whether the assertions can be proved is a merits question that is quite beside the point at the preliminary contention stage of the proceeding. *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 548-49. (1980).

LICENSING BOARDS: SCOPE OF REVIEW

Where a licensing board believes the integrity of the adjudicatory process has been compromised, it should have wide scope to satisfy its concerns. *Carolina Power and Light Co.* (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), CLI-78-18, 8 NRC 293 (1978).

LICENSING BOARDS: DISMISSAL OF PROCEEDINGS

The possibility of future litigation with its expenses and uncertainties is a consequence of any dismissal without prejudice; it does not provide a basis for departing from the usual rule that a dismissal should be without prejudice. *Jones v. SEC*, 298 U.S. 1, 19 (1936); 5 Moore's Federal Practice ¶41.05 [1] at 41-72 to 41-73 (2d ed. 1981).

RULES OF PRACTICE: EARLY SITE REVIEW

An applicant who seeks early site review is not required to own the proposed power plant site. *Potomac Electric Power Co.* (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-277, 1 NRC 539 (1975); *New England Power Co.* (NEP Units 1 and 2), LBP-78-9, 7 NRC 271, 281-83 (1978). See also 10 CFR 2.101(a-1), 2.600-2.606. The real test for deciding on early site review is whether or not the applicant, as a practical matter, can produce the information required by regulation and necessary for an effective hearing. *Concerned Citizens of Rhode Island v. Nuclear Regulatory Commission*, 430 F. Supp. 627, 632-33 (D.R.I. 1977).

RULES OF PRACTICE: PAYMENT OF FEES

Under the Commission's rules, the applicant for a license bears the cost of staff work performed for its benefit. 10 CFR 170; see *Mississippi Power & Light Co. v. Nuclear Regulatory Commission*, 601 F.2d 223 (5th Cir. 1979), *cert. denied*, 444 U.S. 1102 (1980). This rule applies whether an applicant carries the process through to fruition or withdraws its application at an earlier time. 46 *Fed. Reg.* 49573 (October 7, 1981), *petition for review docketed*, *New England Power Co. v. Nuclear Regulatory Commission*, No. 81-1839 (1st Cir. Nov. 25, 1981).

APPEARANCES

Mr. Gonzalo Fernos, Santurce, Puerto Rico, *pro se* and on behalf of the intervenor, Citizens for the Conservation of Natural Resources, Inc.

Mr. Maurice Axelrad, Washington, D.C. for the applicant, Puerto Rico Electric Power Authority.

Mr. Jay M. Gutierrez for the Nuclear Regulatory Commission staff.

DECISION

Without holding an evidentiary hearing, the Licensing Board granted the motion of the Puerto Rico Electric Power Authority ("applicant" or "Authority") to withdraw, without prejudice, its application to construct the North Coast Nuclear Plant, Unit 1. This appeal requires us to delineate the kind of showing a party who seeks withdrawal *with prejudice* must make in order to trigger the need for an evidentiary hearing. We conclude that the Licensing Board was correct in finding no need for an evidentiary hearing in this case.

I.

The first proposal for a nuclear power plant in Puerto Rico dates back to 1970 when the applicant filed for a construction permit to build a facility at Aguirre, Puerto Rico. Seismic problems led the applicant to abandon that site, and to propose that the power plant be built instead at Isolte, Puerto Rico. The application for that amendment was duly noticed in the Federal Register on February 14, 1975. 40 *Fed. Reg.* 6834, 6835. Gonzalo Fernos, and the organization of which he is chairman, Citizens for the Conservation of Natural Resources, Inc., were admitted as intervenors in the proceeding on July 3, 1975.

For a number of years, Mr. Fernos has sought to have dismissed as moot the construction permit proceeding that was to pass on the Authority's plans to build a nuclear power plant at the Isolte site. On May 13, 1975, even before he became a party to the construction permit proceeding, Mr. Fernos espied political doubts in Puerto Rico that the project would ever proceed, and called upon the applicant to state whether it intended to press on with the proposed plant as a condition of going forward with the proceeding. The applicant stated that it most assuredly did, and the Licensing Board carried on with the case.

Mr. Fernos again requested a suspension of hearing activities on November 24, 1975, based upon a newspaper interview with applicant's Executive Director which reported a four year slippage for the proposed plant. The Executive Director thereupon notified the Licensing Board that economic conditions and a decline in the demand for energy led it to *postpone indefinitely* the North Coast nuclear project, but went on to propose that the proceeding be carried on to a determination of the *suita-*

bility of the Isolte site for a nuclear power plant.¹ The applicant promised to indicate the precise scope of the requested hearing in a later filing.

It was not until July 2, 1976, that the applicant formally moved the Licensing Board to proceed with hearings on all issues relating to whether the Isolte site is a suitable location for a 600 MWe pressurized water nuclear power reactor.² After the motion to proceed had been granted, Mr. Fernos, on November 8, 1976, belatedly opposed it. He noted that the applicant had indefinitely postponed the plant, and both principal candidates for governor of Puerto Rico had campaigned against the plant and in favor of returning the expropriated lands³ at Isolte to their former owners. Mr. Fernos insisted the proposed plant was hypothetical, and no legitimate purpose would be served by proceeding with hearings.

Although the Board had permitted the hearing process to proceed, nothing of consequence transpired. On February 16, 1977, the applicant advised the Board that the new Administration in Puerto Rico,⁴ which had been in office for approximately six weeks, was undertaking a review of the timing of the Authority's need for new generating capacity, including nuclear capacity. The review was expected to be completed in approximately six months. Consequently, applicant asked that it be allowed to suggest a schedule for the prehearing conference in about six months. In the meantime, the applicant said it would continue to develop information required for the NRC staff to complete its review of the Isolte site.

The next communication from the applicant, on August 31, 1977, advised that its review of the timing of its need for new generating capacity, including nuclear capacity, was continuing and was expected to be completed by approximately the end of the year. When year's end brought no further news, Mr. Fernos, on February 27, 1978, again moved to dismiss the proceeding. The applicant opposed the motion. It submitted an explanation of the study's delay, and advised the Board of a newly enacted legislative requirement for the Office of Energy of the Commonwealth of Puerto Rico to undertake an independent assessment of the overall energy situation in Puerto Rico. A decision by the Governor on the

¹ This more limited hearing was to assist the Authority in planning its future power additions, and was said to be within the scope of our then recent guidance in *Potomac Electric Power Company* (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-277, 1 NRC 539 (1975).

² In the interim applicant had consulted with the staff and had been informed that the staff's draft environmental impact statement would issue shortly and its site safety review would be completed in early 1977.

³ "Expropriation" apparently is the term employed in Puerto Rico for the exercise of eminent domain powers and, as such, is synonymous with "condemnation."

⁴ The change in administrations had also led to a new Executive Director of the Authority.

Commonwealth's energy needs was expected by December, 1978. On May 29, 1978, the Licensing Board denied Mr. Fernos' motion to dismiss, but imposed on the applicant a requirement to file periodic status reports.

Both in September and October, 1978, applicant filed reports that its review was continuing, but not completed. It indicated that it wanted to factor into its decision the study being conducted by a subcommittee of the National Academy of Science for the Office of Energy, which was expected to be completed during 1979.

At year's end 1978, no decision had been made by the applicant on its energy needs. Its status report did note however, that the Authority had cancelled its contract with Westinghouse Electric Corporation for the nuclear steam supply system for the proposed plant. Nevertheless, the applicant was still interested in having the NRC staff complete its site safety review so that the Authority could study the nuclear option for its mid- and long-term generation requirements.

Status reports continued to drift in — on April 30, August 31, and December 28, 1979. The year end account reported that the Governor and the Authority had announced that the next addition to applicant's generating system would be a 300 MWe coal-burning plant, planned to be operational by 1986 at an as yet undetermined site. Because that plant would need the Authority's immediate needs for additional generating capacity, the applicant noted that consideration of nuclear capacity was being deferred for at least one year, and, in all likelihood, for "a couple of years." The events of the year also included the NRC staff's completion of its Site Safety Evaluation Report issued April 28, 1979, which concluded that the Isolte site was acceptable under 10 CFR Part 100 for construction and operation of a 600 MWe pressurized water reactor.

On April 30, 1980, Mr. Fernos yet again sought termination of the proceeding — this time petitioning the Licensing Board for a show cause evidentiary hearing on why the application should not be dismissed with prejudice for lack of intention to build the proposed nuclear power plant. In a decision issued May 29, 1980, the Licensing Board denied the request on the ground that it was without power to dismiss a construction permit application even where the applicant had abandoned its purpose to build the facility in question. LBP-80-15, 11 NRC 765.

We exercised our *sua sponte* review authority to direct certification of that ruling and reversed, holding that the Atomic Energy Act and Commission regulations were devoid of anything which suggested an intended limitation upon the inherent authority of adjudicatory tribunals to dismiss those matters placed before them which have been mooted by supervening developments. Accordingly, we remanded the matter to the Licensing Board for a determination whether the applicant had in fact abandoned any intention to build the North Coast facility. ALAB-605, 12 NRC 153

(1980). In the course of our opinion, we expressly noted that at that point we did not "concern ourselves with whether it will be necessary to conduct an evidentiary hearing in order to reach an informed judgment on the abandonment question." *Id.* at 155.

Precisely a month later, on September 11, the applicant withdrew its construction permit application and filed a motion to terminate the proceeding. Mr. Fernos requested that the Commission itself direct the dismissal to be with prejudice, or hold an evidentiary hearing on that issue. He referred to his April 30 request for dismissal with prejudice before the Licensing Board, in which he claimed that applicant had dropped any intent to build the nuclear power plant as of August 5, 1976 when it put a halt to expropriating private land holdings at the Isolte site, and had hid that action from intervenors, staff, and the Board.⁵ Mr. Fernos argued that applicant should not be accorded a dismissal without prejudice when it had deceived the parties and the Board for four years as to its true intent not to build the nuclear power plant.

By order dated October 17, 1980, the Commission declined to grant directed certification, and assigned Mr. Fernos' motion to the Licensing Board for decision. Before the Board, Mr. Fernos elaborated upon his reasons for dismissal with prejudice to include the unnecessary expenditure of taxpayers' monies applicant had caused by having the NRC staff prepare a Site Safety Evaluation Report, and the proposed plant's lack of safety stemming from the risk of sabotage by dissident labor groups.

The applicant responded by asserting it had not deceived anyone. Over the several years its construction permit application had been pending, the complicated energy situation in Puerto Rico caused it to defer indefinitely a decision as to when it might proceed with a nuclear plant. Applicant had, however, kept the Board and the parties informed of developments; the establishment of the acceptability of the Isolte site remained one of its goals. The basis for intervenor's claim of deceit — that applicant had halted the expropriation process and had undertaken the return of previously expropriated land to its former Isolte owners — did not, according to applicant, evidence an abandonment of its intent to pursue the nuclear option at some later time. Rather, applicant maintained, that course had been followed because it made little economic sense for it to purchase land and allow the land to remain idle, especially where Commission regulations did not require ownership of a site as a precondition to processing a construction permit application. Further, applicant denied that its land transfer policy was hidden. It had been reported in the June 30,

⁵ At that time applicant also reversed the expropriation process by instituting court proceedings to return the land to the previous owners upon refund of the monies applicant had paid them.

1976 *San Juan Star*, was a matter of local court record, and was said to be reflected in the Final Environmental Statement for the power plant which indicated that the Authority would have to acquire a portion of the site later. The staff supported applicant's position that withdrawal of the application should be allowed without prejudice.

In a memorandum and order issued on February 18, 1981, the Licensing Board granted applicant's motion and terminated the proceeding without prejudice. 46 *Fed. Reg.* 14099 (February 25, 1981). In doing so, the Board considered two factors: first, whether intervenors would suffer some prejudice other than the mere prospect of a second lawsuit if the Board were to permit the withdrawal of the application without prejudice; second, whether the public interest would be prejudiced by that course of action. Because intervenors had not asserted they would suffer any legal harm other than leaving the door open for subsequent litigation, the Board weighed the first factor in applicant's favor. As to the second factor, the Board concluded that the public interest would best be served by leaving the nuclear option open to the applicant should changed conditions warrant its pursuit. The Board found that the applicant had not deceived the Board or intervenors of its intentions: in particular applicant had advised the staff it did not own the Isolte site, a fact reflected in the Final Environmental Statement, and the halt to the expropriation process had been reported contemporaneously in a local newspaper.

This appeal followed.

II.

A.

Our task in this opinion is the easier for having recently visited the substantive standard for deciding whether withdrawal of a construction permit application should be granted with or without prejudice. In our *Fulton* decision, *Philadelphia Electric Co.* (Fulton Generating Station, Units 1 and 2), ALAB-657, 14 NRC 967 (1981), we explained that dismissal with prejudice — that is, a disposition which prohibits the applicant from filing a new application to construct any type of nuclear reactor at the same site — “is a particularly harsh and punitive term imposed upon withdrawal”, the warrant for which must be found in a harm of comparable magnitude. *Id.* at 974. While the Commission has undoubted authority, confirmed in its regulations, to condition the with-

drawal of an application on such terms as it thinks just,⁶ the severe sanction of a withdrawal with prejudice should be reserved for those unusual situations which involve substantial prejudice to the opposing party or to the public interest in general. *Id.* at 978-79.

The standard we enunciated in *Fulton* is essentially the standard applied by the Licensing Board in this case. It takes as its underpinning the recognition that (1) it is highly unusual to dispose of a proceeding on the merits, *i.e.*, with prejudice, when in fact the health, safety and environmental merits of the application have not been reached; (2) the effort spent in pursuing a nuclear power plant application at the same site for a second time is presumptively preceded by a judgment, entitled to some credence, that there exists a public interest need for the plant's power;⁷ and (3) the number of potentially acceptable sites for a nuclear power plant are perforce limited: they should not be eliminated from further consideration absent good and sufficient reason.

The threshold standard for requiring an evidentiary hearing on a motion for withdrawal with prejudice should be related to the substantive standard which a motion of that kind must satisfy. A severe and unusual sanction casts on the party who seeks it a more compelling burden of justification — both for its imposition and for demonstrating that the allegation should be pursued in the shape of an evidentiary hearing. This means that to trigger a hearing on the question of withdrawal with prejudice, the allegations of substantial prejudice must not only be serious, but also

⁶ 10 CFR 2.107(a) provides:

The Commission may permit an applicant to withdraw an application prior to the issuance of a notice of hearing on such terms and conditions as it may prescribe, or may, on receiving a request for withdrawal of an application, deny the application or dismiss it with prejudice. Withdrawal of an application after the issuance of a notice of hearing shall be on such terms as the presiding officer may prescribe.

⁷ We have previously recognized the large role that the states and their regulatory bodies play in making need for power determinations prior to an applicant's invocation of the Commission's Licensing process:

[w]here a utilities commission forecast is neither shown nor appears on its face to be seriously defective, no abdication of NRC responsibilities results from according conclusive effect to that forecast. Put another way, although the National Environmental Policy Act mandates that this Commission satisfy itself that the power to be generated by the nuclear facility under consideration will be needed, we do not read that statute as foreclosing the placement of heavy reliance upon the judgment of local regulatory bodies which are charged with the duty of insuring that the utilities within their jurisdiction fulfill the legal obligation to meet customer demands.

Carolina Power and Light Co. (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), ALAB-490, 8 NRC 234, 241 (1978). See also *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 550 (1978) ("There is little doubt that under the Atomic Energy Act of 1954, State public utility commissions or similar bodies are empowered to make the initial decision regarding the need for power. 42 U.S.C. 2021 (k).")

supported by a showing, typically through affidavits or un rebutted pleadings, of sufficient weight and moment to cause reasonable minds to inquire further. To be sure, this standard is more stringent than that governing the admissibility of contentions where the Commission's rules do not require an evidentiary showing.⁸ However, when the focus of the proceeding shifts away from the substantive merits of the application to the conditions, if any, upon which the unresolved application may be withdrawn, a more stringent standard is fully justified given the unusual nature of the sanction.⁹

B.

In *Fulton* we found the threshold standard met in part,¹⁰ out of deference to the Licensing Board's conclusion that the facts of record demonstrated a possible compromise of the Commission's adjudicatory processes. ALAB-657, *supra* at fn. 12. While we were decidedly *not* satisfied that the Board's conclusion (based as it was on application of an erroneous legal standard) had so firm a factual footing on the unadorned pleadings as to justify its ruling of dismissal with prejudice, we nevertheless were reluctant to bar the Licensing Board from pursuing its inquiry. In this we were mindful of the Commission's teachings that where

⁸ In *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 548-49 (1980), we explained that, as now written, the contention requirement of 10 CFR 2.714(b) does not require an evidentiary showing, but only reasonably specific assertions. Whether the assertions can be proved is a merits question that is quite beside the point at the preliminary contention stage of the proceeding.

⁹ We are not constrained by the terms of the contention rule itself. That rule was intended to apply to the preliminary stage of a proceeding where assertions going to the merits of the health, safety, or environmental matter at issue were to be acted upon. Absent a controlling regulation or further guidance from the Commission, we must formulate a standard which we think strikes a fair accommodation between the competing interests of accurate fact-finding and administrative efficiency.

We expressly leave open the question whether there is a statutory right to an adjudicatory hearing under Section 189 of the Atomic Energy Act, 42 U.S.C. 2239, where the only question left in the proceeding is the proper disposition of a motion to withdraw an application, rather than the grant, suspension, revocation, amendment, or transfer of a license or permit. Assuming, for present purposes, such a statutory right, an agency has sufficient flexibility in charting its procedural course to accommodate the standard set forth in the text of this opinion. *Vermont Yankee Nuclear Power Corp. v. Natural Resources Defense Council, Inc.*, 435 U.S. 519, 543-44 (1978); *BPI v. Atomic Energy Commission*, 502 F.2d 424, 428-29 (D.C. Cir. 1974).

¹⁰ We specifically noted that the "matter might lend itself to summary disposition on written pleadings, accompanied by appropriate affidavits." ALAB-657, *supra* at fn. 12.

a licensing board believes that integrity of the adjudicatory process has been compromised, it should have wide scope to satisfy its concerns. *Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plant, Units 1, 2, 3 and 4), CLI-78-18, 8 NRC 293 (1978).

We see the facts of record in this case quite differently. They do not come to us accompanied by a licensing board suspicion that the Commission's adjudicatory processes have been abused. Nor do the facts adduced by intervenors rise to the level of a colorable claim of substantial prejudice to themselves or the public interest.

First, as the Licensing Board noted, intervenors do not claim any personal prejudice from a disposition which allows applicant to reinstitute its proposal, other than the prospect that they again may be obliged to oppose the project. That kind of harm — the possibility of future litigation with its expenses and uncertainties — is precisely the consequence of *any* dismissal without prejudice. It does not provide a basis for departing from the usual rule that a dismissal should be without prejudice. *Jones v. SEC*, 298 U.S. 1, 19 (1936); 5 Moore's Federal Practice ¶41.05[1] at 41-72 to 41-73 (2d ed. 1981).¹¹

Second, intervenors do not advance a colorable claim of substantial prejudice to the public interest. The principal basis for Mr. Fernos' claim that the applicant should be forever barred from pursuing the nuclear option at the Isolte site is his allegation that from August, 1976 until December, 1979 applicant hid its intention not to proceed with its construction permit application. However, as Part I of this opinion relates, the applicant advised the Licensing Board on December 5, 1975 that economic conditions and a decline in the demand for energy had led it to *postpone indefinitely* the North Coast nuclear project. The line between indefinite postponement and abandonment of any intention to proceed is a fine one. We would be hesitant to enter a judgment of dismissal with prejudice on so nice a distinction where, as here, there is no doubt that the applicant in fact promptly advised the Licensing Board and all parties that the North Coast project had been put in limbo.

Beyond this, the facts intervenors offer to support their claim of applicant's hidden abandoned intention to proceed do not rise to the level

¹¹ We note that the case at bar did not entail lengthy discovery, or proceed through the trial stage. It hardly got off the ground. We leave open the question whether something short of a dismissal with prejudice, such as conditioning withdrawal of an application upon payment of the opposing parties' expenses might be within the Commission's powers and otherwise appropriate where the expenses incurred were substantial and intervenors developed information which cast doubt upon the merits of the application.

necessary for an evidentiary hearing on the issue. We are told that the decision to abandon the North Coast project dates back to the time applicant halted its land acquisitions at Isolte and instituted court proceedings to return the land to its former owners. Intervenor place too heavy reliance on that event. The Licensing Board quite properly pointed out that Commission precedents do not require an applicant who seeks early site review to own the proposed nuclear power plant site. *Potomac Electric Power Co.* (Douglas Point Nuclear Generating Station, Units 1 and 2), ALAB-277, 1 NRC 539 (1975); *New England Power Co.* (NEP Units 1 and 2), LBP-78-9, 7 NRC 271, 281-83 (1978). See also 10 CFR 2.101(a-1), 2.600-2.606.¹² As the court pointed out in *Concerned Citizens of Rhode Island v. Nuclear Regulatory Commission*, 430 F. Supp. 627, 632-33 (D.R.I. 1977):

[N]o statute or regulation to which the Court has been directed requires an applicant to own a site before an application for construction or licensing on that site may be docketed or considered. Compare *Gage v. AEC*, *supra* [479 F.2d 1214, 1222 (D.C. Cir. 1973)]. To the contrary, the Court is informed that NRC has a settled practice of permitting docketing and consideration of applications for after-acquired sites. The real test is a practical one — whether or not the applicant can produce the information required by regulation and necessary for an effective hearing. If it can — and there is no *a priori* reason why it cannot — ownership is irrelevant [footnote omitted].

Not only will applicant's reversal of the acquisition process not bear the weight intervenors ask it to carry, applicant's actions were not hidden. An account was published contemporaneously in the *San Juan Star*, a newspaper Mr. Fernos at least occasionally consulted.¹³ Even more decisive, members of intervenor Citizens for the Conservation of Natural Resources, Inc., the organization of which Mr. Fernos is chairman, are themselves

¹² The early site review regulations to this effect were adopted after applicant's request in this case for site suitability review but confirmed the agency's prior practice as evidenced by the *Douglas Point* decision. See 42 *Fed. Reg.* 22882 (May 5, 1977).

¹³ See Memorandum in Support of Requested Suspension of Hearing Activities at 2 (filed Nov. 24, 1975), where Mr. Fernos refers to an article carried in the August 22, 1975 *San Juan Star* to the effect that the North Coast nuclear power plant had been postponed 4 years due to a drop in demand for electricity and a lack of capital.

landowners at the Isolte site and were advised by applicant of the change in policy.¹⁴ If the matter was deemed so critical a development (and we have already noted the absence of any Commission requirement for site-ownership), then intervenors surely could have informed the Licensing Board.

The two other bases urged for dismissal with prejudice are also insufficient to trigger a hearing. Mr. Fernos argues that dismissal with prejudice is warranted because applicant caused the NRC staff needlessly to expend taxpayers' monies reviewing an application the Authority had no intention to pursue. Mr. Fernos points to the fact that during the time period at issue the staff, at no doubt substantial expense, issued its Draft Environmental Statement, Final Environmental Statement, and Site Safety Evaluation Report.

We do not take lightly the claim that the general taxpayer ought not bear the cost of staff review which has been of special benefit to a particular applicant. This is especially true where, as here, applicant had every reason to expect that further staff review would be undertaken, and indeed urged the staff to continue with its review. The Commission, however, has by rule provided that applicants are to bear the cost of staff work performed for their benefit, and its rule in this regard (10 CFR Part 170) has been upheld in each particular by the Fifth Circuit. See *Mississippi Power & Light Co. v. Nuclear Regulatory Commission*, 601 F.2d 223 (5th Cir. 1979) *certiorari denied*, 444 U.S. 1102 (1980). The Commission has also made plain that the payment of fees rule applies whether an applicant carries the process through to fruition or, as here, withdraws its application at an earlier time. 46 *Fed. Reg.* 49573 (October 7, 1981), *petition for review docketed*, *New England Power Co. v. Nuclear Regulatory Commission*, No. 81-1839 (1st Cir. Nov. 25, 1981). Thus, because the applicant will be liable for expenses incurred by the staff on its behalf, we deem it unnecessary to decide whether dismissal with prejudice would be warranted if the situation were otherwise.

¹⁴ See Final Amended Petition to Intervene, at 4 (filed May 23, 1975) to the effect that members of CCNR's Arecibo Chapter are residents of the surroundings of the area planned for the North Coast project. See also affidavits attached to intervenors' Motion to File Sworn Statements from Owner-Residents of the Isolte Nuclear Plant about Damages Inflicted upon them by Applicant (filed June 13, 1981) which explicitly state that in August or September, 1976, applicant notified the various landowners that it was ceasing its efforts to expropriate their land. We are entitled to look to those affidavits (which were submitted by Mr. Fernos) as a statement against interest even though the affidavits are not part of the record in this case, just as we are entitled to rely upon concessions of counsel in briefs or oral argument.

Lastly, we can briefly dispose of intervenors' claim that dismissal with prejudice is warranted because of the risk of sabotage should the plant ever be built. We need only reiterate what we said in our June 11, 1981 order denying intervenors' motion to take into account the outcome of a then pending governmental corruption investigation of applicant's operations (at pp. 2-3):

[I]t does not follow, as intervenors appear to believe, that those disclosures perforce would have no influence upon the outcome of any new construction permit application which this utility might file at some future time. To the contrary, should such an application be filed, it will be open to any interested person — including the present intervenors — to bring to the attention of the NRC staff or the Licensing Board any information (whether derived from the investigation in question or otherwise) which might bear adversely upon the entitlement of the applicant to receive a permit to construct a nuclear power plant.

• • •

[W]hether the present proceeding is terminated "with" or "without" prejudice, no permit will later issue to this applicant for the construction of a nuclear power facility without prior full consideration of all relevant developments — no matter when they might have come to light [footnote omitted].

So too here, the claimed vulnerability of the North Coast project to acts of sabotage will be fully open for intervenors to advance should applicant again file for a permit to construct a nuclear power plant.

In sum, intervenors have not raised a colorable claim that they or the public interest will be substantially prejudiced by according the Authority the usual disposition where an application is withdrawn without decision on the merits — a withdrawal without prejudice. The facts, as we see them, are not of an applicant bent on hiding its intentions from the Commission, but rather, of a nuclear power plant proposal slowly being scrapped after extended political debate and study of the energy needs of Puerto Rico. While there may well be no occasion for the Authority to alter its decision in the future, that decision can best be left to the governmental applicant, taking into account the full range of energy options available to it without the artificial exclusion of the Isolte site that a withdrawal with prejudice would entail.

Accordingly, the February 18, 1981 decision of the Licensing Board is *affirmed*.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the Appeal Board

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Alan S. Rosenthal, Chairman
Dr. John H. Buck
Christine N. Kohl

In the Matter of

Docket No. 50-395 OL

**SOUTH CAROLINA ELECTRIC AND
GAS COMPANY, *et al.***
(Virgil C. Summer Nuclear
Station, Unit 1)

December 14, 1981

The Appeal Board issues an explanatory memorandum on its unpublished order denying a petition for directed certification filed by the NRC staff seeking interlocutory review of a determination by the Licensing Board to invoke the assistance of several independent consultants on certain seismic issues raised in this operating license proceeding.

**LICENSING BOARDS: DISCRETION IN MANAGING
PROCEEDINGS
(INDEPENDENT CONSULTANTS)**

A licensing board should not call upon independent consultants to supplement an adjudicatory record except in that most extraordinary situation in which it is demonstrated beyond question that a board simply cannot otherwise reach an informed decision on the issue involved.

**RULES OF PRACTICE: AUTHORITY OF APPEAL BOARDS
(CERTIFICATION)**

The authority conferred by 10 CFR 2.718(i) to direct the certification of questions arising in proceedings before licensing boards is specifically included within the express delegation to appeal boards of the authority and review functions which would otherwise have been exercised and

performed by the Commission in, *inter alia*, proceedings on applications for operating licenses under 10 CFR Part 50. 10 CFR 2.785(b)(1).

RULES OF PRACTICE: INTERLOCUTORY APPEALS

The standard for an appeal board's determination whether to undertake discretionary interlocutory review of a licensing board's proposed course of action is whether that action would affect "the basic structure of the proceeding in a pervasive or unusual manner." *Public Service Electric and Gas Co.* (Salem Nuclear Generating Station, Unit 1), ALAB-588, 11 NRC 533, 536 (1980).

LICENSING BOARDS: RESPONSIBILITIES

A licensing board is duty-bound to carry out the instructions of an appeal board so long as those instructions are not countermanded by the Commission.

LICENSING BOARDS: RESPONSIBILITIES

Licensing boards have not been given the function of passing their own judgment on the soundness or propriety of rulings and instructions of a reviewing appellate tribunal.

LICENSING BOARDS: RESPONSIBILITIES

The Commission's Rules of Practice, 10 CFR Part 2, and the guidance found in Appendix A to those rules, give the staff, as a representative of the public interest, a dominant role in assessing the radiological health and safety aspects of facilities involved in a licensing proceeding; adjudicatory boards should give the staff every opportunity to explain, correct, or supplement its testimony before resorting to outside experts of their own.

APPEARANCES

Mr. Steven C. Goldberg for the Nuclear Regulatory Commission staff.

Mr. Joseph B. Knotts, Jr., Washington, D.C., for the applicants, South Carolina Electric and Gas Company, *et al.*

MEMORANDUM

On October 19, 1981, we entered an unpublished order in which, although noting that it was "not without merit," we nonetheless denied a petition for directed certification¹ filed by the NRC staff in this operating license proceeding. Because of the need to act definitively upon the petition without further delay, that order did not do more than briefly state the reasons for that result. We indicated that a full explanation would be provided in a subsequent memorandum.²

By its petition, the staff sought our interlocutory review of a determination by the Licensing Board to invoke the assistance of several "independent consultants" on certain seismic issues that arose from a contention of the single intervenor, Brett Allen Bursey.³ The Board contemplated asking these individuals to furnish it with written reports on certain aspects of those issues and the expert testimony which had already been received from applicant and staff seismic witnesses. In addition, the Board proposed to call upon at least some of the "independent consultants" to testify as *its* witnesses at a further hearing which it intended to hold on the seismic issue. The gravamen of the staff's petition was that these measures were unjustified and that our intercession was merited under the long-prevailing standard for appellate consideration of interlocutory licensing board rulings.

In order to place the petition and our ultimate denial of it in proper context, it is necessary to recite in some detail both the background of the controversy and the developments in the wake of our receipt of the staff's

¹ See 10 CFR 2.718(i); *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-271, 1 NRC 478, 482-83 (1975).

² The text of the October 19 order, as well as of our several prior issuances in the course of consideration of the staff's petition, are included in the Appendix to this opinion.

³ The "independent consultants" the Board had in mind were: (1) two consultants to the Advisory Committee on Reactor Safeguards (ACRS), Dr. Enrique Luco and Dr. Mihailo Trifunac; and (2) three members of the United States Geological Survey (USGS), Dr. William B. Joyner, Dr. David M. Boore, and Dr. Jon P. Fletcher.

request for relief. We do so in Part I below. In Part II, we explicate the basis for the conclusions reached in our October 19 order.

I.

A. In an unpublished prehearing conference order, the Licensing Board modified and restated intervenor Bursey's contention A4 as follows:

- (a) The FSAR [Final Safety Analysis Report] is inadequate with respect to the description of seismic activity in the area of the Summer Plant site;
- (b) The plans for monitoring site seismicity are inadequate in that they do not consider the seismic effect of filling the reservoir. Site seismicity should be monitored for one year subsequent to filling the reservoir and prior to the granting of the operating license.

Order of April 24, 1978, at p. 5. Before the evidentiary hearing began, however, the Licensing Board expressed its own more particularized seismic concerns about those aspects of the staff's Safety Evaluation Report (SER) relating to earthquake magnitude and ground acceleration. Tr. 390-92. In response to the Board's inquiry, the staff advised that it would present a panel of experts, including USGS consultants, to testify on such matters, and that it would supplement the SER prior to hearing. Tr. 394-99.

The hearing commenced with consideration of the seismic issues on June 22-24, 1981. Applicants and the staff each presented a panel of expert witnesses, the staff's including, *inter alia*, two representatives of the USGS (as promised) and an independent consultant from the Los Alamos National Laboratory. See Tr. 702, 1058.⁴ Intervenor Bursey presented no witnesses of his own, limiting his participation to cross-examination. The Board, however, questioned both the applicants' and the staff's panels.

According to the Licensing Board, during the week of July 6, 1981, it indicated to the parties via a conference call that it was considering "retaining" its own experts. LBP-81-47, 14 NRC 865, 869 (1981). At the hearing the following week, the Board confirmed this course of action. Tr. 2512. In response to a staff request, the Board Chairman identified four areas of specific concern to him: (1) whether "the [g] values suggested for the different magnitudes have been fully substantiated by the testimony;" (2) whether "the application of those time histories pegged to these [g] values has been fully substantiated;" (3) whether there has been "a full

⁴The staff had also previously submitted its supplemental SER in April 1981.

enough disclosure on the accelerometer readings at Jenkinsville;" and (4) "whether the Charleston earthquake ought to be migrated to the periphery of the coastal province, or the edge of the piedmont province." Tr. 2514-15.

Several days later at the hearing, the Licensing Board discussed these concerns further. Tr. 3790-3817. It then focused on three principal issues: (1) the g values for ground acceleration, (2) the application of response spectra, and (3) earthquake magnitude. Tr. 3790. The tenor of the Board's complaint was a dissatisfaction with the treatment given these points by the SER and corresponding staff testimony.

As to the first matter, the Board queried whether the Brune model, upon which applicants relied in ascertaining the g values for ground acceleration and with which the staff agreed, provided the best means to compute those values. Tr. 3791. The Board stated that the staff should have relied on other means and data to determine g values (Tr. 3793), but declined to permit the staff to justify its position or explore the matter further (Tr. 3791).⁵ With regard to the application of response spectra, the Board stated that "if the Applicant is not going to use a standard response * * * spectrum[,] * * * the NRC staff ought to inquire whether what is brought in instead is a better item than the original, either more representative or more applicable to the particular site." Tr. 3794. The Board then noted that it did "not believe anything like that was done." *Ibid.* On the third point, earthquake magnitude, the Board questioned the staff's "commit[ment]" to the value it found and expressed "some trouble understanding what it is [the staff] base[s] that decision on and what kind of probability [the staff] really [has] in mind." Tr. 3796.

As a result of these asserted deficiencies in the *staff's* analyses, the Licensing Board concluded that it wanted its own independent, expert consultant(s) to clarify the principal issues described — *i.e.*, "someone other than [one who] is already in the proceedings." Tr. 3797, 3809. See also Tr. 3791, 3793, 3794, 3795. The Board also identified other specific

⁵ As an example of such other data, the Board referred to a 1977 NOAA study of U.S. earthquakes between 1939 and 1975. Tr. 3793. The Board also described its view of how the staff should have proceeded in determining g values (Tr. 3792):

[I]f the staff is going to determine what the appropriate [g] value is it ought to first make a determination of what the best data is [*sic*] for it. Secondly, it ought to make a determination as to the values to be used in conjunction with that formula; and the[n] thirdly, go through the motions of applying that formula to that data. Well, all I can see is that they tried the third.

matters that it wanted its experts to review — the Charleston earthquake and the USGS reports on the Jenkinsville accelerometers. Tr. 3798, 3799.⁶

B. The staff filed its petition for directed certification with us on August 7, 1981. The specific relief sought was a direction to the Licensing Board to refrain from calling independent consultants as its witnesses without first affording the parties themselves the opportunity to respond to the Board's concerns. Upon receipt of the petition, we issued a memorandum on August 10 requesting the Licensing Board to provide us with "a full explanation of the reasons why it believed it necessary to invoke the assistance of independent consultants on the seismic issues presented in this proceeding." See p. 1159, *infra*.

On August 13, the Licensing Board responded to that request. In an unpublished memorandum, it informed us that its comments at Tr. 3790-3817 (see pp. 1144-45, *supra*) constituted its "full explanation." The Board added (at p. 2) that, as those comments were said to reflect, its dissatisfaction was not with the staff's testimony but, rather, was directed to "the [s]taff's review as disclosed by the testimony — a matter that does not lend itself to correction merely by further [s]taff testimony" (emphasis supplied). Thus, according to the Board, the appropriate course was "to attempt to arrange for independent consultants and further hearings with all deliberate speed," with an opportunity thereafter given to the parties to respond to the positions taken by the consultants. *Ibid*.

As authorized by us, on August 21 the staff responded to the Licensing Board's memorandum.⁷ At the conclusion of the response, it stated that, on or about September 15, 1981, it proposed to file supplemental testimony addressing the concerns which prompted the Board to seek the assistance of independent consultants. Taking note of that representation, we entered an order on August 25 in which we, *inter alia*, (1) directed the staff to file the supplemental testimony no later than September 15; (2) announced that the motion for directed certification would be held in abeyance pending the Licensing Board's receipt and consideration of that testimony;

⁶ At this point, applicants recalled one member of their seismic panel in an effort to respond to some of the Board's concerns. The witness pointed out that applicants had analyzed the USGS report on the Jenkinsville accelerograms and endeavored to explain why the model used to estimate g values was the most appropriate for the Summer site. Tr. 3809-12. The Board noted, however, that its concern was with the *staff's*, not the applicants' case, and it generally reaffirmed its desire to seek the assistance of independent consultants. Tr. 3812-17.

⁷ The applicants also responded.

and (3) stated that a further explanation would be provided in a subsequent memorandum. See pp.1160, *infra*.

We issued that explanatory memorandum on August 27. Because its full text is provided in the Appendix to this opinion, we need not rehearse its content in detail here. In essence, it apprised the Licensing Board of our views that (1) independent consultants should not be called upon to supplement an adjudicatory record except in "that most extraordinary situation in which it is demonstrated beyond question that a board simply cannot otherwise reach an informed decision on the issue involved;" (2) in this instance, the staff had not "been given a fair opportunity to resolve the Board's concerns respecting the sufficiency of its seismic review;" and (3) the staff's supplemental testimony would "enable the Board to review the record more carefully and focus its concerns more precisely." See pp. 1163-64, *infra*. We also informed the Board that (*id.* at 1163-64):

[i]n the event that, upon full consideration of the original and supplemental testimony, the Board still is of the view that it cannot resolve the seismic issue on the basis of the evidence adduced by the parties themselves, we shall expect it to provide its reasons in some detail. With those reasons in hand, we will then act on the directed certification motion.

The staff filed its supplemental testimony on schedule, together with an offer to introduce it formally and respond to questions at the hearing session scheduled for September 22. At the inception of that session, however, the Board indicated that it had not as yet had "an opportunity to fully consider" the supplemental testimony and that, therefore, it was not prepared then to address it. Tr. 3886-87. Applicants' counsel thereupon inquired as to when the Licensing Board might be "in communication" with this Board. The Licensing Board Chairman responded as follows (Tr. 3887-88):

Mr. Knotts, if you would care to expound upon what the procedures are and what the obligations are with regard to the Appeal Board's memorandum, we'd be glad to hear from you. But I don't think at this point that we're prepared to say anything about it, and as I indicated in the conference call, there are some procedural problems and substantive problems with regard to that memorandum, but to the extent that you want to offer your positions we'd be glad to hear them, or any other party before we decide on what we ought to do further, that is orally here at hearing.

This prompted a further discussion in which the Board stated that it proposed to have the independent consultants testify during the week of October 12. Tr. 3888.⁸ Although this proposal was satisfactory to the applicants' counsel — who desired to have all further seismic testimony taken during that week — the staff expressed doubt that it would be prepared to go forward in advance of the disposition of its pending motion for directed certification. In this connection, staff counsel made specific reference to our August 27 memorandum. Tr. 3889. The scheduling discussion concluded with the Board's observation that it had done all it could to expedite the proceeding "short of capitulating to something that we don't think is proper." Tr. 3890.

On September 30, the applicants filed with the Licensing Board a "Motion to Establish Schedule" in which they alluded to the foregoing dialogue. When this motion came to our attention, we reviewed the September 22 transcript and concluded that the Licensing Board had apparently misapprehended the instructions contained in our August 27 memorandum. Accordingly, on October 2, we issued another memorandum in which the Licensing Board was specifically directed "not to call any independent consultants as Board witnesses unless and until (1) it has furnished to us its detailed statement of reasons; and (2) the pending directed certification motion is thereafter acted upon by us." See p. 1165, *infra*.

On October 15, the Licensing Board issued a memorandum and order in which it reaffirmed its intention to call upon the independent consultants to testify as Board witnesses. LBP-81-47, 14 NRC 865. The Board acknowledged that the "[s]taff reviewers appeared * * * to be highly competent and credible experts in the fields of geology, seismology, geophysics, and structural engineering." But, as the Board saw it, "none of them was established to be in the forefront (as opposed to being merely highly competent) in the formulation of the highly complex modelling required to arrive at maximum magnitudes and ground motion, and the application of response spectra, in this unique situation involving extremely shallow reservoir-induced seismicity in the Eastern United States." Thus, the Board decided "to seek out those persons in the forefront of the various

⁸ The Licensing Board had previously called upon the consultants to submit written reports and, as of September 22, two of the reports had been provided (one authored by Drs. Joyner and Fletcher jointly and the other by Dr. Trifunac). A third report, authored by Dr. Luco, was received by the Board on September 25. In its September 15 supplemental testimony, the staff commented briefly upon the Joyner-Fletcher report, which it had received a few days earlier.

disciplines to review the record and give their opinions." In its apparent judgment, the five selected individuals met that standard. *Id.* at 868-69.⁹

The Board acknowledged that this explanation did not satisfy the standard for calling Board witnesses which had been set forth in our August 27 memorandum. It endeavored, however, to justify the disregard of that standard on several grounds. First, the Board deemed the standard to be inconsistent with established precedent, improper, and contrary to the public interest. Second, according to the Board, only the Commission itself is empowered to make such "new policy." Third, the Board found nothing in our August 27 and October 2 memoranda which required the application of the "suggested standard." (In this connection, the Board expressed confidence that, upon a reexamination of the matter in "the context of the live facts of this case" as "disclosed by * * * the transcript of hearing," we would reject the "new standard" and uphold its action.) *Id.* at 874-76.¹⁰

II.

It was against this background that we issued our October 19 order in which, as earlier noted, the staff's petition for directed certification was summarily denied, despite our belief that it was "not without merit." We now turn to an elucidation of the basis for the several conclusions which were announced in that order: (1) that, in its October 15 memorandum and order, the Licensing Board failed to comply with the directions contained in our August 27 memorandum; (2) that the Licensing Board's critique of the content of the August 27 memorandum was neither invited nor appropriate; (3) that, in the circumstances, clear warrant existed for our assuming immediate jurisdiction over the *merits* of the seismic issue; and (4) that, notwithstanding those considerations, we had no practical alternative to allowing the Licensing Board to pursue its proposed course of calling its own witnesses. See p. 1166, *infra*.

A. We thought the instructions to the Licensing Board contained in our August 27 memorandum were free of room for any possible or reasonable doubt as to their import. We explicitly called upon the Board to take certain steps following its receipt of the staff's supplemental

⁹ At a later point in its memorandum, the Board took note of the staff's assertion that certain of the written reports submitted by independent consultants corroborated the staff's position on the seismic issue. In the Board's view, this assertion provided further justification for the decision to call the consultants as witnesses. 14 NRC at 873.

¹⁰ On the strength of its asserted belief that we had not *directed* it to employ the standard set forth in the August 27 memorandum, the Licensing Board disclaimed any intention to disobey an order of this Board. *Id.* at 875.

testimony. First, it was to give "full consideration" to both that testimony and the staff testimony previously filed. This, we said, should enable it to "focus its concerns more precisely." Then, if still persuaded that it could not "resolve the seismic issue on the basis of the evidence adduced by the parties themselves," it was to provide detailed reasons. With those reasons in hand, we would act upon the pending staff petition for directed certification — which, we noted earlier in the memorandum, was "clearly" not susceptible of summary rejection.

As we have seen, however, the Board did not observe those instructions — even though they were repeated in our October 2, memorandum.¹¹ The short of the matter is that, in reaffirming its intention to call its own witnesses, the Licensing Board set forth in its October 15 memorandum and order virtually no explanation respecting why an informed decision on the seismic issue could not be reached on the basis of the testimony of the parties. Indeed, while not saying so explicitly, the Board left the distinct impression that it found itself unable to persist in any such claim. For one thing, there was no repetition of the Board's earlier insistence that the staff's seismic review was deficient. For another, the Board characterized the "[s]taff reviewers" (*i.e.*, the sponsors of the staff testimony) as "highly competent and credible experts" in the various scientific disciplines relevant to the seismic inquiry. See p. 1147, *supra*.

As we have also seen, the Licensing Board offered several reasons why, notwithstanding its disclaimer of an intent to disobey our directives, it had not undertaken the task assigned to it. None of those reasons, however, has colorable merit. Beyond that, in large measure they reflect an apparent and vexatious lack of understanding regarding the relationship of licensing and appeal boards in the administration of this Commission's adjudicatory process.

Section 2.785(a) of the Rules of Practice, 10 CFR 2.785(a), empowers an appeal board "to exercise the authority and perform the review functions which would otherwise have been exercised and performed by the Commission" in, *inter alia*, proceedings on applications for operating licenses under 10 CFR Part 50. Specifically included within this express delegation is the authority conferred by Section 2.718(i) of the Rules, 10 CFR 2.718(i), to direct the certification of questions arising in proceedings before licensing boards. 10 CFR 2.785(b)(1). It was, of course, precisely that authority which the staff requested we invoke in the circumstances of this case. And, likewise, our August 27 memorandum was an integral part of the process of determining (1) whether there was sufficient cause for

¹¹ As noted above at p. 1147, we issued our October 2 memorandum in response to the Board's comments at the September 22 hearing — lest the Board continue to harbor further doubts as to what we expected.

stepping into the controversy; and (2) if so, what the ultimate result should be.

To this end, it was necessary to consider at the threshold whether the established standards for our interlocutory review had been met — more particularly, whether the Licensing Board's proposed course of action would affect "the basic structure of the proceeding in a pervasive or unusual manner."¹² It was in that context that we addressed the matter of the responsibilities and prerogatives of licensing boards with regard to the development of the evidentiary record, culminating in the conclusion that a board is not to call witnesses of its own unless it "cannot otherwise reach an informed decision on the issue involved." See p. 1163, *infra*. And it was that conclusion which undergirded our unfulfilled directive to the Licensing Board.

In sum, then, we issued the August 27 memorandum within the adjudicatory framework and in response to a specific request for relief (1) which the staff was authorized to make under a settled interpretation of the Rules of Practice; and (2) upon which we were empowered to act under an express delegation of the Commission's review authority. This being so, the Licensing Board's obligation was patent: it was duty-bound to carry out our instructions so long as they were not countermanded by our own superior tribunal — the Commission. It mattered not whether that Board thought those instructions to be legally infirm. Nor was it of moment whether, in the Board's view, we had crossed the line separating "adjudication" and "policy making." Licensing boards — in common with trial courts — have not been given the function of passing their own judgment on the soundness or propriety of the rulings and instructions of a reviewing appellate tribunal, let alone the power, in effect, to nullify them if not to the boards' liking. Indeed, to sanction the attitude manifest in the statement of the Board below at the September 22 session that it would not "capitulat[e] to something that [it did not] think * * * proper"¹³ would substitute chaos for order in this Commission's adjudicatory process.

The unacceptability of the Licensing Board's response to the August 27 memorandum is not at all lessened by the Board's statement that "as we read the issuances of the Appeal Board in this proceeding, we do not find any *order* to us that requires the application of the *suggested* standard" for

¹² *Public Service Electric and Gas Co.* (Salem Nuclear Generating Station, Unit 1), ALAB-588, 11 NRC 533, 536 (1980). The Licensing Board's suggestion (14 NRC at 874) that review of its interlocutory action "can only be [obtained] in the final appeal" is simply incorrect and not in accord with our "established precedent."

¹³ See p. 1147, *supra*.

calling Board witnesses. 14 NRC at 875 (emphasis supplied). There was absolutely nothing in the August 27 memorandum which could have fairly been taken as giving the Licensing Board the option of applying or ignoring the standard as it saw fit. We set forth the standard in unqualified terms and, once again, it provided the foundation for the directions to the Board. In this connection, we fail to see the relevance of the Board's notation that, as of August 27, we had not as yet determined even whether to grant the petition for directed certification. *Ibid.* While that is quite true, it scarcely altered the binding effect upon the Board of rulings made, and instructions given, ancillary to our consideration of the petition.¹⁴ Equally irrelevant is the Board's stress (*ibid.*) upon our indication in the August 27 memorandum (p. 1161 fn. 1, *infra*) that we had not undertaken a review of the seismic testimony adduced to that point. As the memorandum made manifest, none of the conclusions reached therein (least of all the articulated *generic* standard for calling Board witnesses) was dependent upon such a review.¹⁵

B. Putting aside the matter of the Licensing Board's failure to comply with our explicit directions, its October 15 memorandum and order confirmed our earlier misgivings respecting the propriety of the proposed resort to independent witnesses. More particularly, it removed all doubt that, in the circumstances of this case, such resort will "affect the basic structure of the proceeding in a pervasive or unusual manner." See p.1162, *infra*.

As previously noted, the Board below seemingly no longer finds it necessary to call its own witnesses for the purpose of curing what it had initially perceived to be deficiencies in the staff's seismic review. Although the Board did not explicitly so acknowledge, this is a reasonable inference from (1) its characterization of the staff's reviewers as "highly competent and credible experts" in the relevant disciplines; and (2) the absence of any suggestion on its part that the staff testimony, as supplemented on September 15, had crucial shortcomings. Rather, it now appears, the Board

¹⁴ As the Licensing Board seemingly recognized (14 NRC at 871-72 fn. 2), the fact that we denominated the August 27 issuance a "memorandum" rather than an "order" was of no significance. Lest there be any misunderstanding in that regard, the use of the "memorandum" format was a courtesy to the Licensing Board and rested on our assumption that it would faithfully carry out the instructions to it set forth therein, without the necessity of being formally "ordered" to do so.

¹⁵ The Licensing Board also chafed at our request for a detailed explanation of its action. 14 NRC at 874 fn. 4. Not only is the provision of an explanation a patently reasonable request, but — as we regrettably have had to point out on prior occasions — it also is a board obligation of some considerable moment. *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-504, 8 NRC 406, 410-12 (1978).

contemplates casting its witnesses in the role of auditors; *i.e.*, their function will be to pass independent judgment on whether the analysis and conclusions of the staff reviewers — neither controverted by any other party nor alleged to be inherently suspect — should be accepted by the Board. The asserted justification for the use of Board witnesses to this end was essentially twofold: (1) a trial tribunal has unrestricted, inherent power to call its own witnesses (in the case of federal district courts, a power now embodied in Rule 706 of the Federal Rules of Evidence); and (2) without the aid of the second opinion of experts possessing (at least in the Board's judgment) still better qualifications, the Board would not be able to perform its adjudicatory function satisfactorily. Neither of these reasons, however, withstands scrutiny.

1. Contrary to the impression that might be garnered from the tenor of much of the Licensing Board's discussion of the "legal basis for calling board witnesses,"¹⁶ we neither held nor implied in our August 27 memorandum that such basis was lacking. The issue was not the *existence* of such power, but rather the *reasonable exercise* of it. We decided simply that, although "a licensing board may well have the latitude to call upon independent consultants itself for the purpose of supplementing what it deems to be an unsatisfactory record," the exercise of that power should be confined to those instances where it is beyond question that a board could not "otherwise reach an informed decision on the issue involved." See p. 1163, *infra*. While, as has been seen, the Licensing Board disapproves of that standard, it pointed to nothing which might indicate an inconsistency with prevailing practice in either the federal courts or this agency.

Insofar as Rule 706 of the Federal Rules of Evidence is concerned, the Board itself took note¹⁷ of the fact that the Rule was designed to give express recognition to "the inherent power of a trial court to appoint an expert *under proper circumstances* to aid in the just disposition of a case." *Scott v. Spanjer Bros., Inc.*, 298 F.2d 928, 930 (2d Cir. 1962) (emphasis supplied).¹⁸ Although the Licensing Board's research uncovered "no court cases * * * in which a trial court * * * was reversed in calling its own expert,"¹⁹ so too that research apparently disclosed no instance in which a court saw fit to invoke the Rule in circumstances even remotely approx-

¹⁶ 14 NRC at 872-73.

¹⁷ *Id.* at 872.

¹⁸ In this connection, subsection (a) of Rule 706 requires the court to give the parties a prior opportunity "to show cause why expert witnesses should not be appointed" by it — thus further belying any claim that the court's stated desire to obtain the aid of its own expert is to be invariably deemed the end of the matter.

¹⁹ 14 NRC at 872.

imating those present here. Our own canvass of the reported decisions under the Rule was equally unavailing. But it did bring to light an appellate decision which criticized a district court for appointing an expert to address an issue (the sanity of a criminal defendant) which had already been addressed by witnesses for both the Government and that defendant. *United States v. Weathers*, 618 F.2d 663 (10th Cir. 1980).²⁰ To be sure, the court's ultimate determination was that, because the trial judge had not actually relied on the reports of its independent expert, "any error in the sua sponte appointment of [that expert] was harmless." *Id.* at 664. Further, the basis of the criticism was the Tenth Circuit's "serious doubt" that, "in seeking additional expert testimony" after receipt of the evidence of the parties, the trial judge had acted in accord with the specific procedural requirements and design of Rule 706.²¹ Notwithstanding these considerations, however, *Weathers* stands as stark refutation of the Licensing Board's belief that the "inherent" power of a trial tribunal to invoke the aid of an expert witness of its own is totally beyond appellate scrutiny.²²

The recorded instances of the employment of independent expert witnesses by NRC adjudicatory boards likewise provide no precedential support for the Licensing Board's action. In *Public Service Co. of Oklahoma* (Black Fox Station, Units 1 and 2), LBP-78-26, 8 NRC 102, *stay denied*, ALAB-505, 8 NRC 527 (1978), one of the Board witnesses was an NRC staff geologist who, as reflected in prehearing filings, was in disagreement with the official position taken by the staff witnesses respecting the exact g value of the reference acceleration to which the facility was to be designed. *Id.* at 107-11. By contrast, in the instant case, the staff included in *its own* panel of witnesses Dr. Andrew Murphy, who disagreed with other staff members as to the magnitude of the maximum reservoir-induced earthquake. Dr. Murphy was thus readily available for Licensing Board questioning, obviating the Board's calling him as in *Black Fox*.²³ The other Board witnesses in *Black Fox* were Oklahoma officials called to testify on the question whether they had taken certain state action which was a

²⁰ Although the Tenth Circuit's opinion did not so state, presumably those witnesses (unlike those of the staff and applicants here) had reached divergent conclusions on the sanity question.

²¹ 618 F.2d at 664 fn. 1. These requirements may or may not have equal application in our adjudicatory proceedings.

²² We fail to see the relevance of the Licensing Board's stress upon the fact that our review had been undertaken on an interlocutory basis. See 14 NRC at 872. For one thing, to repeat, NRC practice allows the discretionary review of interlocutory rulings. Secondly, the appropriate time for appellate consideration of the matter at hand was before — not after — the Licensing Board followed through on its proposal. See fn. 12, *supra*.

²³ See Summer Safety Evaluation Report (NUREG-0717, February 1981) at 2-24 to 2-25; Tr. 1058, *et seq.*

condition precedent to the issuance of a limited work authorization for the facility. See *id.* at 121-23.²⁴ These officials were obviously the logical source for that information. Without their testimony, it would have been difficult for the Board to have reached an informed decision on the question.

In *Public Service Electric and Gas Co.* (Hope Creek Generating Station, Units 1 and 2), LBP-78-15, 7 NRC 642 (1978), Coast Guard officers testified as Board witnesses on several issues before the Licensing Board following our remand in ALAB-429, 6 NRC 229 (1977). Although the Licensing Board's opinion does not discuss the attendant circumstances, it appears from the record in that proceeding that the staff brought the officers to the attention of the Board and indicated that it contemplated calling them as staff witnesses on one of the issues. The Board decided, however, to have them testify instead as its witnesses because it had specific questions which it wished to address to them.²⁵ Subsequently, one of the officers made another appearance after informally advising the Board that certain information previously supplied by the Coast Guard on a different issue was incorrect.²⁶ Like *Black Fox*, this can hardly be equated to the situation which confronted us in this case.

As observed in note 5 of our August 27 memorandum (see p. 1162, *infra*), our calling of Dr. Trifunac and Dr. Luco as Board witnesses in *Diablo Canyon* and the former as a Board witness in *Seabrook* was prompted by circumstances totally foreign to those at hand. In *Diablo Canyon*, intervenors sought the testimony of the two seismologists. Because of their status as ACRS consultants, however, those experts were unwilling to accept compensation from or to become witnesses for those intervenors.²⁷ For the same reason, Dr. Trifunac was disinclined to testify on behalf of the *Seabrook* intervenor at the hearing before us following the Commission's remand of certain seismic issues. One of those issues, however, directly involved testimony which he had given several years earlier before the Licensing Board as an intervenor's witness (prior to becoming an

²⁴ Those officials also testified on other matters which came within the ambit of their special regulatory jurisdiction. 8 NRC at 123-26.

²⁵ See Docket Nos. 50-354, 50-355, Tr. 3164, 3377-78 (November 2, 1977), Tr. 3435-36 (November 3, 1977).

²⁶ *Id.* at Tr. 3732, 3770 (January 10, 1978).

²⁷ See *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-519, 9 NRC 42 (1979), and ALAB-604, 12 NRC 149, 150-51 (1980).

ACRS consultant).²⁸ In sum, the experts were treated as Board witnesses as an accommodation to both the intervenors and the experts themselves. Their Board witness status did not originate with the Licensing Board, as in the matter at hand.²⁹

In light of the foregoing, we are entirely satisfied that the standard for calling Board witnesses referred to in our August 27 memorandum represents neither a departure from accepted principles or practice nor the establishment of a "new policy." Our attention has not been directed to a single previous occasion upon which an adjudicatory tribunal has called upon experts of its own to pass independent judgment upon the uncontroverted testimony of witnesses for the parties who are acknowledged to be both "highly competent and credible."

2. In addition to asserting its "inherent right" to call independent witnesses, the Licensing Board attempted to justify its action on the ground that, without their testimony, it could not satisfy its safety concerns and thus would be unable to perform its adjudicatory function. 14 NRC at 874. The Board conceded (*ibid.*) that it had not "demonstrated beyond question" that it could not "otherwise reach an informed decision," as required by our August 27 memorandum (p. 1163, *infra*). We noted above that the Board chose to challenge that standard as an inappropriate new policy, rather than to attempt to comply with it.

There is irony in that criticism of our standard, for it is the Licensing Board that has injected a novel — and troublesome — element into the

²⁸ See *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), Docket Nos. 50-443, 50-444 (November 6, 1980 unpublished order). Another expert who had similarly testified as an intervenor's witness before the Licensing Board was *denied* Board witness status at the hearing on remand because he had not become associated with the ACRS. *Id.* at p. 2.

²⁹ The reliance of the Board below on our decision in *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-382, 5 NRC 603 (1977), is equally misplaced. In that case, the intervenors sought directed certification of the denial by the Licensing Board of their request for Commission funds to pay, *inter alia*, the fees and expenses of an expert witness they wished to sponsor. Upholding that denial as mandated by existing Commission policy against funding intervenors, we noted that the Licensing Board had indicated that it might call the expert as its witness. In that connection, we observed that the Board was free to call witnesses of its own "where it finds a *genuine need* for their testimony," adding that this was a matter resting in the Board's "sound discretion." *Id.* at 607-08 (emphasis supplied). The question now before us is whether, in this case, the Board abused that discretion.

As for the Licensing Board's reference to *San Onofre*, we do not believe it appropriate to discuss the recent action of that Licensing Board in calling Dr. Luco as its witness because the proceeding is still in progress below. We simply note that it, too, was prompted by an intervenor's request for his testimony. See *Southern California Edison Co.* (San Onofre Nuclear Generating Station, Units 2 and 3), Docket Nos. 50-361 and 50-362, Tr. 1801-02 (June 26, 1981), Tr. 2602-06 (July 1, 1981), Tr. 4973-74 (July 27, 1981).

Commission's adjudicatory process. The Board's proposed use of independent consultants for the purpose of appraising the staff's evidence in this case conflicts with the basic structure of NRC licensing proceedings, as reflected in the Commission's Rules of Practice, 10 CFR Part 2, and the guidance found in Appendix A to those rules.³⁰ That framework gives the staff, as a representative of the public interest, a dominant role in assessing the radiological health and safety aspects of the involved facilities.³¹ The Licensing Board would undermine that role by adding, in effect, another party to audit, and duplicate perhaps, the staff's work.

In fact, the Licensing Boards are intended to perform that auditing function. By statute and implementing regulation, the boards contain two technical members, who by training and experience are equipped to make scientific judgments without resort to independent experts. See 42 U.S.C. 2241a; 10 CFR 2.721(a). Thus, unlike the courts and most other administrative tribunals, the NRC licensing boards, by their very composition, take account of, and in large measure are intended to satisfy, the need for scientific expertise in deciding the cases that come before them.

We certainly do *not* suggest that a licensing board should ignore deficiencies in the staff's analysis and testimony or play no role in the development of a complete record. The protection of the public health and safety is a paramount concern. Thus, as we have noted previously, it is a licensing board's right and obligation "to satisfy itself that the conclusions expressed by expert witnesses on significant safety or environmental questions have a solid foundation." See p. 1163, *infra*. Our point is simply that the adjudicatory boards should give the staff every opportunity to explain, correct, or supplement its testimony *before* resorting to outside experts of their own. Moreover, the boards' use of such consultants should be based on more than intuition and vague doubts about the reliability of the staff's presentation: the boards must articulate good reason to suspect the validity and completeness of the staff's work. That is what we meant in requiring a demonstration "beyond question that a board simply cannot

³⁰ This is the fundamental reason that we were willing to entertain the staff's motion for directed certification. See fn. 12, *supra*.

³¹ Indeed, at the operating license stage, the staff generally has the final word on all safety matters not placed into controversy by the parties. 10 CFR 2.760a, 2.105(e), 50.57. And at the construction permit stage, where an adjudicatory hearing is mandatory, "[a]s matters pertaining to radiological health and safety which are not in controversy, boards are neither required nor expected to duplicate the review already performed by the staff and ACRS, and they are authorized to rely upon the testimony of the staff, the applicant, and the conclusions of the ACRS, which are not controverted by any party." 10 CFR Part 2, Appendix A, Section V(f)(1). See also *id.*, Section V(f)(2). This role reserved for the staff reflects the Commission's general confidence in the staff's review process.

otherwise reach an informed decision on the issue involved." See p. 1163, *infra*.³²

The Licensing Board stated that it did "not see how that standard can ever be satisfied" 14 NRC at 874. We, of course, disagree. If the staff is unable or unwilling to clarify its testimony on a significant safety issue and the other evidence of record is similarly unresponsive to a licensing board's articulated concerns, the board is free under our standard to seek outside testimony in an effort to resolve the matter. Perhaps what the Licensing Board meant was that it could not satisfy that standard *vis-a-vis* its calling independent consultants on the seismic issues *in this case*. We observed in our August 27 memorandum (p. 1163, *infra*) that the Board's concerns "appear[ed] to be at least amenable to resolution through further staff review and testimony." See pp. 1143-45, *supra*. Nothing the Board said in its October 15 memorandum alters this conclusion.³³ Moreover, the Board cast no doubt on the abilities or work product of the staff witnesses, characterizing them as "highly competent and credible experts."³⁴ 14 NRC at 868-69. The staff volunteered to supplement its prior work, further demonstrating its desire to explore fully the Board's expressed seismic concerns.³⁵

The Licensing Board thus does not appear to have given the staff the optimum opportunity to resolve the Board's concerns before embarking on its path to independent consultants. On this record, we see no valid justification for the Board's extraordinary action of sponsoring its own witnesses.

C. Having arrived at the above conclusions, the question remained as to what disposition should be made of the staff's petition for directed certification. We had essentially three choices.

The first available option was to grant the petition and to assume jurisdiction ourselves over the *merits* of the seismic issue. In view of the professed inability of the Licensing Board to decide the issue within the bounds of our standard, that alternative had a decided attractiveness. We

³² This effects no gloss on the standard set out in our August 27 memorandum. We explained there that the staff should be "given a fair opportunity to resolve the Board's concerns," and that if the Board could still not resolve the issue on the basis of the evidence adduced by the parties themselves, it should "provide its reasons in some detail." See p. 1163-64, *infra*.

³³ For example, it fails to detail why the Board needs outside experts to explain what the *staff* "ha[d] in mind" in arriving at its earthquake magnitude value. See Tr. 3796.

³⁴ The staff witnesses, as is often the case, included outside experts from the USGS and the Los Alamos National Laboratory.

³⁵ The staff's efforts in this regard continue. Just recently, the staff brought certain new seismic information to the Board's attention and indicated that it is undertaking additional evaluation. Board Notification-New Seismology Information, BN No. 81-32 (October 20, 1981).

would have pursued such a course except that, as noted in our October 19 order, we ultimately ruled it out because it would bring about unacceptable delay not only in this proceeding but also (in view of the state of our appellate docket) in other proceedings now before us as well. See p.1166, *infra*.

The second possible course was a grant of the petition coupled with a direction to the Licensing Board to refrain from calling its own witnesses. Given, however, the unmistakable tenor of the Board's October 15 memorandum and order, we entertained some doubt respecting whether the result would be a fair appraisal of the evidence which has been presented to it by the parties. This concern was heightened by the Board's statement that, in its view, the standard for calling Board witnesses which we enunciated in our August 27 memorandum both required a presumption that the operating license should issue and imposed an affirmative obligation on the Board to seek evidence that would support that issuance. 14 NRC at 874. Although we cannot apprehend the Board's reasoning in that regard, so long as it holds such an opinion, the prudent course was not to force the standard upon the Board in *this* proceeding.

That left the third option — the denial of the staff's petition notwithstanding its merit. That option, reluctantly adopted in our October 19 order, cleared the way for the Board to call its own witnesses despite our conviction that, on the record before us, that action is entirely unjustified.

III.

As we have stated on numerous occasions in the past, our desire is not to second-guess the licensing boards on their day-to-day evidentiary rulings. When a board calls upon independent consultants, however, its action is more than routine and signals the possible need for further scrutiny. Thus, a serious request for our intercession will receive careful consideration. So as to obviate our involvement and minimize delay, we have gone to some length in this opinion in providing the boards with guidance as to the proper circumstances in which to seek outside testimony. We trust that our efforts will not prove to have been futile and that future action will be taken in recognition of the views expressed here.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the Appeal Board

APPENDIX

The following three memoranda and two orders were previously issued by this Board in connection with our consideration of the NRC staff's petition for directed certification. Each is discussed in the foregoing opinion. Their full text is reproduced here; only the captions have been omitted.

MEMORANDUM

August 10, 1981

The NRC staff has filed a "Motion for Directed Certification of Licensing Board Action Regarding Retention of Independent Consultants". Before receiving responses to that motion from the other parties, we desire to have a full explanation of the reasons why the Board believes it necessary to invoke the assistance of independent consultants on the seismic issues presented in this proceeding (which assistance we understand will include the testimony of some or all of those consultants as Board witnesses). Because the staff's motion obviously should be acted upon expeditiously, we would like that explanation in our hands by Monday, August 17, 1981.¹ As soon as it has been received, we will fix the time for the filing of further papers by the parties.

FOR THE APPEAL BOARD

C. Jean Bishop
Secretary to the Appeal Board

Ms. Kohl did not participate in this memorandum.

¹ The Licensing Board is requested simultaneously to mail copies of the explanation directly to the parties by express mail.

ORDER

August 25, 1981

We have in hand the most recent (August 21, 1981) filings of the NRC staff and the applicant in connection with the pending staff "Motion for Directed Certification of Licensing Board Action Regarding Retention of Independent Consultants". Upon examination of all of the papers before us, as well as the particularly relevant portions of the record below (most especially Tr. 3790-3817 to which the Licensing Board made direct reference in its August 13, 1981 memorandum), it appears — though we do not now decide — that a grant of directed certification *may* be warranted under the prevailing standard discussed in, *e.g.*, *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-405, 5 NRC 1190, 1192 (1977).

In its August 21, 1981 submission (at p. 10), the staff informed us that, on or about September 15, 1981, it intends to file supplemental testimony addressing the concerns which prompted the Board below to seek the assistance of independent consultants. As we understand it, the staff proposes to follow this course irrespective of any action we might take in the interim on its directed certification motion.

In the circumstances, we deem it advisable to stay our hand to abide the event of the filing of the supplemental testimony and its consideration by the Board below. Among other things, it is at least possible that, following such consideration, the Board will no longer find it necessary to resort to the independent consultants. Should that contingency materialize, the pending staff motion will, of course, become moot.

We will issue a further memorandum elaborating on the foregoing. The purpose of this summary order is to put the staff on immediate notice that its supplemental testimony is to be filed with the Licensing Board no later than September 15. We assume that that testimony will address, *inter alia*, certain fundamental principles of seismology and other aspects of the seismic testimony previously adduced.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Bishop
Secretary to the Appeal Board

MEMORANDUM

August 27, 1981

1. In this operating license proceeding, the Licensing Board received the testimony of applicant and NRC staff witnesses on, *inter alia*, a seismic issue raised by the only intervenor, Brett Allen Bursey. That testimony focused in part upon the seismic consequences which might be occasioned by the impoundment of water in the Monticello reservoir, located adjacent to the facility. According to applicant and the staff,¹ the conclusion of the witnesses was that, as now designed, the facility is capable of withstanding the maximum seismic event which might be induced by the reservoir impoundment. For his part, Mr. Bursey offered no evidence to the contrary.

The entire proceeding, including the seismic issue, remains in an interlocutory posture below. The staff, however, asks us to review now a Licensing Board determination to invoke the assistance of several "independent consultants", at least some of whom would be called upon to testify as Board witnesses at a further hearing which the Board proposes to hold on the seismic issue.² In a motion for directed certification, the staff challenges the justification for such a step and maintains that sufficient cause exists for our intercession.

Upon receipt of the staff's motion, we invited the Licensing Board to provide a full written explanation of the reasons why it believed it necessary to resort to independent consultants. In an August 13, 1981 memorandum, the Board referred us to oral remarks of its Chairman at the July 17, 1981 session (Tr. 3790-3817). The memorandum asserted (at p. 2) that those remarks reflected the Board's dissatisfaction, not with the staff's testimony, but rather with "the [s]taff's review as disclosed by the testimony — a matter that does not lend itself to correction merely by further [s]taff testimony" (emphasis added). Hence, as the Board saw it, the appropriate course was "to attempt to arrange for independent consultants and further hearings with all deliberate speed". *Ibid.* Still further, the Board emphasized that the parties would be given the opportunity to respond to the positions taken by the independent consultants and encouraged to make full use of that opportunity. *Ibid.*

¹ In view of the present status of this matter before us, we have not undertaken a review of the testimony ourselves.

² The Board is considering at least five individuals — two occasional consultants to the Commission's Advisory Committee on Reactor Safeguards (Drs. Enrique Luco and Mihailo Trifunac) and three employees of the United States Geological Survey.

As authorized by us, on August 21 the staff responded to the Licensing Board's memorandum.³ At the conclusion of the response, it stated that, on or about September 15, 1981, it proposed to file supplemental testimony addressing the concerns which prompted the Board to seek the assistance of independent consultants. Taking note of that representation, we entered an order on August 25 in which we, *inter alia*, (1) directed the staff to file the supplemental testimony *no later than* September 15; (2) announced that the motion for directed certification would be held in abeyance pending the Licensing Board's receipt and consideration of that testimony; and (3) stated that a further explanation would be provided in a subsequent memorandum.

2. "[T]he grant of a request for directed certification is an exception to the Commission's general rule against interlocutory appeals (10 CFR §2.730(f) and, as such, is to be resorted to only in 'exceptional circumstances'". *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-382, 5 NRC 603, 606 (1977), citing *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-271, 1 NRC 478, 486 (1975).⁴ Thus, "[a]lmost without exception in recent times, we have undertaken discretionary interlocutory review only where the ruling below either (1) threatened the party adversely affected by it with immediate and serious irreparable impact which, as a practical matter, could not be alleviated by a later appeal or (2) affected the basic structure of the proceeding in a pervasive or unusual manner". *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-405, 5 NRC 1190, 1192 (1977).

As we suggested without elaboration in our August 25 order, the matter at hand may meet that standard. Although a definite conclusion in that regard need not be reached now, there is little room for serious question that the course upon which the Licensing Board has embarked is highly unusual, if not entirely unprecedented.⁵ To be sure, it does not perforce follow that, as the staff insists, the Board's action is both wrong and fit for interlocutory reversal. But, in the totality of circumstances, its novelty and potential effect upon the basic structure of the proceeding clearly foreclose

³ Applicant also responded.

⁴ *Seabrook* was the first decision to the effect that a party might seek discretionary review of a non-appealable interlocutory ruling by means of a petition for directed certification under 10 CFR 2.718(i).

⁵ Although ACRS consultants recently testified as Board witnesses in the *Diablo Canyon* and *Seabrook* seismic proceedings, this was brought about by circumstances unlike those in the case now before us. See *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-519, 9 NRC 42 (1979) and ALAB-604, 12 NRC 149, 150-51 (1980); *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), Docket Nos. 50-443, 50-444 (November 6, 1980 unpublished order).

a summary rejection of the staff's motion — the customary outcome of endeavors by parties to cast us in the ongoing role of monitor of the day-to-day conduct of licensing proceedings.

The usual expectation is that, in construction permit and operating license proceedings alike, the issues in litigation will be decided by the Board in the context of the evidence adduced by the parties on those issues. This does not mean, of course, that the Board is required to accept uncritically all testimony placed before it unless it has been specifically controverted by other evidence of record. To the contrary, in all circumstances the Board has the right, indeed the duty, to satisfy itself that the conclusions expressed by expert witnesses on significant safety or environmental questions have a solid foundation. To this end, Board members are free to examine the witnesses themselves respecting the basis for opinions which they express — including the methodology or assumptions underlying the analyses which led to those opinions. And, if persuaded following such interrogation that, for one reason or another, certain of the evidence is unreliable, the Board has several options readily available to it short of calling its own witnesses to address the perceived deficiencies. Among other things, the Board can (1) simply reject that evidence and decide the issue without regard to it (*i.e.*, on the basis of the other evidence of record); or (2) require the sponsoring party to produce supplemental testimony which is not subject to the same infirmities.⁶

The foregoing considerations notwithstanding, a licensing board may well have the latitude to call upon independent consultants itself for the purpose of supplementing what it deems to be an unsatisfactory record. Such an undertaking, however, should be reserved for the most extraordinary situation in which it is demonstrated beyond question that a board simply cannot otherwise reach an informed decision on the issue involved. We are thus far not convinced by either the Licensing Board Chairman's remarks at Tr. 3790-3817 or the Board's August 13 memorandum that the staff has been given a fair opportunity to resolve the Board's concerns respecting the sufficiency of its seismic review. In fact, the dichotomy drawn by the Board between the staff's *testimony* and the staff's *review* (August 13 memorandum, p. 2) is a distinction without a difference. Scrutiny of the referenced transcript pages confirms this. The evidentiary deficiencies, as identified there by the Board Chairman, would appear to be at least amenable to resolution through further staff review and testimony. See, *e.g.*, Tr. 3792, 3793, 3794, 3796, 3812-13.

The staff's supplemental testimony to be filed by September 15 will enable the Board to review the record more carefully and focus its

⁶ In this regard, a board can invoke the procedure available under 10 CFR 2.720(h)(2) for soliciting the testimony of NRC staff not already identified as witnesses.

concerns more precisely. In the event that, upon full consideration of the original and supplemental testimony, the Board still is of the view that it cannot resolve the seismic issue on the basis of the evidence adduced by the parties themselves, we shall expect it to provide its reasons in some detail. With those reasons in hand, we will then act on the directed certification motion.

FOR THE APPEAL BOARD

C. Jean Bishop
Secretary to the Appeal Board

MEMORANDUM

October 2, 1981

In accordance with our August 25, 1981 order, the staff filed its supplemental seismic testimony on September 15. As expressly stated in our August 27 memorandum in further explanation of the August 25 order, the Licensing Board was thereupon to reconsider its prior determination to seek the assistance of independent consultants on the seismic issue. That memorandum went on to provide (p. 7) that:

In the event that, upon full consideration of the original and supplemental testimony, the Board still is of the view that it cannot resolve the seismic issue on the basis of the evidence adduced by the parties themselves, we shall expect it to provide its reasons in some detail. With those reasons in hand, we will then act on the directed certification motion.

As of this date, the Licensing Board has not supplied us with a written statement of the reasons why it still believes "that it cannot resolve the seismic issue on the basis of the evidence adduced by the parties themselves". This may be because the Board has now concluded that it no longer requires the assistance of independent consultants. In any event, to avoid any possible misunderstanding, the Board is *not* to call any independent consultants as Board witnesses unless and until (1) it has furnished to us its detailed statement of reasons; and (2) the pending directed certification motion is thereafter acted upon by us.

FOR THE APPEAL BOARD

**C. Jean Bishop
Secretary to the Appeal Board**

ORDER

October 19, 1981

We have closely examined the Licensing Board's October 15, 1981 memorandum and order. LBP-81-47, 14 NRC 865. That examination discloses a total failure on the part of that Board to explicate the reasons why it cannot resolve the seismic issue before it on the basis of the evidence adduced by the parties themselves. See our memorandum (unpublished) of August 27, 1981 at p. 7. Beyond that, the Board below devoted a significant part of its October 15 issuance to a critique of the content of the August 27 memorandum. That critique was neither invited nor appropriate.

In the circumstances, there is clear warrant for directing the certification to us forthwith of the *merits* of the seismic issue. See 10 CFR 2.718(i). Doing so, however, would entail unacceptable delay in this proceeding, as well as in other proceedings currently before the members of this Board. We are thus left with no practical alternative to allowing the Licensing Board to pursue its proposed course notwithstanding (1) our conviction that that course has not been adequately justified, and (2) that Board's open and flagrant disregard of our instructions. Accordingly, although not without merit, the staff's petition for directed certification must be *denied*.¹

In the interest of minimizing further delay in the progress of this proceeding, we are announcing our result at this time. A full explanation will be set forth in a subsequent memorandum.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Bishop
Secretary to the Appeal Board

¹ That petition did not ask us to assume jurisdiction over the merits of the seismic issue but, rather, merely sought review of the Licensing Board's proposed use of independent consultants as Board witnesses. As indicated in the text above, it was the Licensing Board's October 15 memorandum and order which suggested the warrant for granting broader relief *sua sponte*.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Peter B. Bloch, Chairman

Michael A. Duggan

Robert M. Lazo

Ivan W. Smith, Alternate

In the Matter of

Docket No. 50-389-A

**FLORIDA POWER & LIGHT
COMPANY**

(St. Lucie Plant, Unit No. 2)

December 11, 1981

Summary disposition on the merits is granted to intervenors in this antitrust action after the Board finds that the use of a nuclear power plant would maintain a situation inconsistent with the antitrust laws. The Board accepts findings from two prior cases, including decisions of a United States Court of Appeals and the Federal Energy Regulation Commission (FERC). Based on these cases, the Board finds that applicant conspired with another utility to divide markets and that it exercised monopoly power within its territorial limits.

The Board also finds after reviewing the entire record and concluding that there is no remaining genuine issue of fact, that applicant participated in joint planning, with other major utilities, of generation and transmission, including nuclear generation.

Because of the lengthy and somewhat disorganized record, the Board establishes an objections procedure in which parties wishing to preserve their grounds for appeal are required to file objections for resolution by the Board. In addition, procedures are established to expedite the decision of the case.

The Board discusses the relationship of its decision to remedies which might be granted. It states that cities within applicant's territorial boundaries should be entitled to purchase a share of its nuclear power plant, as has already been accomplished in a "settlement" agreement adopted in this case. However, the Board does not rule on whether the terms of the settlement agreement already provide adequate relief for "inside" cities. In

addition, the Board refrains from ruling on whether these "outside" cities should be permitted to purchase a share in applicant's nuclear power plant or in other nuclear power plants it operates.

ATOMIC ENERGY ACT: SITUATION INCONSISTENT WITH ANTITRUST LAWS (REMEDY)

Utilities located within an area in which a utility has exercised monopoly power are entitled to purchase a share in a nuclear power plant which the utility is planning to operate. In addition, cities allegedly outside a utility's area may not be refused the right to purchase firm power when the utility's territorial line was developed in part as the result of a conspiracy to divide markets.

COMMISSION PROCEEDINGS: COLLATERAL ESTOPPEL

The Commission gives effect to factual findings of federal courts and sister agencies when those findings are part of a final judgment, even when the party seeking estoppel effect was not a party to the initial litigation. Although the application of collateral estoppel would be denied if a party could have easily joined in the prior litigation, the Commission will apply collateral estoppel even though it is alleged that a party could have joined in; if the prior litigation was a complex antitrust case. Furthermore, FERC determinations about the applicability of antitrust laws are sufficiently similar to Commission determinations to be entitled to collateral estoppel effect. Even a shift in the burden of persuasion (which did not occur) between FERC and Commission proceedings does not exclude the application of collateral estoppel when it is apparent that the FERC opinion did not arrive at its antitrust conclusions because of the burden of persuasion.

On the other hand, the decision of a federal district court on a summary judgment motion is not a final judgment entitled to collateral estoppel effect, particularly when the court did not fully explain the grounds for its opinion and when its decision was issued after the hearing board had already begun studying the record and had formed factual conclusions which were not adequately addressed in the district court's opinion.

LICENSING BOARD: AUTHORITY TO REGULATE PROCEEDINGS

The Board requires parties to object to the Board's decision in order to preserve grounds for appeal.

RULES OF PRACTICE: SPECIAL RULES FOR CASE CITATIONS

The Board requires that parties citing cases as authority must explain the relevant facts of the cited cases or the Board may disregard the citations. In addition, parties citing a string of cases for the same proposition should know that if the first case in the string is found to be inapplicable other cases will not be considered.

RULES OF PRACTICE: SPECIAL OBJECTIONS PROCEDURE

The Board requires parties to file their objections to its decision pursuant to a Board-established schedule or to waive them.

RULES OF PRACTICE: COLLATERAL ESTOPPEL

See "Commission Proceedings: Collateral Estoppel".

RULES OF PRACTICE: MOTION FOR SUMMARY DISPOSITION

See "Rules of Practice: Summary Disposition".

RULES OF PRACTICE: SUMMARY DISPOSITION

Partial summary disposition is granted in an antitrust proceeding after the findings of two prior cases were accepted because of the application of collateral estoppel and after the Board found there was no genuine dispute as to an additional material fact.

RULES OF PRACTICE: SCHEDULING

The Board simultaneously establishes schedules for the filing of objections, the holding of oral argument and the holding of an evidentiary hearing on remaining questions of fact. Briefs on objections are limited to 40 pages in length, with limited permission for appendices. Parties are authorized to cite material already in the record without copying it over.

MEMORANDUM AND ORDER
(Concerning Florida Cities' Motion
For Summary Disposition on the Merits)

On May 28, 1981, Florida Cities (Cities) requested summary disposition on the merits of its claim that the construction of St. Lucie Plant, Unit No. 2, would maintain a situation inconsistent with the antitrust laws. If Cities prevails, the Commission would be required to remedy the situation inconsistent with the antitrust laws by imposing appropriate conditions on the construction permit issued to Florida Power and Light Company (FPL), the plant's owner and operator.

The Cities' request is based largely on an argument that three prior decisions, one by the Fifth Circuit and two by the Federal Energy Regulatory Commission (FERC), should be given collateral estoppel effect. In addition, Florida Cities has filed documentary evidence and has argued that some key facts are not genuinely in dispute.

Florida Power and Light Company (FPL) opposes Cities' motion. It argues that the Cities' precedents are not entitled to collateral estoppel effect but that a recent decision of a federal district court, adverse to Cities' position, is entitled to such effect. In addition, it argues that the cited cases do not establish the existence of a situation inconsistent with the antitrust laws, that many of Cities' documents are inadmissible and do not support the propositions for which Cities advances them or that the documents lack definitiveness because of contrary evidence offered by FPL.

We have decided, for reasons discussed below, to grant collateral estoppel effect to two of the decisions which Cities cites. We deny granting collateral estoppel effect to the decision FPL cites, but we accept all but one of the findings reached in that case. In addition, our review of the documents persuades us to reject some of Cities' arguments but to make limited factual findings that are helpful to Cities' case. The net effect of these decisions is a determination that a situation inconsistent with the antitrust laws does exist. We also discuss some of the implications of this finding for relief in this case.

Because of the complexity and lack of organization of the record, we do not consider this to be our last word on this motion. Instead, we are implementing a special objection proceeding in which the parties may persuade us to alter our decision. We also have devised procedures designed to bring this case to a reasonably expeditious conclusion.

This memorandum will analyze the collateral estoppel arguments, summarize the facts determined as the result of application of collateral estoppel, decide what facts are not in genuine dispute and reach a con-

clusion about the resulting status of this case and the procedures necessary for a fair and efficient determination of the remaining issues.

I. BACKGROUND AND APPLICABLE LAW

In August 1976 Florida Cities filed a petition to intervene in the construction permit proceeding for St. Lucie Unit 2. The proceeding had begun 31 months previously. However, the Commission affirmed the granting of the petition for late intervention. *Florida Power & Light Company (St. Lucie Plant, Unit No. 2)*, CLI-78-12, 7 NRC 939 (1978).

A. Standards for Determining the Merits

This case arises under the licensing authority granted to the Commission by the Atomic Energy Act of 1954, particularly §2135(c). The applicable law was recently explicated in *Alabama Power Company (Joseph M. Farley Nuclear Plant, Units 1 and 2)*, ALAB-646, 13 NRC 1027 (1981). As that opinion explains, it was the third case in which the Appeals Board was called on to interpret the applicability of antitrust provisions to Commission licensing proceedings. In this section of our opinion, we set forth the applicable law by paraphrasing the *Farley* opinion, particularly at 1035-36 and 1045-1046. The purpose of our discussion is as a guide for readers who are not familiar with Commission precedent. The legal scholar may prefer to read *Farley* directly.

Congress has directed the Commission to consider the antitrust ramifications of its licensing actions. It must review applications for permits to construct commercial nuclear power facilities to determine if the activities sought to be licensed would create or maintain situations inconsistent with the antitrust laws or their underlying policies.

If the Commission finds that the granting of a license would create or maintain a situation inconsistent with the antitrust laws, it may refuse or rescind a license or may condition the license so that the prohibited result will not occur. These provisions reflect a basic Congressional concern over access to power produced by nuclear facilities and represent recognition that the nuclear industry, which originated as a Government monopoly and was established in large measure with public funds, should not be permitted to develop into a private monopoly through the licensing process.

The existence of a situation inconsistent with the antitrust laws does not require a finding of a violation of those laws. Proof of conditions which run counter to the *policies* underlying those laws is sufficient to warrant remedial license conditions.

In addition, if applicant (or licensee) is a dominant business enterprise, its actions have to be tested against a more stringent standard than applies to actions of smaller concerns in highly competitive markets. Electric

utilities are subject to these principles, particularly where they voluntarily enter into commercial relationships governed in the first instance by business judgment and not regulatory coercion.

B. Procedural Setting

Cities' motion for summary disposition arises under 10 CFR §2.749. The relevant standard for determination of its motion appears in subsection (d), which follows:

The presiding officer shall render the decision sought if the filings in the proceeding, depositions, answers to interrogatories, and admissions on file, together with the statements of the parties and the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a decision as a matter of law.

II. APPLICATION OF COLLATERAL ESTOPPEL

The parties agreed at the argument conducted on August 17-18, 1981, that the controlling precedents on collateral estoppel are *Parklane Hosiery Co. v. Shore*, 439 U.S. 322 (1979), *Blonder Tongue Laboratories, Inc. v. University of Illinois Foundation*, 402 U.S. 313 (1971), and *United States v. Utah Construction & Mining Co.*, 384 U.S. 394 (1966). See *Response of Florida Power and Light Co.* (FPL Response) at 93-94 and Tr. 1218. Cities also relies on *Cities of Anaheim, et. al., California v. Southern California Edison Company*, C.D. Cal. No. CV-78-810-MML (May 19, 1981).

Cities argues that collateral estoppel effect should be given to *Gainesville Utilities Department v. Florida Power & Light Company*, 573 F.2d 292 (5th Cir.), *cert. denied*, 439 U.S. 966 (1978), *Florida Power & Light Co.*, Opinion Nos. 57 and 57-A, 32 PUR 4th 313, *Florida Power and Light Company*, Docket No. ER78-19 (orders of December 21, 1979 and February 6, 1980), and *Florida Power and Light Co.*, Opinion No. 517, 37 FPC 544 (1967).

FPL would deny collateral estoppel effect to these cases. It argues that cities could easily have joined in the *Gainesville* litigation and that the application of the *Parklane* standard would preclude Cities from enjoying the fruits of that litigation because it was not willing to expose itself to the risk of an adverse outcome. FPL would deny collateral estoppel effect to FERC 57 because the Commission's opinion expressly denied any intent to bind another forum, because FERC's antitrust concerns are different from ours, because the burden of proof was different in that proceeding and because that proceeding was hurried and that the NRC should give FPL a

more complete opportunity to contest its case than FERC gave it. FPL also argues that FERC ER78-19 is irrelevant to this case and that Opinion No. 517 was first reversed and then affirmed on different grounds than those for which Cities seeks collateral estoppel effect.

Cities has argued, without contradiction by FPL, that it is accepted federal law that prior determinations by an administrative agency may estop the parties from litigating issues resolved earlier. Cities cites *United States v. Utah Construction & Mining Co.*, 384 U.S. 394 (1966) and *City of Anaheim v. Southern California Edison Co.*, C.D. Cal. No. CV-78-810-MML (May 19, 1981, *slip op.*, in support of this position.

A. Gainesville

Parklane involved *offensive* collateral estoppel — the use of collateral estoppel as a sword rather than a shield. The “general rule” of *Parklane*, on which FPL relies heavily, was stated by the Court as follows:

The general rule should be that in cases where a plaintiff could easily have joined in the earlier action or where, either for the reasons discussed above or for other reasons, the application of *offensive estoppel* would be unfair to a defendant, a trial judge should not allow the use of *offensive collateral estoppel*.

Parklane, 439 U.S., at 331 (emphasis supplied).

Whether this case involves “offensive” collateral estoppel, as in *Parklane*, is unclear. The license has been applied for by FPL. An affirmative defense has been presented by Cities. The prior cases never categorized this situation as either offensive or defensive.

If we assume, nevertheless, that *Parklane* applies, we must consider whether Cities “could easily have joined in the earlier action.” FPL has not persuaded us that Cities could have joined the *Gainesville* litigation or that they could have done so easily. Had Cities applied for intervention in that litigation, Rule 24(b) of the Federal Rules of Civil Procedure would have dictated denial of their application if the intervention would “unduly delay or prejudice the adjudication of the rights of the original parties.” FRCP 24(b). It is not clear that a trial court hearing an already complicated antitrust case would have exercised its discretion to admit additional parties, at least not where intervention would have broadened the issues. See *Commonwealth Edison Co. v. Allis-Chalmers Mfg. Co.*, 315 F.2d 564 (7th Cir. 1963), *cert. den.*, 375 U.S. 834, 84 S. Ct. 64, 11 L. Ed. 2d 64 (1963). See also *GAF Corp. v. Eastman Kodak Co.* (S.D.N.Y.) 1981-2 Trade Cases ¶64,205 at 73,751 (in which collateral estoppel applied even though GAF specifically requested a separate trial; weight was given to the complexity of each of these cases plus other factors in deciding whether

GAF could "easily have joined in"). Cities asserts without contradiction that intervention by Cities in the *Gainesville* proceedings would have broadened the issues of that litigation. Tr. 1144.

Even if we were convinced that Cities could have joined the Gainesville litigation, we would not consider that joining would have been accomplished "easily", in the sense of the *Parklane* "general rule". We do not interpret *Parklane* to require a party to join in complex litigation with antitrust overtones in order to invoke collateral estoppel based on the decision in the case. For Cities to have joined in the *Gainesville* case would undoubtedly have been very expensive, and we do not think it appropriate for us to second-guess whether Cities, which have now sued FPL in an antitrust suit, should have sued at the early date that *Gainesville* was brought. We do not believe Cities needed to take that action, or that a substantial judicial economy should be forfeited in this proceeding because they did not.

In any event, the "general rule" of *Parklane* is just that — a general rule. The Supreme Court made clear that federal trial courts — and by extension, federal agencies — ultimately exercise "broad discretion" in determining whether to permit offensive collateral estoppel. 439 U.S. at 331. We look, therefore, to all relevant considerations, and not merely to the matter of whether the proponent of collateral estoppel "could easily have joined in the earlier action."

Here, in our view, the relevant considerations weigh in favor of applying collateral estoppel. This is not one of those situations discussed in *Parklane*, 439 U.S. at 330, where a defendant first suffers an adverse result in litigation for relatively small stakes and then experiences an attempt by a new opponent to use the first result offensively where much larger stakes are involved. The Court considered it unfair to hold a defendant to the result of a case where "he may have [had] little incentive to defend vigorously." *Id.* But *Gainesville* was serious litigation and there is every indication that FPL defended itself with vigor.

Another important factor in favor of collateral estoppel is that the evidence of conspiracy, consisting primarily of letters written by company officials, was set forth in the Fifth Circuit's opinion and was found to be overwhelming. The Circuit Court reversed a jury verdict, necessarily concluding that the evidence was so strong as to admit of only one reasonable conclusion. Yet in our proceeding FPL does not suggest that it has any highly probative evidence which was excluded from the prior record or not available at that time. It merely suggests that we might reach a conclusion different from the Fifth Circuit's based on essentially the same evidence.

Tr. 1167-70. But in view of the evidence detailed in *Gainesville* — including patently “incriminating correspondence”, 573 F.2d at 303 — FPL has failed to persuade us that re-litigation of the *Gainesville* issues would be a fruitful exercise.

For all of the reasons stated in this section of the memorandum, we conclude that *Gainesville* should be given collateral estoppel effect.

B. FERC 57 and 57-A

1. Different Legal Standards

FPL alleges that the standards used by FERC in *Opinion 57* and *57A* are different standards than those applied by the NRC in its antitrust proceedings and that, consequently, collateral estoppel is inappropriate.

We disagree. FERC must consider whether proposed tariffs are just and reasonable. As part of that determination, it must reflect the policies expressed in the antitrust laws. This is the way FERC expressed its responsibility in *FERC Opinion 57*, 32 PUR 4th (1979) at 315:

The allegations and evidence of staff and the intervenors together with the associated responses of the company have coalesced into issues typically examined in the context of a monopolization case under §2 of the Sherman Act [W]e wish to emphasize that in evaluating the anticompetitive effects of a proposed rate change and in making findings with respect thereto, we do not make findings that *violations* of the antitrust laws have occurred. Instead, it is our *obligation* to evaluate the public policies expressed in federal antitrust laws and to reflect those policies in the conduct of our responsibilities under the Federal Power Act. This we have done in the instant case.

[Emphasis in original.] [See *Gulf States Utilities Co. v. Federal Power Commission* (1973) 411 US 747 . . . ; and *Federal Power Commission v. Conway Corp.* (1976) 426 US 271]

FERC's standard is remarkably similar to our own, as it has been explained in *Consumers Power Co.* (Midland Units 1 and 2), LBP-75-39, 2 NRC 29 (1975) at 908-09 and cited in *Alabama Power Company* (Joseph M. Farley Nuclear Plant, Units 1 and 2), ALAB-646, 13 NRC 1045-46 (1981).

[P]roof of an actual violation of the antitrust laws is not required to show the existence of a situation “inconsistent with” them for Section 105c purposes. The Congressional framers of the section (the members of the Joint Congressional Committee on Atomic Energy) were originally divided between those who favored proof

of an antitrust violation before allowing Section 105c remedies to be imposed and those who thought a showing of circumstances merely "tending" to such a violation should suffice to allow that relief. An accommodation between the two views was eventually reached. The members of the Joint Committee agreed that proof of conditions which run counter to the *policies* underlying those laws, even where no actual violation of statute was made out, would warrant remedial license conditions under Section 105c. We need not linger over the matter; this compromise is expressly manifested in the report of the Joint Committee and is reflected in the Commission's decisions.

[Emphasis in original.]

Hence, we find that both agencies have similar functions concerning administration of the *policies* of the antitrust laws. However, we consider this issue a red herring. If we accord collateral estoppel effect to a finding, that factual or legal finding is accepted in our proceeding. To the extent that the finding is relevant, it can be given appropriate effect. If it is irrelevant, it is of no help. The only proper procedure to determine relevance is to consider each finding entitled to collateral estoppel effect and to consider how it affects this proceeding.

2. Different Burdens of Proof

FPL argues that in FERC proceedings it has the burden of persuasion but that in an antitrust proceeding before the NRC, intervenor has the burden of persuasion. FPL would have us conclude that this alleged change in the burden of persuasion deprives the FERC decision of collateral estoppel effect.

We disagree completely.

First, we find that FPL has the burden of persuasion in this proceeding, notwithstanding contrary dicta by our brethren in *Toledo Edison Co.*, (Davis-Besse Units 1, 2, and 3), LBP-77-1, 5 NRC 133, 253-54 (1977) and *Midland* at 45. These conclusions on burden of proof were not affirmed by the Atomic Safety and Licensing Appeal Panel, and we have concluded that there is a better view.

The burden of proof is allocated by 10 CFR §2.732, which states: Unless otherwise ordered by the presiding officer, the applicant or the proponent of an order has the burden of proof.

That section is interpreted by Appendix A to Part II, at V.(d)(1) to mean simply "the applicant has the burden of proof."

Antitrust issues are just one set of issues which must be determined in the licensing process. They are covered by Part II. The required antitrust review is set in motion by 10 CFR §2.102, in which the antitrust review provisions are subsections parallel to the subsections providing for other staff reviews.

Although antitrust issues are, as our brethren have remarked, traditionally serious civil or criminal charges on which defendant would not have the burden of persuasion, we do not believe that factor to be relevant to the interpretation of §2.732. As with safety issues, the proponent of antitrust licensing conditions has the burden of coming forward and of making a prima facie case. However, the ultimate burden of persuasion rests with Applicant, who seeks a licensing order.

FPL argues that it is not the proponent of an Order. Tr. 1184-1193. However, we are not convinced. In the course of argument, FPL admitted that it must either have an order estopping Cities from objecting to the issuance of a license or an order terminating this proceeding without a finding that there is a situation inconsistent with the antitrust laws. Tr. 1192-1193. Regardless, we consider FPL to be the proponent of the licensing order. Intervenors merely seek conditions to that order, just as they would do for safety or environmental issues. The fact that this is an ongoing proceeding with respect to a construction permit that has already been granted is incidental and should not affect the burden of persuasion.

We also disagree with Applicant's contention that shifts in the burden of proof preclude collateral estoppel effect. Applicant relies on cases in which the *standard* of proof is different. For example, acquittal of a criminal defendant does not absolve the defendant of potential civil liability. Similarly, a loss of a civil action for damages from an injury does not preclude pursuit of an administrative claim before an agency whose standards are more lenient than those applicable to a tort action. (See *Response of Florida Power and Light* at 92-93.)

Applicant considers a shift in the burden of proof to be a greater change than a shift in the standard of proof. Consequently, it argues that it follows *a fortiori* that a change in the burden of proof precludes collateral estoppel. With this we disagree.

The precise analytical question involved is sharply highlighted by both FPL and Cities. FPL relies on Restatement (2d) of Judgments, §68.1 (Tent. Draft No. 1, 1973), which states that collateral estoppel should be precluded when the burden of proof has shifted. The Restatement cites for authority the dissenting opinion in *Harding v. Carr*, 79 R.I. 32, 83 A.2d 79 (1951). The Restatement merely says that "the reasoning of the dissent in the case is believed to be more persuasive."

We agree with the majority in the *Harding* case and with Cities. Ordinarily, the apportionment of the burden of persuasion does not affect

the outcome of the case. That explains, in part, why the Appeal Board has not yet found it necessary to apportion that burden in NRC antitrust cases. Differences in the burden of persuasion are unlike differences in the standard of proof, which may often affect the outcome—particularly where the difference is between proof beyond a reasonable doubt and proof by a preponderance of the evidence. We approve of the sentence in Cities' Supplemental Memorandum in Response to Board Questions at 10, stating that "the possibility of equipoise seems so slight that it should not counter-balance the sound public policy in favor of collateral estoppel and against relitigation."

Were we convinced that the portion of the FERC opinion dealing with antitrust issues rested on the burden of persuasion, we might decline to give its opinion collateral estoppel effect. See *United States Fire Insurance Company v. Adirondack Power & Light Corporation*, 201 N.Y.S. 643 (App. Div., 3rd Dept. 1923). However, FERC's antitrust conclusions are stated in positive terms. For example, Opinion 57 states at 323 that:

Although there is a potential for competition in the wholesale market, actual competition has been inhibited by FP&L, as we discuss below This opinion reflects our concern that wholesale monopoly power not be used to maintain or enhance a utility's retail market position.

. . .

We find that FP&L has monopoly power in these relevant markets, as determined by Dr. Taylor in unrebutted testimony.

Similarly, at 324, FERC finds that:

Although the record does not contain precise statistical indicia of FP&L's share of the wholesale power market, it is *clear* that the company has monopoly power over bulk power transactions as well.

[Emphasis added.]

In addition, as FPL pointed out at the conference, Tr. 1178, FERC knows how to indicate when its findings are based on the burden of persuasion. At 314-15, it stated that utilities could move to amend general tariffs to limit service availability but that FP&L "has failed to carry its burden of justification." However, we do not agree with FP&L that this language indicates that the entire opinion hinges on the burden of proof. To the contrary, we conclude from FERC's use of language that the antitrust conclusions were unequivocal and that the result was that FPL had to shoulder the burden of proof in justifying limitations of service

availability. It is this burden, which arose from a prior finding of monopoly power, that FPL could not meet.

3. Full and Fair Opportunity to Litigate

FPL also argues, citing the FERC administrative law judge whose opinion was reversed by that Commission, that it was denied a full and fair attempt to litigate the issues in that forum. FPL argues that a hearing began only 2.5 months after the FERC commenced its proceeding, depriving the parties of an adequate time for discovery and preparation for a hearing. It grieves because the administrative law judge found that the time constraints prevented him from adequately exploring whether specific antitrust violations have occurred. FPL Response at 95. And it even cites lax standards for admission of evidence as a possible source of prejudice.

We find this argument of FPL without merit. *Parklane* indicated, at pp. 561-62, that it might be unfair to apply offensive collateral estoppel to a party who lacked the "incentive to defend vigorously", citing a case where an attempt was made to estop a \$7 million suit because of a \$35,000 judgment. However, we find no indication that *Parklane* would require judges to inquire into the procedures of other forums, after the close of earlier litigation. We do not consider that appropriate. Such questions are more appropriately settled by appeal in the prior case.

It is clear that FERC concluded that FPL had its day in court. It reversed the administrative law judge after studying his record for a full year. The lack of time to consider specific antitrust violations did not work against FPL's interests, but against its customers. Despite few specific findings of antitrust violations, the FERC was able to conclude that FPL had monopoly power in specified markets. It also indicated that its proceeding may have been "too elaborate". It concluded its opinion, FERC No. 57, at 340, as follows:

Finally, we note that FP&L has matters pending before us in over 30 dockets, most involving interchange transmission service filings in which antitrust allegations have been made. We see little need in those cases for the kind of elaborate presentation made in this one. It would be helpful to the commission for the parties to pinpoint the competitive problems and defenses relating to the filings in each of these cases.

To be sure, the FERC did insert in its opinion language that its decision should not bind "other forums." See *id.* at 315. However, this restrictive language occurs immediately following an explanation that the FERC had not found "violations" such as would be required in a civil antitrust suit.

We do not interpret this language to extend to the NRC, whose proceedings apply a standard more similar to FERC's than do the civil courts.

On the same page as this limiting language, FERC states its belief that "our evaluation of the anticompetitive effects of the proposal is correct and supported by the record." Furthermore, FERC expressed no reservations at all about the use of this finding in the 30 other dockets then pending involving FPL. We consider these indications of the seriousness of the FERC findings to be more important than the limiting language. Furthermore, we do not consider these limitations binding on us, as we alone have the jurisdiction to determine the application of collateral estoppel to our proceedings.

We believe that deference is due to FERC opinions by the NRC. We come to antitrust issues involving public utilities as a sidelight of our more common efforts to evaluate the safety and environmental effects of nuclear energy. For the FERC, the economics of public utilities are their bread and butter. Its staff comes to public utilities issues with acquired expertise and it may therefore be able to telescope issues which would take us longer because of our need to learn about the practical aspects of utility regulation.

4. Conclusion

For all the reasons stated in this section of the memorandum, we conclude that FERC Opinion 57 and FERC Opinion 57A should be given collateral estoppel effect.

C. Other FERC Opinions

Cities argue that ER78-19 should be accorded collateral estoppel effect. However, ER78-19 was reversed by *Florida Power & Light Company v. Federal Energy Regulatory Commission* (5th Cir. No. 80-5259, Nov. 6, 1981). Consequently, nothing in that case is now relevant here.

With respect to FERC Opinion 517, we find ourself in agreement with FPL. Cities seeks to use this case as determinative of the fact that:

FPL receives substantial benefits from its participation in the Florida Pool in the coordination of spinning reserves, the arrangement of plant maintenance schedules, and the assurance of the reliability of frequency control and from both the Florida Pool and ISG in the form of automatic assistance in the case of emergencies.

[*Florida Power & Light Company*, 37 FPC 544, 551-552 (1967), reversed 430 F.2d 1377 (5th Cir. 1970), reversed, *Florida Power and Light Company v. FPC*, 404 U.S. 453 (1972) (FPC Case), as cited in *Cities' Motion to Establish Procedures* at 34.] However, this case does not stand for as much as *Cities* wishes.

First, we note that FPL correctly argues that the case was reversed and then affirmed on only one of the FERC's two initial grounds. The issue in the case was whether FPL was subject to FERC jurisdiction because it transmitted electrical energy in interstate commerce. Technical issues concerning how electrical energy is generated and how it travels along interconnected transmission lines were in center stage. This issue of whether FPL derived a benefit from coordination was at best a fringe concern, irrelevant to the outcome of that case. Footnote 5 of *Parklane Hosiery Co. v. Shore*, 439 U.S. (1979) at 326, citing 1B J. Moore's *Federal Practice* ¶0.405[i], pp. 622-624 (2d Ed. 1974) and cases cited in that reference, states that issues are precluded by collateral estoppel only if they are "necessary to the outcome of the first action." Hence, *Cities* cannot use the FPC case for the suggested proposition.

We do think that the Supreme Court opinion in the *FPC Case* contains a few findings of marginal assistance to *Cities* and, applying principles discussed more fully above, we would apply collateral estoppel to those findings. These findings include FPL's membership in the Florida Pool and its interconnection to four named utilities, with which it "coordinates activities" and exchanges power. However, we will not infer much from the phrase "coordinates activities" since the decision does not discuss the nature of the coordination, which was not an issue necessary to the decision of the case.

III. FINDINGS RESULTING FROM COLLATERAL ESTOPPEL

Deciding to apply collateral estoppel only starts our consideration of how prior cases affect this case. The next step in this process, reflected in this section of the memorandum, is to decide which findings of prior cases are binding here.

The cases relied on in this section are those cited on pp. 2-3 of this memorandum. For convenience, they shall be cited merely as Gainesville, FERC57, and FPC (referring to the Supreme Court opinion we have referred to above as "FPC Case"). In adopting the findings of these decisions, we liberally borrow language without direct citation. We are grateful for the language composed by others but have not used direct citation because it would make our own findings more cluttered and confusing.

A. Background

Background material derivable from the opinions relates primarily to the size of FPL and of Florida Power Corporation (Corp.). Generally, this material merely shows that FPL and Corp. are large companies. It also shows that they have some interconnections with other companies. Although there is a finding on "coordination," we have already discussed above the ambiguity in the use of this word by the Supreme Court. The rest of this subsection cites as fact the findings we rely on.

FPL is Florida's largest electric utility. It serves about one million customers and is roughly the ninth largest utility nationally and 14th largest in investment in gross utility electric plant. Despite this significant size, the peninsular nature of Florida, the concentration of the company's sales in the southern part of the state, and the recurrent threat of hurricanes which might sever power lines, the operations of the company are unusually insular and independent of the operations of like companies in other States. FPC at 605.

FPL was a member of the Florida Pool and is interconnected with Corp., the Tampa Electric Co., the Orlando Utilities Commission, and the City of Jacksonville. These interconnected utilities and authorities coordinate their activities and exchange power as circumstances require. A purpose of the energy interchanges is to take care of temporary needs. *Ibid.*, including footnote 4.

Corp., FPL, and the other Florida Pool participants are members of the Interconnected Systems Group (ISG), a national interlocking of utilities that automatically provides power in case of emergencies. FPC at 606.

FPL operates generally in the eastern and southern parts of Florida from Jacksonville in the north to the Miami area in the south. Corp., also privately owned, is the second largest electric utility in the state. Corp.'s predominant service area is the western and central portions of Florida from the Panhandle in the north to the St. Petersburg area in the south. Gainesville at 294.

B. Relevant Markets

FPL operates in two broadly defined product markets. FERC57 at 321. The retail market involves sales of capacity and energy to ultimate consumers by vertically integrated utilities such as FPL and by distribution utilities. The bulk power market involves sales of wholesale power and energy to retail distributors (including the captive retail distribution centers of vertically integrated systems) by bulk power producers and suppliers. *Id.* at 321.

The bulk power market may be separated into submarkets for discrete firm requirements and for coordination. *Id.* at 322. Firm services are

noninterruptible; priced on the basis of average system costs; designated to meet a customer's base, intermediate, and/or peak-load requirements; and continuously available over the indefinite future. Conversely, interchange or coordination services are interruptible; incrementally priced on the basis of oil-fired generation costs; ancillary to bulk power supply and not practicable sources of base-load power; and of limited duration. *Ibid.*

FPL sells electric power and energy to most of the heavily populated areas along the eastern and western coasts of peninsular Florida and portions of central and north-central Florida. Within or adjacent to this service territory are 22 smaller areas served by municipal and cooperative utilities. This composite area, comprised of some 35 Florida counties, is the relevant geographic market for both retail and wholesale product markets. *Ibid.*

The wholesale bulk power market has a similar area to the retail market because there are relatively few wholesale transactions across its boundaries. This geographic limitation applies as well to the bulk power submarkets, particularly the firm requirements submarket. *Id.* at 323.

C. Monopoly Power

FPL has monopoly power in retail and bulk power markets within its geographic market or "composite area". *Id.* at 324. Included in FPL's bulk power resources are virtually all of the nuclear generating capacity and substantially all of the gas-fired generation available within the relevant market. Each of these forms of generation give the company a significant edge in the production of low cost power for base-load requirements. Three of the four operating nuclear plants in the state of Florida are owned by FPL, except for some small interests that New Smyrna Beach has in Florida Power Corporation's nuclear plant and for interests which it was required to sell pursuant to the partial settlement reached in this case. *Id.* at 324. FPL also enjoys an advantage over municipal generating systems because it has contracted for long-term, noncurtailable supplies of natural gas. *Ibid.* By comparison, municipal generating units are small capacity, oil-fired steam or internal combustion machines which characteristically have high operating costs and are ill-suited to provide base-load requirements. *Id.* at 325.

FPL owns 81 percent of the transmission lines within the relevant market with operating voltages of 69 kv or above. These are the facilities over which bulk power is transported within the relevant markets and FPL's ownership share gives it "strategic dominance" over transmission. *Id.* at 325.

D. Wholesale Market Division

FPL has engaged in a per se violation of the Sherman Act by conspiring with Florida Power Corporation to divide the Florida wholesale power market by not selling wholesale power to customers in each other's service territories. FERC57 at 326-327; Gainesville at 294.

Robert Fite and Ben Fuqua, acting in an official capacity for FPL, wrote a series of letters indicating the existence of a market division and implementing that division in several specific instances. Gainesville *passim*. A letter of February 17, 1965, implemented the division with respect to Gainesville. *Id.* at 295. Other letters concerning Gainesville were written by FPL officials. One was written between August 2 and August 30, 1966. *Id.* at 296. Another was written on October 24, 1966. *Ibid.*

Prior to its dealings with Gainesville, FPL officials had implemented the market division with respect to other entities. They refused to provide retail service to the town of Chiefland. *Id.* at 297. They thanked Florida Power Corporation for refusing to sell wholesale power to the City of Arcadia in 1956. *Ibid.* They learned by telephone and memorandum of reciprocal action Florida Power Corporation had taken in 1955 with respect to Lake City, which sought either wholesale or retail service. *Ibid.* They also were informed that Florida Power Corporation had refused in 1954 to serve Starke, which was not even served by FPL but was located in an area generally served by it. *Ibid.*

FPL refused to offer power to Lake Helen in November 1956, even though Lake Helen, which was generally within Florida Power Corporation's area, was not served by Florida Power Corporation. *Id.* at 298. It reminded Florida Power Corporation of this action and wished it well in buying Lake Helen's electric facilities. *Ibid.* In another incident, in 1962, before FPL agreed to an interconnection with the City of Orlando's municipal system, it first obtained Florida Power Corporation's assent and agreed to the construction of a cross-state transmission line. *Ibid.*

In 1963, Florida Power Corporation's customer, the City of Winter Garden, was considering switching to a municipally-owned system. Pursuing this option, citizens asked FPL for wholesale power. FPL responded that "the company did not supply municipal systems with wholesale power" and that Winter Garden was beyond its "economic service area." *Id.*, at 298.

In 1965, FPL learned from Florida Power that the City of Jacksonville, which was already intertied with FPL and within its territory, sought an interconnection with Florida Power Corporation. Florida Power Corporation inquired whether FPL would let Jacksonville go through its territory for this purpose. Florida Power Corporation then met with FPL to discuss

the matter; and Jacksonville never intertied with Florida Power Corporation. *Id.* at 299.

The *Gainesville* case also makes some positive findings about FPL and we agree with FPL that when Cities requests collateral estoppel effect it must accept the good with the bad. Although the relevance of those favorable findings is not altogether clear, we find that there was no agreement, understanding or concert of action between FPL and Florida Power Corporation to refuse to interconnect with Gainesville unless that city would enter into a territorial agreement. We also find that FPL's refusal to interconnect with Gainesville was not an act in furtherance of an attempt to monopolize. *Id.* at 303-305.

E. Existence of Retail Competition

For twenty years, FPL has competed with municipal utilities within its service territory to serve entire communities. FERC57 at 327, 330. At various times FPL has promoted acquisition or willingly received municipal proposals. Most, if not all, of those incidents occurred when the municipal systems were arranging new bulk power supplies from the options of self-generation, wholesale purchase from FPL, and retail purchase from FPL after franchise disposition. *Id.* at 330. The company has not succeeded in many acquisitions, because the municipal candidates solved their supply problems by adding generation. However, self-generation is becoming less and less attractive. *Ibid.* Since FPL controls the remaining two options, we conclude that its wholesale monopoly power can only increase, and, thereafter, its retail power as well. *Ibid.*

Twice (in 1958 and 1968), FPL sought to acquire the Lake Worth utility. *Id.* at 327-328. FPL offered to furnish firm power to New Smyrna Beach in 1958, if that utility would not order additional generating equipment and would enact an ordinance making it easier to dispose of its assets. *Id.* at 328. From 1965 to 1975 FPL took various steps and made internal plans directed at acquiring the New Smyrna Beach utility. *Ibid.*

In 1975 FPL sought to buy or acquire a 30 year lease on the Fort Pierce utility, which had approached it for an interconnection. *Ibid.* In 1976, the Fort Pierce Utility had concluded that it was too inefficient to compete with FPL and it unsuccessfully sought to purchase 30 mw of base-load firm power from FPL. *Id.* at 329.

In 1976, FPL proposed a sale or lease of the Homestead utility. *Ibid.* A serious effort to acquire the Vero Beach system was undertaken in 1976. *Ibid.* FPL management considered the attempt to acquire Homestead to be related to the possible acquisition of Daytona Beach, Fort Pierce, Homestead and other municipal utilities. *Ibid.*

F. Importance of Retail Competition

There is an important relationship between FPL's wholesale sales and its ability to retain existing retail franchises. FERC57 at 330.

Between 1976 and 1985, franchises covering retail sales to 41.8 percent of FPL's customers were scheduled to expire. In addition, FPL served another 93 communities at retail with no franchise agreement. *Ibid.* Franchise competition can be a positive force to encourage better service and lower rates; thus, a utility should not be allowed to tilt the balance by artificially making wholesale service unattractive to potential retail market entrants. *Id.* at 330-331.

Due to the continuing expirations of retail franchises, we conclude that vigorous franchise competition exists within the retail market which FPL can influence through its wholesale sales policies. *Id.* at 331.

G. Policies on Sales to Municipalities

Traditionally, FPL has demonstrated considerable reluctance to engage in firm power transactions with municipal utilities, even within its own service territory. *Ibid.* During the 1950's and 1960's this amounted to an unqualified refusal. *Ibid.* Rate Schedule RC under which firm service was provided to cooperatives required that capacity and energy not be resold or distributed by the customer to any municipality or unincorporated community for resale. *Ibid.* For example, there were six separate instances over a period of thirteen years when the Clewiston municipal utility requested and was refused wholesale service by FPL. *Ibid.*

While FPL has been discouraging purchases by self-sufficient municipals it has adopted a marketing strategy which promotes high load factor usage as a means of improving its declining system load factor. *Id.* at 336, footnote 55. In addition, FPL's RP rate is intended to promote high load factors. *Id.* at 336.

FPL proposed to FERC that its Schedule PR should be withdrawn. *Id.* at 339. Had it succeeded in this request, it would have finally concluded the efforts of the municipalities over ten years to obtain a source of economically priced, base-load power. *Ibid.* Some utilities would have been more likely to leave the utility business. *Ibid.* Furthermore, this would have assured that electric service from municipalities would be more expensive than FPL and would have enabled FPL to exploit its scale economies in future franchise renewal contests. *Ibid.*

The FERC, in Opinion No. 57, set forth its conclusions concerning several individual situations involving FPL and requests by municipalities for wholesale or retail power. The rest of this subsection of the Memorandum sets forth some of FERC's findings, often in FERC's own words.

In 1972, Homestead unsuccessfully attempted to purchase firm wholesale power. *Id.* at 332. Finally, in 1973 FPL agreed to sell Homestead firm interchange power providing that the city would agree to install additional generation capable of carrying its electrical load. *Id.* at 333. FPL's motivation for this offer was to reduce the chance that Homestead would request that power be wheeled from other municipalities and to avoid a long-term firm power commitment. *Ibid.* FPL made the demand for installation of additional generation capacity despite its knowledge that the size of the city would deprive it of the economies of scale available to large utilities. *Ibid.*

In January 1974, FPL agreed in writing to provide Homestead with electric power for 36 months after it completed new interconnection facilities. The rate was not to exceed the company's approved wholesale rate schedule in effect at the time. *Ibid.* However, after the interconnection was completed in October 1977, FPL attempted to terminate the rate schedule referred to in the agreement and to terminate this service to Homestead. *Id.* at 333-334.

Fort Pierce's efforts to obtain wholesale service from FPL found a similar response. *Ibid.* Indeed, it was not until after an FPL witness admitted under oath that Fort Pierce was eligible to purchase firm service under the SR-1 tariff that FPL delivered a draft service agreement to the city and commenced service. *Id.* at 334-335.

H. Nuclear Plant Ownership

It is FPL's policy to retain full ownership of the nuclear generating plants which it constructs, except when the United States Justice Department and the staff of the Commission obtained a settlement agreement requiring it to divest part of its ownership. *Id.* at 355. Joint ownership of nuclear generating facilities would provide municipal and cooperative utilities (as well as other utilities in the region) with access to the less expensive energy which these large nuclear facilities produce (economies of scale). *Ibid.*

I. Transmission Services

The four wheeling services made available by FPL offer only surplus transmission capacity on an as-available basis. *Id.* at 336.

J. FPL's Supply Situation

FPL has greatly reduced its demand and load forecasts in recent (prior to 1979) years, with the actual rate of growth averaging at most around 4 percent annually. *Id.* at 338. FPL has experienced significant improvement in earnings and related market factors. (*Ibid.*) FPL has been reporting

lower, more manageable growth; greater internal generation of funds; improved earnings and coverage ratios; and increased dividends. *Ibid.*

IV. EFFECT OF *FLORIDA CITIES* vs. *FLORIDA POWER & LIGHT CO.*

The parties have filed briefs concerning the effect on this proceeding of an "Order . . . Granting Defendant's Summary Judgment Motion on Plaintiff's Nuclear Access Claim," *Florida Cities v. Florida Power & Light Co.*, (U.S.D.C. Southern District of Florida), October 13, 1981. That judgment applied to the City of Tallahassee. It was based on a record that is virtually identical to our own. (Uncontroverted assertion of FPL.)

FPL argues that this decision should be granted collateral estoppel effect in this litigation against Tallahassee and against all other cities. In particular, it argues that we are precluded from finding that any lack of access to FPL's nuclear facilities evidences a "situation inconsistent with the antitrust laws."

FPL bases its argument on a sound understanding of the applicable legal criteria. It states that collateral estoppel is applicable in our proceedings, citing *Toledo Edison Company (Davis-Besse Nuclear Power Station Units 1, 2 and 3)*, ALAB-378, 5 NRC 557, 561 (1977). It also correctly states the criteria for application of collateral estoppel (cited in *Parklane* and in other cases). The two criteria in dispute in this proceeding are: (1) the party against whom collateral estoppel is asserted must have been a party, or in privity with a party, to the prior action, and (2) there must have been a final determination of the issues on which collateral estoppel is sought.

A. Arguments About Privity

FPL argues that privity is established because "FPL's summary judgment motion was opposed by plaintiffs as a group." Furthermore, it argues that parties to this proceeding who were not parties in the district court proceeding should be foreclosed from challenging the decision because the attorney in that case is the same as the attorney in this case. It cites *Pinto Trucking Service, Inc. v. Motor Dispatch, Inc.*, 1981-1 Trade Cas. ¶64,028 at 76,325 (7th Cir. 1981) and *Montana v. United States*, 440 U.S. 147 (1979).

Cities argues that there is no authority entitling a winning party to estop different adversary parties. It also argues that Sherman Act proceedings apply more rigorous standards of antitrust than do NRC proceedings. Hence, it is logically possible for there to be a situation inconsistent with the antitrust laws without there being a violation of the

Sherman Act and it would be improper to apply estoppel to preclude all claims in this case.

We conclude that the requirement of privity was met only with respect to Tallahassee. The cases cited by FPL do not demonstrate that privity stretches as far as they would have it. *Pinto* held that plaintiffs *could not* be estopped because they were not in privity with the "Apaloosa defendants" and because they had been deprived of an opportunity to participate in the first trial because a directed verdict had been granted prior to the holding of the trial. *Montana* involved estoppel against the United States, which had "directed and financed" its contractor's participation in the prior case, which was granted collateral estoppel effect.

Although *Pinto* says, at 76,325, that collateral estoppel is applicable against parties which have "a substantial interest in the outcome of the lawsuit and . . . participated in a significant way in the litigation", we have no evidence of any direct participation in the district court summary judgment motion by any party other than Tallahassee. Of even greater importance is the fact that the District Court opinion applies only to Tallahassee—although it could have applied to other parties as well. Hence, the District Court has yet to apply its decision to any other party and we are sufficiently unfamiliar with that docket to be willing to extend the court's opinion further than it did. We are particularly loathe to extend that opinion to parties to our case that are not also parties to that case, solely on the ground that they have hired the same lawyer.

B. Finality

Cities have argued that Judge King's decision in *Florida Cities v. Florida Power & Light* is not a final judgment, under Federal Rules of Civil Procedure Rule 54(b) and that it can not give rise to collateral estoppel for that reason. According to Rule 54(b) the Order is "subject to revision at any time before the entry of a judgment adjudicating all the claims and all the rights and liabilities of all the parties."

It is FPL's position that the decision is "adequately deliberated and firm" and should be given collateral estoppel effect. It cites *Lumms Co. v. Commonwealth Oil Refining Co.*, 297 F.2d 80, 87-90 (2d Cir. 1961); *Zdanok v. Glidden*, 327 F.2d 944, 955 (2d Cir.), cert. denied, 377 U.S. 934 (1964); and *GAF Corp. v. Eastman Kodak Co.*, 1981 Trade Cas. ¶64,205, at 73,749 (S.D.N.Y. August 3, 1981). However, a simple analysis of the facts of these cases indicates that they do not establish FPL's position. Both *Lumms* and *Zdanok* are scholarly opinions by Hon. Henry Friendly. They establish that an opinion of a circuit court of appeals becomes binding as the law of the case. *GAF* merely applies *Zdanok*.

None of these cases directly addresses the question of whether a summary judgment on one issue against a single plaintiff should be considered final.

C. Conclusions

We have carefully read Judge King's opinion. It was offered to us by FPL for its preclusive effect on this hearing. However, we have concluded that Judge King's opinion should not be given collateral estoppel effect. Although our conclusions, based on our record, are similar to Judge King's in many respects, his opinion was tailored to the stage of the case before him and did not need to reflect the kind of legal and factual analysis that is more typical of a final judicial opinion. Necessarily, in an opinion of this type, which may be explained further before the case is concluded, many of the judge's statements are conclusory in nature.

The nature of Judge King's opinion makes it difficult for us to determine whether to rely on his conclusions. First, he does not discuss the evidentiary basis for his conclusions. This makes it difficult for us to satisfy ourselves or the Appeals Board that the conclusions are satisfactory. Second, part of his underlying rationale, which appears not yet to have been fully explained, may be related to Sherman Act concepts that are not fully applicable under the Atomic Energy Act. Hence, we cannot determine whether his conclusions, in the context of a treble damages action, are suitable in our proceeding.

In any event, were we to have applied collateral estoppel we would have applied the privity requirement to limit its effect to the single litigant, Tallahassee, to whom the decision was issued.

Nevertheless, FPL offered this opinion for its preclusive effect on this litigation. Although we do not accept it for that purpose, we accept it for the lesser included purpose of considering it as relevant evidence pursuant to the public records exception to the hearsay rule. Federal Rules of Civil Procedure, Rule 803(8). (Cities brought our attention to this rule when it argued that court decisions on which it relies could, even if not given collateral estoppel effect, be given evidentiary effect.) It seems even more appropriate to accept a judge's conclusions from his record than it does to accept in evidence the conclusions of an investigator prepared in the course of his employment, and this latter category of evidence is expressly admissible pursuant to a subsection of the public records and reports rule of evidence. Additionally, principles of judicial economy support the interpretation of the public records exception as extending to the admissibility of the conclusions of a fellow judge in the course of his duties.

On examining Judge King's opinion in light of our record, we have decided to accept most of his findings as appropriate conclusions in this case. Some of Judge King's findings are simple conclusions on well known

subjects, such as the efficiency of currently operating nuclear power generation facilities. When such findings are not contradicted by any evidence in our record, we have every reason to accept them. Another category of Judge King's findings is generalizations about his entire record. With respect to such global findings, we have examined our own record and have independently corroborated those findings, presenting the findings as Judge King's only because of the added weight which his judgment lends to our own.

Two of Judge King's findings, one relating to the economic risks of nuclear generation, could also be adopted by taking official notice. 10 CFR §2.743(i)(1). We therefore advise the parties that we are adopting Judge King's findings (3) and (5) pursuant to official notice.

In the process of adopting Judge King's findings, we have reached some conclusions that are adverse to the position of Cities. Indeed, the resulting findings are occasionally so adverse to some of Cities' positions that we conclude there is no remaining genuine issue of fact. Under that circumstance, even where Cities has "reserved" the right to introduce evidence (as it has for its contention concerning a separate market for nuclear energy), we think it appropriate to grant partial summary disposition against Cities, which is the party moving for summary disposition. After all, when a party attempts to persuade us through documents that an opposing party has not raised a genuine issue of fact, the moving party introduces all the evidence and legal argument it can. If we decide that it has not even gotten to first base, it will have had a full and fair opportunity to bat and there is no equity to the proposition that the responding party bats once but the moving party bats twice. *Missouri Pacific RR Co. v. National Milling Co.*, 409 F2d 882 (3rd Cir. 1969); 6 J. Moore's Federal Practice ¶56.12 (1976).

D. Findings We Accept

We have paraphrased and underlined findings of Judge King's that we accept, and we have some brief comments of our own, as follows:

- (1) *FPL's three operating units plus St. Lucie No. 2 provide 29% of the total amount of electricity generated by it. These units are extremely cost efficient producers of electricity.* We note that this finding is on a narrow evidentiary issue and is the kind of judicial conclusion that fits most comfortably under the public records exception to the hearsay rule. It is particularly credible because FPL urged us to accept Judge King's findings without any reservations about specific facts found by him.

- (2) *FPL had sold nuclear energy only to its own customers until it was required by its settlement [in this case] to sell nuclear power to certain cities located within its "territory" or adjacent to it, and these sales do not demonstrate the existence of a conspiracy not to sell power to outside cities such as Tallahassee. In addition, a sale to some existing customers and a concurrent refusal to sell nuclear energy to outside cities that were not customers does not by itself support a Section 1 claim.* The position of both parties is consistent with this finding. We see no logic to Cities' claim that FPL's settlement with certain cities "discriminated" against outside cities in a way which constituted a violation of the antitrust laws. Nor do any of the precedents cited by Cities in this proceeding support that allegation. There certainly has been no illegal subgrouping of customers, such as existed in *United States v. Borden*, 370 U.S. 460 (1962). We accept Judge King's finding and grant partial summary disposition on this issue against Cities because there is no genuine issue of fact in support of its allegation.
- (3) *Although nuclear power may be more cost-efficient than other methods of electricity generation, the interchangeability of nuclear generated electricity with other electricity requires, pursuant to the principles set forth in U.S. v. E.I. duPont de Nemours & Co., 351 U.S. 377, 396 (1956), that the generation of electricity be treated as a market that is not subdivided into separate markets related to the way the electricity was generated.* Indeed, since both forms of electricity are physically indistinguishable to users and have exactly the same value to them, it would be ludicrous for us to hold that there are separate markets for electricity depending on the manner in which it is generated.

This is not a case of product differentiation, where even identical products may be more acceptable to some customers because of marketing pizzaz. There is no evidence even suggesting that there is any substantial group of individuals that would feel better or pay more in order to receive nuclear generated electricity as opposed to identical electricity generated some other way. We accept Judge King's finding and grant partial summary disposition on this issue against Cities because there is no genuine issue of fact in support of its allegation.

- (4) *With respect to Tallahassee and other "outside cities" there is no evidence that FPL possesses monopoly power in a relevant market for electricity.* Indeed, it is clear that cities operating within those parts of Florida Power's traditional territory which have not been

added by FERC to FPL's territory, are not affected by any alleged "monopoly power" possessed by FPL within its territory. Nor do we consider there to be any merit to Cities' argument that indirect effects, such as "yardstick competition", on inside cities support relief for outside cities.

The cases relied on by Cities, *United States v. Griffith*, 334 U.S. 100 (1948) and *South Carolina Council of Milk Producers, Inc. v. Newton*, 360 F.2d 414 (4th Cir.), *cert denied*, 385 U.S. 934 (1966), are simply inapposite. In particular, there is no showing that the exercise of monopoly power within FPL's territory caused any harm to outside cities, with which FPL has steadfastly refused to compete.

The only evidence in our case concerning monopoly is with respect to FPL's monopoly power within its own territory. We have accepted a finding on that issue as a result of the application of collateral estoppel, discussed above, but that finding in no way extends to outside cities. We accept Judge King's finding as precluding summary disposition in Cities' favor.

(We do not grant summary disposition on this issue against Cities, however. Our record establishes that FPL and Florida Cities, the two largest utilities in Florida, conspired to divide markets. The existence of the conspiracy suggests but does not prove the existence of a peninsula-wide market and Cities should be permitted, because it may be relevant to the extent of appropriate relief, to attempt to prove both the existence of a peninsula-wide market and the market power of the two largest participants in that market, if it exists.)

- (5) *FPL assumed substantial business risks in constructing and operating nuclear facilities. The extensive outlay of capital required to construct a nuclear facility, combined with the uncertain acceptance of nuclear generated power, indicates that the risks assumed were substantial.* Examination of recent experience in the nuclear industry indicates that companies (such as General Public Utilities, operator of Three Mile Island) can suffer substantial, adverse financial consequences from constructing and operating nuclear facilities. Furthermore, companies have experienced delays in being able to use their facilities due to backfit requirements and, to an indeterminate extent, to regulatory delays. A consequence of these risks is that the financial community has shown concern about the relative safety of bonds issued by companies that are constructing or operating nuclear plants and the entire future of the domestic nuclear generation industry is in doubt.
- (6) *There is no evidence that defendant took affirmative action to block Tallahassee or other outside cities from participating in nuclear power generation. Similarly, Defendant's 1976 refusal of*

Tallahassee's request to participate in defendant's nuclear power production has not been shown to be anything but a sound business decision. The only persuasive evidence in our record concerning arguably improper practices with respect to outside cities relate generally to coordinated planning among Florida's major utilities and to the conspiracy found to exist in the *Gainesville* case. Neither of these incidents was directly related to nuclear access, as contrasted to the general operation of the markets for wholesale and retail electricity. Indeed, we have no evidence of any conspiracy addressed directly to the construction of nuclear power reactors of the kind now operated by FPL. The only evidence of a conspiracy addressed to nuclear generation relates to an earlier generation of reactors, none of which was ever built in the State of Florida. We are not convinced that cooperative studies of those reactors gave FPL an unfair advantage in building larger power reactors. The fact that FPL cited this prior experience in license applications does not establish a sufficient causal link to attribute its nuclear power plant licensing activities to the earlier joint research activities.

- (7) Although the following finding does not seem relevant to our proceeding, we accept it as a credible conclusion on a matter directly before Judge King: *Tallahassee's 1976 request for access to nuclear power raises questions concerning its earnestness in seeking nuclear power. Plaintiff's request came well after defendant had begun operation of a nuclear power facility. The request only consisted of an "opportunity to consider" purchasing a share of defendant's facilities or unit power from defendant. There is no indication that plaintiff had a specific plan or even had the necessary approval of the governing board of the Tallahassee City Commission. Without such approval, an agreement of sale would not have been final.*
- (8) *In 1966, Tallahassee unsuccessfully attempted to join the Florida Operating Committee, which it was invited to join in 1971.*

E. The Finding We Reject

The one finding of Judge King that we cannot accept for purposes of this proceeding is the finding that "plaintiff's evidence does not reasonably allow an inference of joint effort."

Our principal reason for rejecting this finding relates to our prior study of the record. In this case, we had already undertaken a detailed study of the exhibits before we were made aware of Judge King's decision. In the course of that study, we have firmly concluded just the opposite of what

Judge King has concluded on this one issue. Furthermore, due to the preliminary nature of Judge King's opinion, we have several reasons for rejecting his finding on this issue. First, our standard for finding a situation inconsistent with the antitrust laws is different from that applied by district courts, which apply more rigorous statutory standards. We may look to the purposes of the antitrust laws and may balance antitrust concerns with other public interest factors. *Alabama Power Company (Joseph M. Farley Nuclear Plant, Units 1 and 2)*, ALAB-646, 13 NRC 1027, 1100-02 (1981).

Third, Commission precedent suggests to us that the ordinary pattern in the electric utility industry is the existence of a market for coordination services. *Farley* at 38-39 and *Consumers Power Co. (Midland Units 1 and 2)*, ALAB-452, 6 NRC 892 (1977) at 949-74. These precedents inform us that generally the function of coordination arrangements is that "utilities interact with each other in planning for and constructing the necessary transmission and distribution facilities and in operating them." *Farley* at 39. With this framework in mind, we have concluded—as the Appeal Board did in *Farley*—that there is no compelling reason to reach a different conclusion here.

Indeed, in the next section of this opinion, we analyze the evidence and find that it compels the conclusion that the major utilities in Florida cooperated in jointly planning their generating and transmission facilities and that they thereby placed their competitors at a disadvantage. These coordination efforts were undertaken in order to realize important joint economies of operation and it would be unreasonable for us to conclude that these economies were not realized. Hence, we find that these coordination efforts created a situation inconsistent with the antitrust laws and that these conditions should be weighed in deciding whether to impose license restrictions.

V. JOINT PLANNING OF COORDINATION OF GENERATION AND TRANSMISSION

We have already found, as a result of granting collateral estoppel effect to FERC57, that there is a market for coordination services. In this section of the memorandum, we discuss how five of the largest utilities in the State of Florida coordinated their activities.

Our review of these materials persuades us, contrary to the assertions of FPL, that coordination amounted to far more than just "research" or "studies". These were not academic studies conducted to slake a thirst for knowledge. They were hard-headed operational studies planned by companies interested in improving their individual efficiency by generating information concerning advantages they all could enjoy by coordinating

their efforts. We note that these efforts were expensive and that they continued without any protestations that the studies were useless or overly expensive. In addition, we have examined the "study" documents and related letters, which describe these studies as "guides", not just as academic studies.

Under the circumstances, there is a strong presumption that FPL used this expensive and potentially useful information in its planning process. Although there is no direct evidence that the information was used, it would have been as unnatural for it to be ignored as it would be for an oyster lover to ignore a shucked oyster on a bed of crushed ice. In the circumstances, we would have skeptically examined planning documents that purported to show that these data were ignored. However, none of the important planning documents are still in existence.

Consequently, we conclude, for reasons explained further below, that the participants derived real benefits, giving them an advantage not enjoyed by their competition and that this created a situation inconsistent with the antitrust laws. In particular, the participants benefitted from their ability to plan to their mutual advantage for additions to generating and transmission facilities.

A. The Fite Letter

On November 3, 1964, Robert H. Fite, President & General Manager of FPL, invited the City of Jacksonville to join with four other utilities in a study which would "be used as a guide for generating and transmission additions, as we grow with Florida." (Exhibit 15.) The planning period involved extended from 1967 through 1980, which includes the period during which the St. Lucie nuclear power plant Unit 2 was planned and a large part of the period during which it is being constructed. Exhibit 15 to Cities Motion to Establish Procedures. (Hereinafter all such exhibits will be referred to by number, without reference to the motion to which they were attached.)

The letter is sufficiently important to this proceeding to quote in full its first two paragraphs:

Our company, along with Tampa Electric Company, Florida Power Corporation and Orlando Utilities Commission, is preparing to make a long range power supply study to be used as a guide for generating and transmission additions, as we grow with Florida. Knowing your interest in these matters, we are writing this letter to invite you to participate with us.

This will be a digital computer study to be made using the facilities of General Electric Company and data furnished by each

participant. *It will cover the period beginning 1967 and extending through 1980, or from the 1967 load level of approximately 6600 mw to a projected load level of 24000 mw for the combined systems. It will develop the transmission system required to coordinate to mutual advantage, the present and projected plans of each participant for generating unit additions, and will point the way for lowered reserves and resultant savings in capital costs. It will also determine how long a 240 kv grid will serve the requirements of the several systems, and if and when by 1980, the transmission systems must be strengthened by superimposing extra high voltage lines, of say, 500 kv.*

[Emphasis supplied]

B. Long Range Generation—Transmission Planning Study

In July 1966, the Long Range Study Group of the Florida Operating Committee published an "interim report" called "Long Range Generation—Transmission Planning Study." (Exhibit 16.) One of the signers of the study was its chairman, K.S. Buchanan.

FPL objects to the admissibility of this and similar documents. It questions the ground offered by Cities for the admissibility of this document, stating that it is not an admission by a party since it was signed by several parties only one of whom was a representative of FPL. FPL argues, therefore that this could not be the views of an agent expressed within the scope of his authority. We find this view to be correct, as far as it goes; but the document is nevertheless admissible. FPL admits to being a member of the Florida Operating Committee. K.S. Buchanan was its representative. Hence, this report, and similar reports by the Committee and its groups, constitute direct evidence of joint activities in which FPL was a participant, over an extended period of time.

The Interim Report had two stated objectives. Cities' Motion to Establish Procedures at B395. One was to present alternative generation and transmission options "for the 1968-1982 period, treating the utilities as a single unit." We think it significant that this analysis treated the participants as a single unit and suggested generation option of benefit to the unit. It had the additional objective of providing a state transmission design to accommodate the generation options. In this way, the mutual advantages of the utilities, for both generation and transmission, could be laid bare for all to see. Under the circumstances, it was unnecessary for the parties to agree to implement the conclusions.

An important criterion for the generation plans was the use of "a system risk level index" which calculated the combined risk being taken by the utilities under each of the generation options. Ibid. The results of the

study summarize "the unit sizes and *time of addition* for the various plans investigated." [Emphasis added.] *Id.* at B397. A variety of power options involving nuclear energy were considered and the group recommended further study for a plan calling for "50% of the additional units being nuclear." *Ibid.* The study also concluded that there was a "possible need for defining a plan with somewhat larger units which would indicate some kind of turn up in the total cost curve." *Ibid.* In addition, we note from our overall examination of the report that it contains several tables and charts examining in detail data related to the addition of nuclear capacity. Hence, we conclude that the report concentrated on the efficient joint planning of generating capacity but that it dealt thoroughly with an important sub-issue, how nuclear power could be used to mutual advantage.

C. Confirmation of Coordinated Planning in National Power Survey

Document 13 is a cover letter and a report, "National Power Survey 1963-1980 State of Florida (Federal Power Commission Study Area 24) February 1963." The cover letter is from a Senior Vice President of Florida Power Corporation to a Vice President of Florida Power & Light Company. The letter states that Florida Power Corporation is submitting the report to the Federal Power Commission for the National Power Survey. The report "was compiled by engineers of the Florida Power & Light Company, Tampa Electric Company and Florida Power Company."

Since FPL has not submitted any documents indicating that it sought to correct items in the report or made any contrary filing with the Federal Power Commission, and since the document apparently was intended to inform that Commission in its official capacity, we find its factual assertions to be binding on FPL. This document confirms our interpretation of other documents about which we have already commented.

The following is an excerpt from the beginning of the report. It describes the joint planning process which was in effect:

General: Coordinated planning of the generating and transmission facilities of the four major utilities in the study area has been carried on by planning committees made up of personnel from Florida Power and Light Company, Florida Power Corporation and Tampa Electric Company. At the present, there is a general plan in effect which is serving as a guide for expansion up to the year 1970. This plan is based upon the "single system" approach, taking into consideration factors such as pooling of reserves, the sharing of units, area protection with inter-area transmission ties so that the expansion pattern would be one that is well coordinated among the participating companies.

The expansion plan described in this report is a projection of this joint plan to the year 1980, based upon the same criteria which has [sic] been applied to the plan in the past. The study area has been subdivided into six natural load areas as indicated on the maps being presented as Exhibits 8 through 11 in this report. Using this load area approach, coordinated generator schedules may be applied on a unit sharing basis. Some of the future generators are therefore identified by area only, rather than by exact locations in existing or new sites.

D. Similar Report Published in 1960

Document 12 is similar to later reports. It is signed by K.S. Buchanan of FPL, who subscribed to a cover letter stating:

Attached hereto is a report entitled, "A Coordinated Plan for the 1970 Generation and Transmission Requirements for the Electric Utilities of Florida." The entire state east of the Apalachicola River is treated as if it were served by one fully integrated electric company.

This is a bold undertaking . . . that is a basic step toward reducing the cost of electric service in this area. There are a great many other facets of this objective which in time and by other groups will surely be worked out. We are happy to have had a part in this endeavor.

(This report was subscribed to only by Tampa Electric Company, Florida Power & Light Company and Florida Power Company, through its representatives. Mr. E.L. Bivans is listed as FPL's representative on the planning committee.)

We note that the document candidly states, *Id.* at B114, the following advantage from planning:

The major savings accruing through integrated planning will be in the field of bulk power supply - new generating equipment. The staggered installation of larger and more efficient units can become a reality only if participation in each unit is on an "equalized reserve" basis In short, each company's net income picture must improve under coordinated planning and integrated operation; otherwise, there would be no incentive for participation.

The plan then sets forth a variety of options, specifying the number, size and location of generators required for each option.

E. The Power Pooling Task Force Characterizes the "Committee"

On December 11, 1974, the Power Pooling Task Force of the Florida Operating Committee issued a report on Electric Power Pooling in Peninsula Florida. Mr. Buchanan of FPL is listed as a member of the Task Force. (Document 26.)

At C199 and C191, the report characterizes the Florida Operating Committee as an "Informal Power Pool." The report also contains two sections informing us about "Power Pooling Concepts" and "Types of Power Pools." *Id.* at C192-199. Excerpts from these sections (with emphasis added) tell us that:

In the beginning, power pooling consisted primarily of mutual assistance arrangements which, together with the growing ability to transmit bulk power over considerable distances, made it possible for interconnected utilities to share reserves. This sharing reduced the burden of capital cost that the individual utilities had to invest for the same degree of reliability. As power pooling arrangements became generally accepted and the number of power pools grew, the concepts of power pooling broadened to include other areas where cooperation and coordination proved to be economically beneficial.

Joint studies of forecasted short and long range power requirements for large geographical areas allowed utilities to coordinate efforts in constructing bulk power transmission systems that provided greater benefits to pool members at a lower cost.

Transmission systems planned and constructed to provide for the flow of bulk power from one area to another enabled pool members to coordinate the construction of generating facilities. This was accomplished principally by staggering power plant construction or by the joint ownership of power generating facilities. By staggering construction, a member of a power pool builds a generating facility with greater capacity than required for its own needs. Through prior agreement, the building pool member then sells excess capacity to other member systems for a specified period of time. The process is repeated in turn by other pool members Both concepts, staggered construction and joint ownership, allow the various pool members to share in the "economies of scale" and the associated risks of larger units which can be constructed at a cheaper cost per kilowatt . . .

. . . .

Both Formal and Informal Power Pools provide the economic

benefits that become available through performance of one or more of the following basic functions of interconnections:

1. Firm power sales and purchases
2. Reduction of generating reserve requirements
3. Economic loading of generating units
4. Provision of short-term capacity to compensate for unanticipated capacity deficiencies
5. Utilization of load diversity to reduce generating capacity requirements
6. Greater flexibility in scheduling maintenance
7. Staggered construction to make possible installation of larger generating units with attendant sharing of financial risk.

[Emphasis added.] *Id.* at C192, C194-5.

Section 5 of the report contains a draft agreement for the formation of a Florida Electric Power Pool. Although the agreement has not been executed, the introduction drafted by the Power Pooling Task Force is instructive. It says:

Some of the unique features of the existing informal Florida Pool, Florida Electric Power Coordinating Group (FCG), and its history of good operating and planning functional relationships facilitates an easy transition into a more formal pool structure with additional advantages. *The FCG presently achieves five (5) of the seven (7) basic functions (enumerated in Section 3 [and quoted verbatim above]) of an interconnected system to some degree.*

[Emphasis added.] (*Id.* at C210.)

F. FP&L's Planning Documents Have Not Been Introduced

Florida Cities, in its Supplemental Memorandum in Response to Board Questions, at Appendix A, p. 1.1, asserts that Exhibit 1, the Deposition of Robert J. Gardner, determines:

Mr. Gardner's deposition proves that FPL's specific coordination assumptions in planning its nuclear units cannot be determined because, he testified, . . . either FPL never wrote down its final plans for constructing its nuclear units, nor the assumptions used in planning the units, or that it has lost many of its planning documents.

Cities note that in September, 1981, following their request in connection with the Gardner deposition, FPL provided Cities with additional documents, some of which appear to be planning docu-

ments. Cities have not yet analyzed these fully, nor have they had an opportunity to examine Mr. Gardner or other FPL officials in deposition concerning the newly received documents.

We have read Exhibit 1 and consider Cities characterization of it to be correct. FPL has not introduced any planning documents from which we could directly examine the assumptions used in its planning of generator capacity and transmission. Nor has FPL argued that the additional planning documents it gave to Cities create a genuine issue concerning the existence of joint planning. What FPL relies on are affidavits of two top officials, Mr. Bivans and Mr. Fite. *See Reply Memorandum of Florida Power & Light Company (October 13, 1981), Appendix A at 6-7.*

FPL characterizes Mr. Fite's testimony as supporting the proposition that FPL did not rely upon its interconnection with other systems to postpone bringing generating units on line, and that FPL did not want other systems to rely upon interconnections with FPL as a basis for postponing units. It quotes the following two passages from Mr. Bivan's testimony;

A planning subcommittee was appointed to study the transmission plans of the member utilities and to identify potential weaknesses. In order to test the transmission systems in hypothetical studies, it was necessary to factor into the studies generation plans of the individual interconnected systems. These studies always took the individual generation plans of the members as given, took account of planned transmission additions and then studied the effect of postulated events on the reliability of the interconnected transmission system. The FOC never engaged in joint planning of generation.

. . .

"Joint" as used in the planning subcommittee reports refers to the fact that the FOC members cooperated in providing individual system data, personnel, and in sharing the costs of studies to determine whether individual transmission plans would be adequate for and compatible with interconnected operations. Transmission planning was "joint" only in the sense that studies were performed, based on the individual systems' generating plans, to consider possible transmission configurations to accommodate this planned generation. The results were not binding on any system, and simply served as a useful beginning point for transmission planning by the individual systems.

We accept FPL's characterization of the Bivans and Fite testimony for purposes of this decision. We find it illuminating that neither Mr. Fite nor Mr. Bivans have denied that FPL derived competitive advantage from the joint planning studies. Fite says that FPL's interconnections did not cause it to "postpone" bringing generating units on line. However, if others had postponed bringing their units on line, their demand for a portion of FPL's capacity would have benefitted FPL. Furthermore, Fite said that FPL "did not want" other systems to rely on interconnections in order to postpone units. However, he has not denied that FPL created conditions—through joint planning—that permitted competitors to implement mutually advantageous delays in installing units.

To the extent that Mr. Fite's testimony could be interpreted as contradicting our inferences concerning the "oyster theory", we simply reject it. The weight of the evidence, which includes documents of the Florida Coordinating Group itself, persuades us that there is no genuine issue of fact concerning the use of the studies for economic benefit. Direct evidence, consisting of planning documents themselves, is not available because it apparently no longer can be found. Hence, we must reach our conclusions from secondary sources.

Mr. Bivans statement also does not create a genuine issue of fact. We accept his statement that the "results were not binding on any system." However, that is not the mischief we find in the arrangement. The system was "informal" but we cannot reach any other conclusion that it produced important benefits for its members, who were thereby advantaged with respect to their competitors.

One inference FPL might like us to derive from the Bivans testimony can not legitimately be drawn. Mr. Bivans states that individual generation plans of members were taken as a given. In a sense that is correct. However, the plans explored various generation options and this would have been very useful to members in solidifying their plans. Hence, we conclude that these studies did serve as guides by which members decided what mutual generation and transmission additions would best serve them.

We consider our factual findings consistent with Judge King's findings that there was no conspiracy directed at excluding Cities from acquiring nuclear capacity. However, the Florida Coordinating Committee produced planning advantages which made it more attractive for its members to plan for nuclear generation. Hence, our findings concerning joint coordination necessarily imply that Committee members acquired an advantage with respect to nuclear power that was not enjoyed by cities which were not members.

G. Dates Other Cities Joined the Florida Operating Committee

FPL has asserted that Tallahassee and Lakeland joined the Florida Operating Committee by 1971. Furthermore, in July 1972 a Florida Electric Power Coordinating Group, comprised of 40 utilities, was formed. This group included all electric utilities in Florida that accepted an invitation to attend a meeting and to join. Since this assertion is not refuted by Cities, it is accepted.

We note that the construction permit for St. Lucie No. 2 was docketed September 4, 1973. See 5 NRC 789. We presume that the economic and engineering studies needed prior to docketing must have been well under way prior to 1971.

VI. ADDITIONAL EVIDENCE OF MARKET DIVISION

Cities Exhibit 20 is a remarkable series of documents showing that Armour and Company approached FPL in 1976 with a proposition that it supply it with firm baseload power equal to 325,000 k.w., with loads during seven months equalling 400,000 k.w. FPL turned this deal down because the proposed plant was within Tampa Electric Power's territory. Tampa Electric Power sent FPL's chairman a note expressing its gratitude for this referral.

VII. SUMMARY AND CONCLUSIONS

A. Summary

In the course of this decision we adopted each of the following findings, many of which have been accompanied by supporting or corroborating findings:

1. FPL operates in the retail market for electricity within a geographic area along the eastern and western coasts of Florida. Within or adjacent to this service territory are 22 smaller areas served by municipal and cooperative utilities. This composite area constitutes the retail market served by FPL. FPL has monopoly power in this market.
2. FPL also operates in a firm bulk power market within its composite area. Firm bulk power sales generally occur only within the composite area. FPL has monopoly power in this market.
3. FPL enjoys competitive advantages which flow from its joint activities with other utilities.

- a. As a member of the Florida Pool, it enjoys advantages from its interconnection with Florida Power Corporation, the Tampa Electric Company, the Orlando Utilities Commission and the City of Jacksonville. These interconnected utilities and authorities coordinate their activities and exchange power as circumstances require.
 - b. FPL participates in the Interconnected Systems Group, a national interlocking of utilities that automatically provides power in case of emergencies.
 - c. From the early 1960s to 1972, FPL jointly participated with four other of the largest utilities in Florida in hard-headed, expensive studies of generating and transmission options. These studies were used by the participating utilities as guides for making generating and transmission choices. They produced substantial economic benefits for the participants.
4. FPL conspired with Florida Power Corporation to divide Florida into mutually exclusive territories. This is a per se violation of the Sherman Act.
 5. For 20 years, FPL has competed with municipal utilities within its service territory to serve entire communities. There is an important relationship between FPL's wholesale sales and its ability to retain existing retail franchises. Since self-generation by municipalities is becoming less and less attractive, FPL's wholesale monopoly and its retail power are likely to increase.
 6. FPL has demonstrated considerable reluctance to engage in firm power transactions with municipal utilities, even within its own service territory. During the 1950s and 1960s this amounted to an unqualified refusal to serve. Simultaneously, FPL adopted a marketing strategy which promoted usage of electricity as a means of improving its declining system load factor.
 7. FPL's policy of refusing to sell firm wholesale power to municipalities was pursued through tariff litigation before the FERC. Its opposition to selling firm wholesale power to municipalities was pursued until 1979, when its position was rejected in FERC Opinion No. 57.

8. FPL's three nuclear power units, including St. Lucie Unit No. 2, are extremely cost efficient producers of electricity. Nevertheless, FPL sold nuclear energy only to its own customers until it was required by its settlement in this case to sell nuclear power to certain cities located within its composite area.
9. The advantages FPL enjoyed from its joint planning of generating capacity and transmission assisted it in its planning for the addition of nuclear generating capacity.

B. Conclusions

For each of the reasons we have just summarized, as supported by additional reasons contained in this opinion, we conclude that the unrestricted operation of St. Lucie Nuclear Power Plant Unit 2 would maintain a situation inconsistent with the antitrust laws.

It follows from our reasoning that the inside and adjacent cities should be permitted to purchase a portion of St. Lucie Unit 2 or to buy unit power from it in order to share some of the attendant cost advantages and to offset some of the disadvantages suffered by the cities as a result of the situation inconsistent with the antitrust laws. We have not decided whether the license conditions benefitting inside Cities would be any more severe than the terms of the settlement agreement executed in this case. We also have not decided whether there is any reason in this proceeding to require sales of interests in previously licensed nuclear power plants, as urged by Cities.

With respect to "outside" Cities, we have concluded that relief is appropriate because the division of markets effectuated by FPL and Florida Power Corporation affects the existing territorial division which FPL asks the Commission to recognize. As a result, FPL should not be permitted to deny firm wholesale service (or any other form of available service) to any entity based solely on its geographical location. Cities has represented that "outside" cities can obtain wheeling so that they can pick up power from FPL's power net. Since that is possible, it should make no difference to FPL whether it is serving an "inside" city or an "outside" city. In either case, it generates electricity and makes it available on its transmission system.

FPL has argued that its rates to existing customers would have to be increased if it were required to serve outside cities. We reject this argument as irrelevant and we consider that whatever effects are felt by customers must be accepted because a portion of the rate advantage was produced through monopolistic practices and illegal conspiracy. FPL is arguing that because it never has served entities outside of its geographical area, as that area has recently been defined by the FERC, that area

should now be recognized by this Commission and ratified as the area within which FPL must serve.

Even were there substantial adverse economic effects for customers of FPL, we would consider those offset by the advantages accruing to customers of outside Cities, which have been deprived of a competitive environment because of the existence of a situation inconsistent with the antitrust laws. The marketplace is indifferent to which consumers are benefitted and which hurt through its operation, and we must be equally blind.

FPL has, at our request, provided us with statistics on the extent of the impact on its customers. Based on its expectation that it might have to provide 500 mw of additional power, it estimates a 3 percent increase in revenues paid by existing customers. (Memorandum of Florida Power & Light Company on Matters Relating to August 17 and 18, 1981, Conference of Counsel at Attachment C to Attachment C, which is the "Supplemental Howard Affidavit".) Furthermore, Florida Cities has stated that the amount of power cities need is about 200 mw of firm baseload power. Tr. 1062. Hence, the total impact on consumers would be 40 percent of FPL's estimate or less than 1.2% of utility bills. While the total amount of impact in dollars might over many years exceed \$2 billion because of FPL's large size, the magnitude of the effect is not sufficient to give concern about massive economic repercussions.

In addition, we find FPL's concern about servicing additional municipal customers to be inconsistent with its continuing efforts to add industrial and cooperative customers. (See Exhibit 57, demonstrating talks within the last three years with Siemens and the existence of an economic development division within FPL.)

Our views are consistent with those of FERC in Opinion 57. In that opinion, FPL's obligation to deliver firm wholesale power was limited to its composite service area, which represented an extension of the traditional service area. FERC also found that wheeling was not available to "outside" cities, which were therefore excluded from consideration for receiving firm wholesale power from FPL. The FERC opinion is silent on what FPL's obligation would be when wheeling becomes available for cities which are not contiguous to its power lines. There is nothing in the FERC opinion which is inconsistent with our decision.

Furthermore, we recognize the special features of the public utility industry, including the need to provide reliable service. For that reason, we will not preclude FPL from denying service to outside cities if it can demonstrate to the FERC that "compelling public interests justify the service conditions" and that it has selected "the least anticompetitive method of obtaining legitimate planning or other objectives." FERC Opinion 57 at 314. In addition, FPL could assert any other bona fide defense to

providing service which may subsequently become available under FERC regulations or precedent, providing that it does not rely on concepts of geographic territoriality.

We have not decided whether, in addition, outside cities should be permitted to purchase a share in St. Lucie Unit 2 or in other existing nuclear power plants.

Although we have expressly left open the issue of requiring a sale of interests in other nuclear power plants, we are highly skeptical about whether such a requirement would be appropriate. Those licenses have been issued without such conditions and we would need to be shown why it is appropriate to reopen questions which could have been raised in those prior cases. We also would need to be shown why the sale of a portion of St. Lucie would not provide sufficient relief.

VII. FURTHER PROCEEDINGS

We have analyzed a complex and somewhat disorganized record and reached many conclusions. Under the circumstances, it is appropriate for the parties to obtain serious consideration for objections they may have to this decision. On the other hand, duplication of the already voluminous briefs and documents already in our files is not desirable.

We have decided to require the filing of objections. The briefs will be limited to 40 double-spaced pages. They shall contain the following sections: (1) a concise statement of objections for which oral argument is desired, including a statement of reasons why these particular issues have not already been fully aired and the precise grounds for alleging error; and (2) a concise, abbreviated statement of all other objections reserved for appeal, including citations to already filed documents and sections of briefs. Objections not raised will be waived.

Case citations in all remaining briefs in this case must either state that they rely on dicta or must state the holding and its applicability. When multiple case citations are used, the Board will examine the first citation and will conclude that if the first case is not applicable the other cases supposedly in the same line of precedent also are not applicable. Failure to comply with case citation principles established here will result in waiver of the right to argue the applicability of the cited case, unless there is a showing of good cause for the failure.

The briefs containing objections shall be served and filed by January 13, 1982. Reply briefs of no more than 20 double-spaced pages may be served and filed by no later than January 22.

Along with its objections, Cities shall file proposed license conditions to effectuate the Board's conclusions and to grant relief permitted under this order, subject to further proof by Cities. Accompanying the proposed

license conditions shall be a brief of up to 20 double-spaced pages outlining Cities trial plan, including the names and qualifications of witnesses, an outline of their testimony and identification of documentary evidence. (File only new documents.) For the purpose of this filing, Cities shall assume that no objections of the parties will be granted. If it chooses, it may submit an Appendix of no more than ten double spaced pages addressing proof it would submit if particular objections were granted.

FPL shall submit a brief of up to 20 double-spaced pages in response to the proposed license conditions and trial plan submitted by Cities. This brief shall contain FPL's trial plan, containing information analogous to that required of Cities. FPL also may submit an Appendix of no more than ten double-spaced pages outlining its case if certain objections are granted.

A hearing is scheduled to convene on February 9 in Fort Lauderdale, Florida, at a location to be announced. Cities shall have one hour to present oral argument concerning relief, but it may reserve up to 15 minutes for rebuttal. FPL shall have one hour for response. Additional subjects for the hearing may include oral argument on specified objections and an evidentiary hearing on remaining issues. A subsequent order shall establish rules for the prefiling of testimony and exhibits.

Discovery shall henceforth be limited to issues determined in this decision, or by subsequent decision, to be legitimate issues in this case.

ORDER

For all the foregoing reasons and based on consideration of the entire record in this matter, it is this 11th day of December 1981

ORDERED

- (1) We adopt the factual findings and legal conclusions in this Memorandum, including the summary and conclusions contained in Section VI.
- (2) We conclude that the licensing of St. Lucie Nuclear Plant, Unit 2, would maintain a situation inconsistent with the antitrust laws unless the license is appropriately conditioned.
- (3) Parties must file objections to this decision pursuant to procedures established in Section VII. Failure to file an objection will result in waiver of that ground for appeal.
- (4) For all subsequent filings in this case, parties shall follow the case citation requirements established in this decision. Failure to follow these requirements may waive the right for cited materials to be considered in this proceeding.

- (5) Parties shall file pretrial briefs pursuant to the requirements set forth in Section VII of this Memorandum.
- (6) Discovery shall be limited to matters still in controversy.
- (7) This is an interlocutory decision and is not subject to appeal.
With the concurrence of Judge Michael A. Duggan,

FOR THE ATOMIC SAFETY AND
LICENSING BOARD,

Peter B. Bloch, Chairman
ADMINISTRATIVE JUDGE

Robert M. Lazo
ADMINISTRATIVE JUDGE

December 11, 1981
Bethesda, Maryland

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Ivan W. Smith, Chairman
Dr. Walter H. Jordan
Dr. Linda W. Little

In the Matter of

Docket No. 50-289-SP
(Restart)

METROPOLITAN EDISON
COMPANY
(Three Mile Island Nuclear
Station, Unit No. 1)

December 14, 1981

APPEARANCES

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CITING CONVENTIONS, ACRONYMS AND INITIALISMS

The practice in NRC hearings is for witnesses to prepare in advance written direct testimony, to adopt orally the written testimony at the hearing, then to testify orally upon examination by the parties. The written direct testimony is physically bound into the transcript of the hearing at the page where it is received into evidence by the Board. The method of citing to the evidence in this decision reflects this practice. For example the citation, "Brown, ff. Tr. 9387, at 7" would mean that Mr. Brown's written testimony is bound into the transcript following page 9387 and the point to be supported by the citation appears at page 7 of his written testimony. If two witnesses sponsor an item of written testimony the citation would appear, for example, as "White and Green, ff. Tr. 8456, at 7", but if more than two witnesses sponsor the item of written testimony the citation might appear as "Black, *et al.*, ff. Tr. 7487, at 7. If one witness on a panel of more than one witness alone sponsors a particular portion of the joint written testimony the citation would appear, for example, as "Grey, *et al.*, ff. Tr. 6391, at 7 (Rose)."

The oral testimony of a witness or other oral statement would for example, be cited as "Tr. 3621 (Green)." Documents other than written testimony received into evidence are exhibits and are cited, for example, as "Licensee Ex. 68" or "Lic. Ex. 68." Exhibits are usually not bound into the transcript.

Attached to Partial Initial Decision of August 27, 1981, is an Index of Written Testimony (Appendix A) and an Index of Exhibits (Appendix B) cited in that and in this Partial Initial Decision. Attached to this Partial Initial Decision is another appendix with indices of the written testimony and exhibits relating to emergency planning issues.

Following are the acronyms and initialisms used in this Partial Initial Decision.

ACRS	Advisory Committee Reactor Safeguards, NRC
AEC	Atomic Energy Commission
AFW	auxiliary feedwater
ANGRY	Anti-Nuclear Group Representing York (intervenor)
ANS	American Nuclear Society
ARAC	Atmospheric Release Advisory Capability
ASME	American Society of Mechanical Engineers
ATOG	Abnormal Transient Operating Guidelines
ATWS	anticipated transient without scram
B&OTF	Bulletins and Orders Task Force, NRC
B&W	Babcock and Wilcox
BOP	balance of plant

BRP	Bureau of Radiation Protection
BWST	borated water storage tank
CD	Civil Defense
CEA	Chesapeake Energy Alliance (intervenor)
CFR	Code of Federal Regulations
CR	control room
DBE	design-basis event
DCRDR	Detailed Control Room Design Review
DHR	decay heat removal
DOE	Department of Energy
DOP	Disaster Operations Plan
DOR	Division of Operating Reactors, NRC
EAC	Emergency Assessment Coordinator
EACC	Environmental Assessment Command Center
EAL	emergency action level
EBS	Emergency Broadcast System
ECCS	emergency core cooling system
ECNP	Environmental Coalition on Nuclear Power (intervenor)
EFW	emergency feedwater
EMC	Emergency Management Coordinator
ENS	Emergency Notification System
EOF	Emergency Operations Facility
EP	emergency procedure
EPA	Environmental Protection Agency
EPE	Emergency Preparedness Evaluation
EPPI	Emergency Plan Implementing Procedures
EPRG	Emergency Planning Review Guideline
EPRI	Electric Power Research Institute
EPZ	emergency planning zone
ER	emergency response
ESF	engineered safety feature
ESFAS	engineered safety feature actuation system
FDA	Food and Drug Administration
FEMA	Federal Emergency Management Agency
FMEA	failure mode and effects analysis
FSAR	Final Safety Analysis Report
GDC	General Design Criterion/Criteria
GPU	General Public Utilities
HEPA	high-efficiency particulate air
HPI	high-pressure injection
ICC	inadequate core cooling
ICS	integrated control system
IE	Office of Inspection and Enforcement, NRC

IEEE	Institute of Electrical and Electronics Engineers
IREP	Integrated Reliability Evaluation Program
LER	licensee event report
LOCA	loss-of-coolant accident
LOFT	loss-of-fluid test (facility)
LPI	low-pressure injection
MFW	main feedwater
MIDAS	Meteorological Information and Dose Acquisition System
MOU	Memorandum of Understanding
NNI	non-nuclear instrumentation
NRC	Nuclear Regulatory Commission
NREP	National Reliability Evaluation Program
NRR	Office of Nuclear Reactor Regulation, NRC
NSSS	nuclear steam supply system
NTOL	near-term operating license
OARD	Operator Accelerated Retraining Program
ORNL	Oak Ridge National Laboratory
PAG	Protective Action Guide
PEMA	Pennsylvania Emergency Management Agency
PF	proposed finding
PID	partial initial decision
PIO	Public Information Officer
PL	Panel Left
PORV	power-operated relief valve
PWR	pressurized-water reactor
RAC	Radiological Assessment Coordinator
RACES	Radio Amateur Civil Emergency Service
RC	reactor coolant
RCP	reactor coolant pump
REMP	Radiological Environmental Monitoring Program
RF	reply finding
RG	Regulatory Guide
RHR	residual heat removal
RMC	Radiation Management Corporation
RPF	Right Panel Front
RSP	Remote Shutdown Panel
RTD	resistance temperature detector
SAI	Science Applications, Inc.
SBLOCA	small-break loss-of-coolant accident
SDS	submerged demineralizer system
SER	Safety Evaluation Report
TLD	thermo-luminescent dosimeter
TMI	Three Mile Island

TMI-1	Three Mile Island Unit 1
TMI-2	Three Mile Island Unit 2
TMIA	Three Mile Island Alert, Inc. (intervenor)
TSC	Technical Support Center
UCLA	University of California, Los Angeles
UCS	Union of Concerned Scientists (intervenor)
USDA	U.S. Department of Agriculture
USI	unresolved safety issue
WGDS	waste gas disposal system
YATA	York Area Transportation Authority

**PARTIAL INITIAL DECISION
(PLANT DESIGN AND PROCEDURES, UNIT SEPARATION,
AND EMERGENCY PLANNING ISSUES)**

I. INTRODUCTION

589. On August 27, 1981 the Atomic Safety and Licensing Board presiding over this proceeding issued a Partial Initial Decision (PID) on procedural background and management issues. In this Partial Initial Decision, we decide plant design and procedures issues in Part II, issues relating to the separation of the TMI units in Part III, and emergency planning issues in Part IV. In each of these parts we have made determinations favoring restart based upon findings that certain short-term actions are necessary and sufficient to provide reasonable assurance that the public health and safety will not be endangered by the operation of TMI-1 and that those short-term actions have been or must be performed before restart because of Licensee commitments, NRC Staff requirements, or Board-imposed conditions. Also in each of these Parts we have found that other, long-term actions or objectives are necessary and sufficient to provide reasonable assurance that the operation of TMI-1 will not endanger the public health and safety and that the Licensee has made reasonable progress toward the completion of the long-term actions or attainment of the long-term objectives.

590. In Part II below on plant design and procedures issues, we have made determinations in twenty-one major categories of design, modification, and procedures issues, including those set out in the Commission's August 9, 1979 hearing order, CLI-79-8 (10 NRC 141); NUREG-0660, NRC Action Plan Developed as a Result of the TMI-2 Accident; NUREG-0737, Clarification of TMI Action Plan Requirements; the various Staff safety evaluation reports, particularly NUREG-0680 and its supplements; intervenor contentions; and Board questions. Several design

and procedure changes were urged by intervenors and the Commonwealth of Pennsylvania. Of particular note, was a dispute between the NRC Staff and Licensee over whether a reactor vessel water-level meter or its equivalent is necessary at TMI-1. See Part II.B, *infra*. Although we have resolved the design and procedure issues in favor of restart, depending upon various commitments, requirements and conditions, we have included a form of "recapture" provision in the decision. We have directed the NRC Staff to report for later Board approval its plan for the implementation of the Board findings and to explain which commitments, requirements, and conditions should be attached to the license either as technical specifications or other license conditions. The Licensee is directed to respond to the Staff's report.

591. The Commission directed the Board to consider the necessity and sufficiency of certain short-term actions required of the Licensee to ensure adequate separation of Units 1 and 2 so that decontamination and/or restoration of operations at Unit 2 do not affect safe operations at Unit 1 and to ensure adequate waste-handling capacity at Unit 1. We find that the actions taken by the Licensee, in Part III below along with the conditions we impose, are necessary and sufficient to resolve the concerns identified by the Commission with respect to the potential interactions between Units 1 and 2. These conditions relate to fuel handling, tests of the ventilation separation program, restriction of the Unit 1 solid waste handling capacity to the Unit 1, continuation of the groundwater monitoring program, and verification of calculations of maximum flood levels. The separation issues are included in the Board's directive to the Staff to report for our approval its plan of implementation of the Board's decision.

592. As will be seen in Part IV, the record on emergency planning is extensive and covers a broad spectrum. Much of the evidence is pertinent to more than one issue, and many of the issues overlap. Therefore, no organization of the emergency planning findings could be neatly developed. We decided to follow the organization used by most of the parties in their proposed findings because the organization appears to be one of the best possible ones and because it was convenient to utilize it. As we discuss in the introduction to Part IV, because of necessary overlap, it is difficult for the full picture to emerge on a particular emergency planning concern until all subject categories in Part IV dealing with that concern have been read. Very briefly, we have found that emergency planning issues identified in the Commission's August 9, 1979 order, the new emergency planning rules, the Board's questions, and the contentions which we find to have merit will not all be satisfied unless certain conditions which we impose in Section IV.L are satisfied prior to restart. Most of those conditions involve deficiencies, or the need for reports to the Commission by the Staff on items not accomplished prior to the close of our record,

related to off-site coordination and implementation of protective actions by state and local government agencies (although the Licensee is involved in providing assistance for many of those items). For example, one of the most important conditions is that the siren alert system within the plume emergency planning zone (EPZ) be in place and be fully tested in accordance with our requirements in Section IV.E.2. Another example of an important condition, but one which is within the control of Licensee, is our requirement in Section IV.B.1 that Licensee's off-site Emergency Operations Facility (EOF) be fully staffed within one hour of the declaration of an emergency.

593. In our PID of August 27, 1981, we reserved jurisdiction over management issues because of reports of cheating on NRC operator licensing examinations. PID ¶¶ 43-45. We are not yet able to close the record or complete our initial decision on the issues involved in that matter, which is now the subject of a reopened evidentiary proceeding. We discuss the ramifications of this situation in Part V below.

594. On September 10, 1981 intervenors Steven Sholly and Union of Concerned Scientists (UCS) filed motions to reopen the evidentiary record in this proceeding on plant design issues. Each motion requested that hearing sessions be held to receive additional evidence through NRC Staff witnesses with respect to a document entitled Recommendations of TMI-2 IE Investigation Team (Operational Aspects), dated September 1979 (the Martin Report). Mr. Sholly requests the appearance of the members of the IE Operations Team which prepared the Martin Report. UCS seeks, *inter alia*, to compel the Staff to identify, and to make available for deposition by UCS, the persons responsible for the recommendations in the Martin Report and the persons responsible for the decision not to include the IE recommendations as requirements for TMI-1. UCS seeks, in addition, an order that the Staff pay the costs of the depositions and to pay UCS' costs and expenses in preparing for and attending the evidentiary hearings sought by UCS.

595. The intervenors' motions have produced a large number of pleadings and some factual affidavits. Resolving these issues in accordance with prevailing NRC law and procedures will require a substantial amount of the Board's time. We have reviewed the affidavits filed by the NRC Staff in particular, and the entire file. We believe that the issues involved in the motions have a very low probability of affecting our initial decision with respect to the necessary short-term actions found sufficient in Part II below. Therefore we are deferring our ruling on the motions until we can dispose of other matters with higher priorities. This is in accordance with

the leave to retain jurisdiction over longer term actions following a partial initial decision granted to us by August 9, 1979 hearing order.⁶⁴

II. PLANT DESIGN, MODIFICATIONS, AND PROCEDURES

596. In its August 9, 1979 Order CLI-79-8 (10 NRC 141), the Commission set forth several short- and long-term actions which concerned plant design and modifications.⁶⁵ In addition, the Licensing Board admitted numerous contentions on this subject and developed its own Board questions. The short- and long-term actions, the contentions, and the Board questions are set forth in the discussion below.

597. The Board's findings of fact on plant design and procedures issues have been organized by subsidiary subject matters as shown in the Table of Contents. Board questions and intervenor contentions which are addressed under a given subject are set out at the beginning of our findings on that subject. Board limitations and clarifications on the scope of the contentions, if any, are also identified at the outset. Some subject matter sections address only one specific question or contention, while others address a number of them which are closely related and generally were the subject of common evidentiary presentations at the hearing.

598. The record of the hearing on plant design and procedures issues includes the written and oral testimony of witnesses presented by Licensee, the NRC Staff and intervenor Union of Concerned Scientists (UCS). Among the exhibits received which are relevant to the plant design and procedures issues are Licensee's Report in Response to NRC Staff Recommended Requirements for Restart of Three Mile Island Nuclear Station Unit 1 (the Restart Report) (Licensee Ex. 1), the NRC Staff's Evaluation of Licensee's Compliance with the Short and Long Term Items of Section II of NRC Order dated August 9, 1979, NUREG-0680 (June 1980) (the Restart SER) (Staff Ex. 1), and Supplement No. 3 to the NRC Staff's Restart SER (Staff Ex. 14). These exhibits assess Licensee's compliance with the short- and long-term actions on plant design and procedures recommended by the Director of Nuclear Reactor Regulation and set forth in Section II of the Commission's Notice of Hearing CLI-79-8, 10 NRC 141 (1979). Intervenor contentions which challenge the sufficiency of certain of these actions, and Board questions which addressed specific

⁶⁴ The order provided: "Accordingly, the Atomic Safety and Licensing Board designated to conduct this proceeding should give priority to consideration of those issues which are related directly to suspension of operation. To the extent feasible, the Board should defer full review of the issues related to the longer-term actions until after the rendering of a partial initial decision regarding the suspension-related issues." 10 NRC at 142.

⁶⁵ Specifically, short-term actions 1 (a-d), 2, and 8 and long-term actions 1, 2, and 3 deal with plant design and modification. 10 NRC 144-45.

actions, were the subject of additional evidence presented by Licensee and the NRC Staff. Some issues were not specifically litigated. In Board Question 2, Section S, *infra*, we inquired into the method by which the Staff assured itself that all of the necessary short- and long-term items have been identified and resolved.

599. The Board's findings of fact below do not address issues raised by intervenors UCS and Sholly on hydrogen generation and control because their contentions were never brought to trial.⁶⁶ In the Board's First Special Prehearing Conference Order, we ruled that discovery may proceed on these contentions while the Board considered Mr. Sholly's petition, under 10 CFR 2.758, to waive 10 CFR 50.44. LBP-79-34, 10 NRC 828 (1979), at 836 (UCS Contention 11) and 842 (Sholly Contention 11). The Board subsequently certified to the Commission on January 4, 1980, the questions of whether the provisions of 10 CFR 50.44 should be waived or exceptions thereto made in this proceeding, and whether post-accident hydrogen gas control should be an issue in this proceeding. LBP-80-1, 11 NRC 37 (1980). In a Memorandum and Order issued May 16, 1980, the Commission determined that 10 CFR 50.44 should not be waived or exceptions made thereto, and that post-accident hydrogen gas control may be litigated in the proceeding under 10 CFR Part 100. CLI-80-16, 11 NRC 674 (1980), *motion to reconsider denied*, Commission Memorandum and Order (unpublished, September 26, 1980). The parties then agreed to confer to determine whether an agreed-upon hydrogen control contention could be submitted to the Board. See Board Memorandum and Order, September 30, 1980. No contention was agreed to and submitted by the parties. Instead, UCS elected to stand on its original contention and to preserve its right of appeal from the Commission's refusal to waive the provisions of 10 CFR 50.44. See, generally, Tr. 4556-86. Consequently, the Board now rejects UCS Contention 11 as inconsistent with the Commission's rulings. Mr. Sholly withdrew his Contention 11 in a written memorandum dated December 23, 1980. On January 15, 1981, UCS filed an offer of proof of its Contention 11, outlining what it would have attempted to establish if the Commission had waived 10 CFR 59.44.

⁶⁶ ANGRY Contention V(A), seeking the installation of a hydrogen recombiner, was withdrawn in light of Licensee's commitment to install one. Tr. 11,033.

A. Natural and Forced Circulation

600. The following contentions on this subject were advanced by Union of Concerned Scientists (UCS):

UCS Contention 1:

The accident at Three Mile Island Unit 2 demonstrated that reliance on natural circulation to remove decay heat is inadequate. During the accident, it was necessary to operate at least one reactor coolant pump to provide forced cooling of the fuel. However, neither the short nor long term measures would provide a reliable method for forced cooling of the reactor in the event of a small loss-of-coolant accident ("LOCA"). This is a threat to health and safety and a violation of both General Design Criterion ("GDC") 34 and GDC 35 of 10 CFR Part 50, Appendix A.

UCS Contention 2:

Using existing equipment at TMI-1, there are only 3 ways of providing forced cooling of the reactor: 1) the reactor coolant pumps; 2) the residual heat removal system; and 3) the emergency core cooling system in a "bleed and feed" mode. None of these methods meets the NRC's regulations applicable to systems important to safety and is sufficiently reliable to protect public health and safety:

a) The reactor coolant pumps do not have an on-site power supply (GDC 17), their controls do not meet IEEE 279 (10 CFR 50.55a(h)) and they are not seismically and environmentally qualified (GDC 2 and 4).

b) The residual heat removal system is incapable of being utilized at the design pressure of the primary system.

c) The emergency core cooling system cannot be operated in the bleed and feed mode for the necessary period of time because of inadequate capacity and radiation shielding for the storage of the radioactive water bled from the primary coolant system.

601. UCS Contentions 1 and 2 challenge the adequacy of natural circulation to remove decay heat at TMI-1 in the event of a small-break LOCA. Contention 1 asserts that the accident at TMI-2 demonstrated the inadequacy of natural circulation, while Contention 2 alleges that the

equipment available at TMI-1 to provide forced cooling of the reactor does not meet NRC regulations and is not sufficiently reliable. UCS presented no direct testimony in support of these contentions.

602. Natural circulation is the phenomenon by which circulation of reactor coolant is maintained through the coolant loops under conditions when the primary coolant pumps are not available to provide forced circulation. The flow through the loops is produced by unequal fluid densities in the section of the primary coolant loop that is heated by the core and in that section which is cooled by the steam generators. The unequal fluid densities produce an unbalanced force (hydraulic head) thereby producing flow. Keaten and Jones, ff. Tr. 4588, at 3, 4 and Fig. 1.

603. Natural circulation is an inherent design feature and is the normal means of providing core cooling for pressurized water reactors (PWRs) when all reactor coolant pumps (RCPs) are inoperative. Keaten and Jones, ff. Tr. 4588, at 3-4. In sum, natural circulation is the condition where the RCPs are off, the system is basically full of liquid excluding the pressurizer, and the driving force or head is caused by the difference in fluid densities between the hot and cold regions of the system. Tr. 4682-83 (Jones).

604. Single-phase (no voids) natural circulation⁶⁷ is the normal cooling mode that would occur following the tripping of reactor coolant pumps during an anticipated operational transient. All parties agree that natural circulation is adequate to remove the decay heat from the core following a shutdown provided the primary system inventory is maintained, the pressure is kept well above the saturation pressure and the level of feedwater in the steam generator is maintained. See UCS proposed finding ¶ 3.

605. During a small-break loss-of-coolant accident (small-break LOCA), however, voids may form in the reactor coolant system and prohibit natural circulation. In fact, for the majority of the accidents in the small-break LOCA spectrum, Licensee's analyses predict voiding in the reactor coolant system such that natural circulation cannot be maintained throughout the accident. Keaten and Jones, ff. Tr. 4588, at 2-3, 5-6; Tr. 4854 (Jones). It is necessary, then, to address the means for providing adequate core cooling for a small-break LOCA where natural circulation may not be available. This involves both the energy removal from the core and the energy removal from the reactor coolant system. See, Keaten and Jones, ff. Tr. 4588, at 6; Tr. 4851 (Jones).

⁶⁷ Licensee's witnesses used the term "natural circulation" to refer to the single-phase condition. See Tr. 4682-83 (Jones). Staff witness Jensen used the term "natural circulation" to refer to both the single-phase and two-phase conditions. Tr. 4932, 4940 (Jensen). The latter condition was called the "boiler-condenser" cooling mode by Licensee's witnesses. Keaten and Jones, ff. Tr. 4588, at 7.

606. To understand how adequate core cooling is provided for a small-break LOCA, one must first understand the heat removal process. The energy within the core must be transferred into the reactor coolant. This energy is initially removed in the transient by the forced circulation cooling provided by RCP coastdown. Then, as long as the core remains covered by liquid coolant or a two-phase (steam and liquid) mixture, adequate core cooling will be maintained indefinitely (assuming heat removal from the reactor coolant). Tr. 4624; 4852 (Jones). If the fuel rods become uncovered for a limited extent and time, cooling of the uncovered portion of the core is provided by the steam generated within the portion of the core covered by the two-phase mixture. The Licensee noted that the ECCS is designed to provide makeup fluid to the reactor coolant system to assure adequate core cooling. Keaten and Jones, ff. Tr. 4588, at 6.

607. The energy added to the reactor coolant system must be removed to prevent excessive system pressure. For reactor coolant system breaks greater than .02 ft², the energy discharged through the break is sufficient to prevent a pressure increase, even without natural or forced circulation. Thus, additional heat removal is not required. For breaks smaller than about .02 ft², during the time the primary system remains sufficiently void free, natural circulation will be established and the steam generator will remove the added energy, if this heat sink is available. Breaks of .005 ft² or less do not involve voiding. Tr. 4600 (Jones). If primary system voids increase to a volume sufficient to fill the inverted U-bends at the top of the hot legs, natural circulation is interrupted. Tr. 4634 (Jones). However, a boiler-condenser process would occur which provides further heat removal. Keaten and Jones, ff. Tr. 4588, at 6-8.

608. If either main or emergency feedwater is not delivered to the steam generators for these smaller LOCAs, heat removal from the primary system can be accomplished by the "feed and bleed" mode of cooling. In this mode the high pressure injection (HPI) system is utilized to "feed" water to the reactor coolant system, and the pressurizer relief and/or safety valves "bleed" the fluid from the system.⁶⁸ In this manner, the inventory injected by the HPI system is used to assure that the core is covered by liquid coolant or a two-phase mixture (thus, adequately cooled), while the water discharged through the pressurizer relief and/or safety valves removes the energy added to the primary system by the core. Keaten and Jones, ff. Tr. 4588, at 7, 8; Keaten, *et al.*, ff. Tr. 16,552, at 8;

⁶⁸ Board questions on the reliability of the feed-and-bleed cooling mode, including any required operator actions and the discharge capabilities of the relief valves, and on its role in bringing the plant to cold shutdown, are part of Board Question 6, Emergency Feedwater Reliability, discussed, *infra*.

Jensen (UCS Contention 1), ff. Tr. 4913, at 8-9.⁶⁹

609. Licensee witnesses Keaten and Jones, who are both familiar with the accident at TMI-2, responded to UCS Contention 1 which asserted that the accident demonstrated that reliance on natural circulation to remove decay heat is inadequate. They testified that the periods of inadequate core cooling did not occur due to any inherent inability of natural circulation or the other decay heat removal processes described above, but rather were the result of premature reduction of HPI flow such that the fuel rods were not covered by a two-phase mixture. After adequate injection flow was restored, and subsequent to the core damage, the core was effectively cooled even though natural circulation was not occurring in the primary system. Keaten and Jones, ff. Tr. 4588, at 8; Tr. 4854-55 (Jones).

610. The restart of a reactor coolant pump at approximately 16 hours after accident initiation at TMI-2 was performed to reestablish a uniform temperature distribution in the primary system by removing voids from the 180° bend in the reactor coolant hot legs, and to establish heat removal via the steam generator. The reactor coolant pump was tripped approximately one month after the accident, and since that time natural circulation has provided adequate core cooling even with the core blockage which is believed to exist. Keaten and Jones, ff. Tr. 4588, at 8, 9.

611. The Board finds that, contrary to UCS Contention 1, the accident at TMI-2 did not demonstrate that natural circulation is inadequate to remove decay heat. Rather, the accident demonstrated that maintaining adequate reactor coolant system inventory is essential to adequate core cooling, and that natural circulation cannot be established in the presence of significant primary system voiding. This is conceded by Licensee in its analyses of small-break LOCAs, where voiding is predicted to interrupt natural circulation in the majority of cases. Licensee proposed finding ¶ 17.

612. The natural circulation capability of the TMI-1 design has been verified by analyses, testing, and unplanned occurrences where natural circulation maintained the plant in safe condition. Keaten and Jones, ff. 4588, at 4-5; Tr. 4688, 4702 (Jones). There were unplanned occurrences at Oconee on January 4, 1974; at Arkansas Unit 1 on February 22, 1975; at Davis Besse on November 29, 1977; and at Crystal River in February 1980. Tr. 4704-05 (Jones).

613. Responding to questions from the Board, Mr. Jones testified that natural circulation and, if needed, the boiler-condenser cooling mode, are adequate to remove all core decay heat, provided primary system inventory is maintained. Tr. 4695; 4697 (Jones).

⁶⁹ In yet another "feed and bleed" cooling mode, reactor coolant leaves the system via the normal letdown piping. This mode of cooling is not discussed in this section because it depends on non-safety grade components and, in any event, appears to have limited heat removal capability.

614. In his testimony, Staff witness Jensen stated: (a) that natural circulation provides adequate and effective cooling to remove decay heat immediately after shutdown which is about 7 percent of full power, and (b) that forced circulation is not necessary to adequately cool the core following a small-break LOCA. Moreover, the Staff argued that reliance on natural circulation to remove decay heat following a small-break LOCA is not a violation of General Design Criterion (GDC) 34 because that regulation does not specify the means or equipment utilized for decay heat removal. Similarly, such reliance is not a violation of GDC 35 which also does not specify the means or systems to be used to meet system requirements. Jensen (Natural Circulation), ff. Tr. 4913, at 4-5, 11-13.

615. The Staff clarified this by stating that during a transient which causes RCP trip, natural circulation removes all decay heat, while in the case of LOCA, some or all of the decay heat (depending on break size), would be removed by coolant being discharged from the break. Specifically, for break sizes greater than about .01 ft², enough energy would be discharged through the break that there would be no reliance on natural circulation for energy removal. For break sizes smaller than approximately .01 ft², only a part of the decay heat would be removed through the break. "Natural circulation" would remove the remainder of the decay heat. Jensen (Natural Circulation), ff. Tr. 4913, at 4, 5.⁷⁰

616. As stated in UCS proposed finding ¶ 24, the evidence supports a conclusion that liquid natural circulation is an adequate means of satisfying GDC 34 and GDC 35 for small-break loss-of-coolant accidents *provided that* feedwater is available and the high pressure injection system provides sufficient water to the primary system to prevent the formation of voiding in the 180° bends of the hot legs. Keaten and Jones, ff. Tr. 4588, at 4, 5.

617. UCS proposed finding ¶ 25 urges the following: ". . . [I]n light of the TMI-2 accident, it must be assumed that accidents involving sufficient voiding to interrupt circulation are credible. If this were not the case, there would be no need for several modifications, such as the high point vents, being required by the Commission."

618. This is essentially in accord with our findings above. However, as long as the core remains covered with a two-phase mixture, the core will be adequately cooled even in the absence of natural circulation. The

⁷⁰ As we noted above licensee estimates that all of the decay heat will be discharged through the break for break sizes larger than .02 ft². This is not inconsistent with the .01 ft² of this paragraph. The minimum size of the break is not important in arriving at a decision on the adequacy of natural convection. We note that Mr. Jensen's use of the term "natural circulation" includes the boiler-condenser mode of cooling.

equipment, procedures and training required to assure that the core will never be uncovered, as it was in TMI-2, is addressed in other sections of these findings.

619. As were stated above, a small-break LOCA can interrupt natural circulation. However the core heat can be removed either by condenser-boiler cooling through the heat exchanger and the EFW system, or by means of feed-and-bleed cooling if the EFW system were to fail. UCS reply findings ¶¶ 49 and 50 raise the problem of voids interfering with the reestablishment of natural circulation. It is well known that the hydrogen bubble did interfere with reestablishing natural circulation and led to the requirement for vents in the primary system. If, however, the voids are steam, as would be expected in a small-break LOCA, the bubble in the hot leg should be compressed and condensed as the primary system pressure is increased by operation of the HPI system. This was the situation at Crystal River as described by Licensee's witness Jones. Tr. 4706. There is no evidence that UCS' postulate that other non-condensable gases would operate to prevent the reestablishment of natural circulation. UCS reply findings ¶¶ 56 and 57. As for UCS reply finding ¶ 58, the Board was not influenced by the Staff's proposed finding that the high point vents would be installed prior to restart. The Staff witness didn't mention a date but he did point to a Staff study which stated that the expected quantities of non-condensable gases should not interfere with "natural circulation" as defined by the Staff. Jensen, ff. Tr. 4913, at 10.

620. High point vents would be useful in reestablishing natural circulation following a small-break LOCA. Jensen (Natural Circulation), ff. Tr. 4913, at 10. The schedule for installing such vents is addressed in NUREG-0737, item II.B.1 which would require installation by July 1, 1982.

621. UCS proposed finding ¶ 27 asserts a lack of evidence to support a conclusion that the boiler-condenser mode of heat removal meets the requirements of GDC 34 and GDC 35. Both Licensee and Staff have presented evidence that the boiler-condenser mode is a reliable method of heat removal. Tr. 4695-96 (Jones); Tr. 4933, 4994, 4999 (Jensen). The cited replies elicited by UCS from Licensee witness Jones do not demonstrate that the boiler-condenser mode cannot be relied upon, but rather that some of the tests did not duplicate the expected conditions following a small-break LOCA.

622. GDC 34 and 35 require reliable, redundant systems for removing decay heat from the core. Both natural circulation cooling and boiler-condenser cooling depend upon a safety grade EFW system. The EFW system will be redundant at restart — long-term improvements will further improve its reliability. See Section Q below for a discussion of EFW classification and reliability.

623. UCS proposed finding ¶ 28 asserts that the two-phase mode of natural circulation (boiler-condenser mode) requires that the water level on the secondary side be higher than the water level on the primary side of the steam generators in order to provide a condensing surface. In fact, that is the situation that would exist following a LOCA with considerable voiding and reduction of water level in the primary. Transfer of heat from core steam generator would proceed by the boiler-condenser mode prior to reestablishment of single phase natural circulation. Jensen (Natural Circulation), ff. Tr. 4913, at 5-6, citing Licensee Ex. 5.

624. The reliability of the emergency feedwater system (UCS proposed findings ¶¶ 29, 30, and 34) is the subject of Board Question 6. In that discussion we conclude that the emergency feedwater system, when backed up by the feed-and-bleed mode of HPI, is adequately reliable.

625. We do not disagree with the UCS claim (proposed finding ¶ 35) that extensive training and well-conceived procedures are required when the feed-and-bleed cooling mode is relied upon to dissipate the heat from the core, but the complete record as it stands today supports the conclusion that these procedures and training can be provided. However, we have reopened the record in this proceeding to inquire into the significance of the test cheating disclosures on the effectiveness of operator training.

626. In summary we find against UCS Contention 1. The operation of one or more reactor coolant pumps is not required in the event of a small-break LOCA. Since the pumps are not required, UCS Contention 2(a) fails. We agree with UCS Contention 2(b) that the residual heat removal (RHR) system is incapable of being utilized at the design pressure of the primary system. We agree that there would be some merit in a system that worked at all pressures. However, no PWR has such a system. Since TMI-1 will have two safety-grade systems (EFW and HPI)⁷¹ for removing residual heat at high pressure, it is the Board's view that a high pressure RHR system is not required.

627. UCS Contention 2(c) alleges that feed-and-bleed cooling is unreliable because of inadequate capacity and shielding for the storage of radioactive water bled from the primary system. In the feed-and-bleed operation, fluid discharged from the reactor coolant system is received initially by the pressurizer relief quench tank. If this cooling mode continues, the mass of fluid "bled" from the primary system will exceed the

⁷¹See also our findings on Board Question 6.

capacity of the quench tank, and will be discharged into the containment. If feed-and-bleed cooling is continued, the borated water storage tank (the initial source of HPI water to the reactor coolant system) will be emptied, and supply for the HPI system will be changed to the containment sump, via the LPI system. See Licensee Ex. 14 for an illustration of the fluid flow paths for these system configurations, and the accompanying explanation at Tr. 5049-52 (Jones); see also Keaten, *et al.*, ff. Tr. 16,552, at 6. Throughout this sequence, the containment provides adequate capacity and shielding for the discharged fluid. Keaten and Jones, ff. Tr. 4588, at 11.

628. In this scenario, most of the reactor coolant system cooling water will be stored inside the containment. However, operation in this feed-and-bleed cooling mode will result in the transport of some of the coolant through components and piping located outside the containment building. In response to a "lessons learned" recommendation⁷² to perform a radiation and shielding design review of the spaces around systems that may as a result of an accident contain highly radioactive materials, Licensee has performed a study to identify any locations in which personnel occupancy may be unduly limited or safety equipment unduly degraded by the radiation fields which might exist after an accident. See Licensee Ex. 1, §2.1.2.3. The results of this study have identified only one concern for use of the feed-and-bleed cooling mode, even if the coolant were highly radioactive. The concern is that a portion of the HPI piping is located in proximity to two motor control centers which perform functions important to safety. Highly radioactive fluid in the HPI pipes would result in radiation levels at these motor control centers sufficiently high that the integrity of some of the materials found in the motor control centers cannot be demonstrated. Consequently, Licensee agrees that it will install, prior to restart, new shield walls between the HPI piping and the motor control centers which will reduce the radiation levels at the motor control centers to levels at which material integrity can be assured. Keaten and

⁷² Item 2.1.6.b (Design Review of Plant Shielding), NUREG-0578, TMI-2 Lessons Learned Status Report and Short Term Recommendations (July 1979). While we are concerned here with the adequacy of radiation shielding specifically for the storage of radioactive water during feed-and-bleed operation, the NRC Staff's review documenting Licensee's compliance with the short-term requirements of this item and demonstration of reasonable progress toward the satisfactory completion of the long-term requirements of the recommendation is documented in Staff Ex. 1, at C8-C32, C33, and in Staff Ex. 14, at 35, 36. The Staff has identified additional modifications that must be completed by January 1, 1982 to meet the requirements of item II.B.2 of NUREG-0737.

Jones, ff. Tr. 4588, at 12, 13; Tr. 7770-73 (Keaten). Licensee proposed finding ¶ 22. It is the Board's view that the actions described here adequately respond to the concerns listed in UCS Contention 2(c).

629. In summary the Board finds that operation of the reactor coolant pumps following a small-break LOCA is not required to assure adequate cooling of the core. In the event that natural circulation is interrupted, the decay heat can be dissipated by other means until natural circulation is restored. Provisions are being made to operate in the feed-and-bleed mode even if the level of radioactivity in the coolant exceeds that experienced in the TMI-2 accident.

B. Detection of Inadequate Core Cooling (ICC)

1. Background and Findings on the Merits

630. The Board admitted three contentions which were concerned with the detection of inadequate core cooling. UCS Contention 7 argued that the public health and safety would not be adequately protected unless a direct measure of water level was provided. Sholly Contention 6(b) states that the August 9 order was inadequate in that it did not require "completion of the installation of instrumentation for the detection of inadequate core cooling". ANGRY Contention V(B) claims that the NRC order does not protect the health and safety of the public in that it fails to require "Installation of instrumentation providing reactor operators direct information as to the level of primary coolant in the reactor core".

631. Although UCS and Mr. Sholly ultimately withdrew their contentions on this issue, both the Staff and the Licensee responded to all three contentions. The Licensee's testimony was prepared by Robert W. Keaten, Michael J. Ross, and Robert C. Jones, ff. Tr. 10,619. The Staff presented its testimony through Lawrence E. Phillips, ff. Tr. 10,807 (two sets hereinafter Phillips-1 and Phillips-2) and Denwood F. Ross, Jr., ff. Tr. 15,915. UCS, ANGRY, and Mr. Sholly did not submit any direct testimony and did not participate in cross-examination. The Commonwealth of Pennsylvania did cross-examine both the Staff and the Licensee witnesses and submitted proposed findings (¶¶ 79-101). See generally, Tr. 10,728-86, 10,866-907, 15,987-16,000, and 16,036-39.

632. No intervenor participated in the evidentiary sessions at which Licensee and Staff testimony was heard; nor did any intervenor submit proposed findings on inadequate core cooling issues. Consequently, this portion of the decision is not directed to the intervenor contentions but rather to the issue of compliance with the Commission's August 9, 1979 order, a matter of dispute among Staff, Licensee and the Commonwealth.

633. Instrumentation for detection of inadequate core cooling (ICC) is a mandatory issue in this proceeding in that it is included as Section 2.1.3.b of NUREG-0578. The TMI-2 Lessons Learned Task Force (Task Force) adopted the following positions:

1. Licensees shall develop procedures to be used by the operator to recognize inadequate core cooling with currently available instrumentation. The licensee shall provide a description of the existing instrumentation for the operators to use to recognize these conditions. A detailed description of the analyses needed to form the basis for operator training and procedure development shall be provided pursuant to another short-term requirement, "Analysis of Off-Normal Conditions, Including Natural Circulation" (see Section 2.1.9 of this appendix).

In addition, each PWR shall install a primary coolant saturation meter to provide on-line indication of coolant saturation condition. Operator instruction as to use of this meter shall include consideration that is not to be used exclusive of other related plant parameters.

2. Licensees shall provide a description of any additional instrumentation or controls (primary or backup) proposed for the plant to supplement those devices cited in the preceding section giving an unambiguous, easy-to-interpret indication of inadequate core cooling. A description of the functional design requirements for the system shall also be included. A description of the procedures to be used with the proposed equipment, the analysis used in developing these procedures, and a schedule for installing the equipment shall be provided.

NUREG-0578 at A-11, A-12.

634. On p. 8 of NUREG-0578 the Task Force summarized item 2.1.3.b as follows:

Perform analyses and implement procedures and training for prompt recognition of low reactor coolant level and inadequate core cooling using existing reactor instrumentation (flow, temperature, power, etc.) or short term modifications of existing instruments. Describe further measures and provide supporting analyses that will yield more direct indication of low reactor coolant level and inadequate core cooling such as *reactor vessel water level instrumentation* [emphasis added].

635. On pp. A-11, -12 the Task Force discussion mentions a number of suggestions for directly measuring coolant level or void fraction but concludes "that detailed engineering evaluation is required before design requirements for a direct level measurement system can be specified."

636. Table B-1 of NUREG-0578 is the Task Force recommended implementation schedule for each of the recommendations. Position 1 of 2.1.3.b, the use of existing instrumentation plus the subcooling meter to detect ICC, is considered a Category A item scheduled for early completion. Position 2, the design and implementation schedule for new instrumentation that will yield a more direct indication of low reactor coolant level, is also a Category A item; only the installation of the new instrumentation is placed in Category B. We note, however, that under item II.F.2 of NUREG-0737, it appears that the Staff no longer considers that the requirements of position 2 must be completed prior to the proposed restart dates. However, the Staff does maintain that reasonable progress must be demonstrated prior to restart and that the Licensee has failed to demonstrate such progress. Staff Ex. 14, at 28-30.

637. Positions 1 and 2 of 2.1.3.b will be discussed individually in the following paragraphs. The measures taken by Licensee to meet the requirements of position 1 will be briefly described, and Staff concurrence in the adequacy will be documented. Following that discussion we will explore the disagreement between Licensee and Staff concerning compliance with position 2 on the need for additional instrumentation. In the discussion that follows we will use the term "coolant level instrumentation" in a broad sense to denote a system that measures coolant level, coolant inventory, coolant density, or some parameter closely related to the foregoing.

638. The instrumentation available at TMI-1 which indicates inadequate core cooling consists of core exit thermocouples which indicate coolant superheat associated with excessive fuel cladding temperature, reactor coolant pressure sensors, cold leg and hot leg resistance temperature detectors (RTDs) which provide inputs to compute the margin to coolant saturation conditions, subcooling meters which will display the margin to saturation, and reactor coolant pump current which provides indication of increasing coolant quality while the pumps are running. Further, prior to the restart of TMI-1, the Licensee will upgrade the existing instrumentation systems, information displays, and operating procedures which relate to the detection of and response to inadequate core cooling conditions. These modifications in conjunction with improved operator training will substantially enhance the capability of the operator to recognize and respond to conditions of inadequate core cooling. Phillips-1, ff. Tr. 10,807, at 5, 6-7; Keaten (Detection of ICC), ff. Tr. 10,619, at 7-9.

639. In addition to the upgrading of existing systems, the Licensee has committed to the installation of a primary coolant saturation meter, has described two short-term modifications to existing instruments, and has proposed new emergency procedures to aid in the detection of inadequate core cooling. Phillips-1, ff. Tr. 10,807, at 6-7. The two short-term modifications involve routing the in-core thermocouple signals outside of containment and connecting the 52 in-core thermocouples to the plant computer (for display purposes), and providing an extended range for reactor outlet (T_H) temperature measurement (from 520° -620°F to 120° -920°F). This modification will be made to four T_H channels, two in each reactor coolant loop. In addition, it is intended to isolate the new wide range T_H signal from the existing control signals. These signals will then be seismic Category I and separated for use as redundant signals. All modifications required for existing instrumentation will be implemented prior to TMI-1 restart. *Id.*, at 7; Keaten, *et al.*, ff. Tr. 10,619, at 8-9.

640. The proposed emergency procedures for inadequate core cooling (EP-1201-39) and 1202-6B) rely on the information available from the core exit thermocouples, reactor coolant system pressure, reactor vessel outlet temperature, and the new saturation (subcooling) meters to identify the approach and existence of inadequate core cooling and to specify the operator actions required to prevent or recover from inadequate core cooling. Keaten, *et al.*, ff. Tr. 10,619, at 9. These procedures are under review by the Staff and revised submittals have been required from the Licensee. Although the Staff has not completed its review at this time, it is confident that procedures acceptable for TMI-1 restart without reliance on water level measurement can be developed. The Staff has found inadequate core cooling emergency procedures based on instrumentation similar to that which will be provided prior to TMI-1 restart to be acceptable for other PWRs while a level measurement system to further enhance the operational safety is being developed. Phillips-1, ff. Tr. 10,807, at 6.

641. As we have discussed in our PID on management issues (¶¶ 196-204), the Licensee has also included specific training in heat transfer and fluid dynamics, plant operating characteristics, plant response to transients, and guidance for operator response to LOCAs in its Operator Accelerated Retraining Program (OARP). All of the licensed TMI-1 operators will be required to complete the OARP. This training, along with the ongoing requalification training program (*see* PID ¶¶ 180-195), is to assure that the operators will recognize and respond to reactor coolant conditions approaching and following saturation. The training provided to TMI-1 operators is intended to assure that the operators are aware of

available information on the status of core cooling and know how to interpret it correctly.⁷³ Keaten, *et al.*, ff. Tr. 10,619, at 7, 14-15.

642. This Board agrees with Staff and Licensee that the measures described above meet the requirements of position 1 of "Lessons Learned" Section 2.1.3.b and will be adequate to protect the health and safety of the public in the short term. In our opinion, those changes in equipment plus the changes in procedures and operator training, if effective, will provide adequate protection for the health and safety of the public for a limited period of operation. We now turn to a discussion of the basis for our conclusion that a water level meter is required in the long term.

643. It is Licensee's position that the above modifications are adequate for the long term — that no additional instrumentation is needed. The Staff insists that further instrumentation to measure coolant level is necessary and that Licensee's plans for such instrumentation must be adequate to demonstrate reasonable progress prior to restart. The Commonwealth of Pennsylvania recognizes that a coolant level meter "would be desirable for the long term" but urges that further generic studies and testing be undertaken by the Staff prior to a commitment by Licensee. Licensee proposed finding ¶ 53; Staff proposed finding ¶ 102; Commonwealth proposed findings ¶¶ 98-100.

644. In support of their position that instruments to measure water level are not needed to detect ICC, the Licensee relied heavily on the testimony of a panel of expert witnesses, Messrs. Keaten, Ross, and Jones, ff. Tr. 10,619.⁷⁴ Mr. Keaten defined ICC as: ". . . inadequate core cooling is considered to exist when the fuel is uncovered to an extent and/or for a time such that the limits of 10 CFR 50.46 would be exceeded." *Id.*, at 7.

645. We have some problems with Licensee's definition of ICC. We prefer Staff's definition: "When the two-phase froth level begins to drop below the top of the core, the exposed fuel begins to heat up and will ultimately reach temperatures at which fuel damage occurs. This is inadequate core cooling." Phillips, ff. Tr. 10,807, at 3. The differences in definition of the beginning of ICC do have some bearing on the differences of opinion on the need for coolant level instrumentation.

646. The Licensee urges us to reject the Staff's definition. Licensee PF ¶ 34. This we decline to do. In our opinion ICC occurs prior to fuel damage — continued ICC leads to fuel damage and should be detected when the fuel heat-up process begins.

⁷³ The dependence upon correct operator responses in conjunction with the new instrumentation underscores the importance of the reliability of NRC and Licensee-administered operator tests and the importance of the reopened proceeding on cheating on these tests.

⁷⁴ The qualifications of the witnesses are attached to their testimony. Their expertise is recognized by this Board.

647. Staff witness Phillips has pointed out that neither the instrumentation proposed by the Licensee nor the coolant level instrumentation urged by the Staff are direct measurements of ICC. Phillips-1, ff. Tr. 10,807, at 4. A direct measurement of fuel cladding temperature would be preferable but is impractical. Lacking any direct indication of ICC they urge that Licensee's instrumentation be supplemented by coolant level instrumentation — a second string to the bow.

648. TMI will have devices to measure the temperature of the coolant at the core exit and in the hot legs above the core. If the measured exit temperature is below the saturation temperature, the core is covered with water. Jensen, *et al.*, ff. Tr. 7548, at 10. Since saturated conditions must occur in the reactor coolant system hot legs before there is danger of inadequate core cooling, the instrumentation available to the operators to detect a loss in the subcooling margin, including the new saturation meter which was not available at the time of the TMI-2 accident, provides information anticipatory to an inadequate core cooling condition. Thus, the instrumentation provides the operator with knowledge that action should be taken to maintain or reestablish the subcooling margin and that an inadequate core cooling condition is being *approached*. See Keaten, *et al.*, ff. Tr. 10,619, at 8 (Keaten); Tr. 10,729-30 (Keaten); Tr. 10,828-30 (Phillips).

649. If an accident occurs which nevertheless results in the uncovering of the core, superheated reactor coolant conditions would be indicated by core exit thermocouples and the expanded reactor coolant hot leg temperature instrumentation. Keaten, *et al.*, ff. Tr. 10,619, at 5 (Jones); Phillips-1, ff. Tr. 10,807, at 4. The Staff's witness Jensen testified that the ranges of this instrumentation used to monitor core cooling are adequate for the operator to determine if the coolant in and above the core is subcooled, saturated or superheated. Jensen, *et al.*, ff. Tr. 7548, at 9. The Staff has suggested, nevertheless, that while core exit thermocouples can provide an indication of the existence of inadequate core cooling, the measurement of superheated steam temperatures by the core exit thermocouples indicates inadequate core cooling imminent or already present. Staff Ex. 1, at C8-21. Thus it becomes apparent to the Board that the differing definitions of ICC lead to differing conclusions concerning the need for additional instrumentation.

650. Both Licensee and Staff agree that the saturation meter would be the first to indicate the need for operator action in the event of a small-break LOCA. Staff agrees with Licensee that the core exit temperature indicators (RTDs) would provide evidence of core uncovering and overheating. However it is Staff's position that a level meter is needed to cover the period between the initiation of the break and the uncovering of the core. Tr. 15,992 (Ross). This period may be as long as 30 minutes to

over three hours. Phillips-2, ff. Tr. 10,807, at 3. The level meter obviates the need for the operator to fly blind for an extended period. It provides an additional and diverse method of determining ICC. Tr. 15,995 (Ross).

651. In order to avoid the onset of inadequate core cooling conditions, Licensee has taken specific steps at TMI-1 to ensure that the operators understand the requirements for adequate core cooling and are provided the necessary information to evaluate core coolant conditions. Plant procedures at TMI-1 have been revised to emphasize the importance of maintaining an adequate saturation margin in the reactor coolant system and to provide guidance for steps to be taken if the saturation margin is less than the required value. Keaten, *et al.*, ff. Tr. 10,619, at 7, 8 (Keaten). The revised procedures define the use of the information available from the core exit thermocouples, reactor coolant system temperatures and the new saturation meter in identifying when inadequate core cooling, by Licensee's definition, is approaching and to specify the operator action required to promptly enhance core cooling. *Id.*, at 9.

652. For example, in the immediate and follow-up action requirements of TMI-1's procedure for loss of reactor coolant causing high pressure injection (Licensee Ex. 48), strong emphasis is placed on maintaining reactor coolant system pressure-temperature relationships to assure that a subcooling condition of at least 50° F exists. Specifically, the procedure requires that upon automatic initiation of HPI all reactor coolant pumps are tripped and HPI shall not be terminated unless: (1) the low pressure injection system is in operation, flow is at a rate in excess of 1000 gpm in each line, and the situation has been stable for 20 minutes; or (2) the degree of subcooling is at least 50° F (as determined by the saturation meter or the five highest in-core thermocouple readings) and the action is necessary to prevent pressurizer level from going off scale high. If 50° F subcooling cannot be maintained, the procedure requires that full HPI shall be reinitiated. Licensee Ex. 48, at 2, 8.

653. The TMI-1 procedures, using the instrumentation described above, assure that the operators take the following key actions during any approach to an inadequate core cooling condition:

- a. Initiate high pressure injection;
- b. Maintain steam generator level;
- c. Trip the reactor coolant pumps if the engineered safety features actuation signal is initiated by low reactor coolant system pressure; and,
- d. Monitor core exit thermocouple temperatures to assure that adequate core cooling exists.

No further action is required for design basis events. Keaten, *et al.*, ff. Tr. 10,619, at 9, 10.

654. Licensee has objected to the water level meter, partly because it would not aid the operator, but also in that the operator might be misled and improperly turn off the HPI system. Licensee proposed finding ¶ 65; Tr. 16,649-50 (Jones). Later questioning by the Board led to a restatement that the improper operator action would not occur if he were properly trained in using water level instrumentation.⁷⁵ We believe a better statement of Licensee's position (also adduced by Licensee) is that without an identifiable use for the instrumentation, its installation would detract, rather than add to safety from a human factors point of view. Licensee Ex. 23, Appendix A, at 2; Tr. 10,644-45 and Tr. 10,703 (Keaten); Tr. 10,706 (M. Ross).

655. The Staff has reviewed the Licensee's justification for no additional instrumentation and found it unacceptable and therefore not in compliance with position 2 of 2.1.3.b of NUREG-0578. Phillips-1, ff. Tr. 10,807, at 9. Mr. Phillips gave a number of reasons why he believes that a water level meter (or equivalent) is necessary at TMI-1 for the protection of the health and safety of the public. We will summarize his testimony in the following paragraphs taken largely from Staff proposed findings ¶¶ 108-144.

656. The Licensee's procedures for detection of inadequate core cooling rely primarily on the saturation meter and core exit thermocouples. The saturation meter, while providing a basis for initial actions, does not distinguish between anomalous transients which can drain the pressurizer and cause primary loop saturation due to cooling and shrinkage of primary coolant versus loss-of-coolant inventory which could lead to inadequate core cooling if it continues. Phillips-2, ff. Tr. 10,807, at 2.

657. Licensee witness, in rebuttal, pointed out that in either event, the proper action is HPI actuation, and that the operator can diagnose the event from a knowledge of the secondary side parameters. Tr. 10,711-16 (Jones).

658. The Staff has pointed out that the TMI-1 Emergency Procedure 1202-6B describes the different operator responses to small-break LOCA versus overcooling events which cause automatic high pressure injection. These procedures now require the operator to distinguish between the transients based on indirect indicators from existing instrumentation. Vessel level instrumentation, if available, would permit a much quicker and

⁷⁵ Dr. Denwood Ross stated it well and succinctly when he testified for the Staff: "I do not believe inherently that an operator can interpret temperature, flow and pressure, but not level. Those are the four classic parameters. I do not know inherently why he would be confused by one and guided by the other three." Tr. 16,006.

more reliable diagnosis of the conditions. For small-break LOCA, an orderly cooldown is required, but not necessarily for an overcooling transient. In both cases, a vessel level meter, if available, would provide coordinating information to assist the operator in restoring the water solid primary system (possibly using the upper head vent) and the normal water level in the pressurizer. Phillips-2, ff. Tr. 10,807, at 2-3.

659. For a small-break LOCA, the primary system will continue to lose coolant inventory, at a rate and duration dependent on the size and location of the break, until the safety injection make-up flow exceeds the rate of coolant loss. For some conditions, the time interval from the instant of primary system saturation conditions until the occurrence of superheat indication on the core exit thermocouples or hot leg RTDs is in excess of 30 minutes, and possibly up to three hours or more. The superheat condition does not occur until the core is partially uncovered and fuel heatup has begun. *Id.*, at 3.

660. If level instrumentation were available, the effectiveness of HPI in recovering the system and the trend of level indication (continuing to lose coolant or refilling the system) would provide valuable diagnostic information on the nature of the transient before the level drops into the core. The level indication would also provide evidence that the core is covered during recovery from a TMI-2 type flow blockage condition, even though superheat may persist at the core exit thermocouples. None of the process parameters monitored by existing instrumentation provide equivalent information on a continuous basis. *Id.*, at 3.

661. In the view of the Staff, vessel level information is important and possibly essential to proper emergency procedures relating to use of the reactor vessel head vent required by the TMI Action Plan. Vessel level information would indicate the existence of a void in the upper head so that the need for vessel venting could be evaluated. *Id.*, at 4-5.

662. The Staff believes that while existing equipment may be sufficient to respond to TMI type accidents, it may not be sufficient to respond to other unidentifiable accidents. Tr. 10,892 (Phillips). One of the lessons learned from the TMI-2 accident was that there need to be more diverse instruments that would let operators cope with anomalous transients for which procedures and training do not exist. Tr. 15,994 (Ross). Thus, instrumentation other than that currently being used is needed. Reactor vessel level is an additional and diverse method of determining inadequate core cooling. Tr. 15,995 (Ross). Just what the Staff had in mind with reference to anomalous transients was not made clear except that they were outside the scope of proposed procedures and training. Licensee's position is that the present procedures are adequate for any small-break LOCA. Keaten, *et al.*, ff. Tr. 10,619, at 5, 12, 14 and 19.

663. In support of their position the Staff cites two recent incidents, one at St. Lucie, the other at Sequoyah 1. Both were small-break LOCAs. In the St. Lucie incident of June 11, 1980 a bubble was formed in the reactor vessel head at a pressure believed to have been above saturation pressure. There was an extended period of operator confusion concerning the status of the system. In the Sequoyah 1 loss-of-coolant incident of February 11, 1981, it required 35 minutes for the operator to diagnose the event. D. Ross, ff. Tr. 15,915, at 3-4.

664. In a sense the St. Lucie and Sequoyah events can be used in support of both Licensee and Staff. By following procedures, the operators took action that terminated the events successfully. But procedures can never be an adequate substitute for operator understanding. The failure to diagnose each event quickly can only be laid to lack of information on the part of the operators as to what was happening.

665. We are convinced that a meter capable of measuring reactor coolant inventory from 100 percent to zero would be a useful and valuable operating adjunct and is needed in the long term. To that extent we agree with the Staff. However, we do not agree with the Staff that the state of the art is sufficiently advanced to require a demonstration of reasonable progress by the Licensee to the extent of requiring the completion of six items (listed in Staff Ex. 14, at 29-30) prior to restart.

666. Staff witness Ross has described the state of development of coolant level meters by the nuclear industry. D. Ross, ff. Tr. 15,915, at 11-12. It appears that Westinghouse may be able to adapt a pressure differential system to their reactors but there was no evidence that such a system could be fitted to a B&W plant. Combustion Engineering is looking at heated junction thermocouples but has not completed design and testing. Tr. 15,977 (Ross). B&W has not committed to any design. Although many other plants appear to be further along than TMI-1 in their research and development efforts, none have met the requirements of position 2 of 2.1.3.b.

667. Licensee did not ignore the long-term recommendations of Section 2.1.3.b of NUREG-0578. Licensee's Restart Report includes B&W's *Evaluation of Instrumentation To Detect Inadequate Core Cooling*, Prepared for 177 Owners Group, August 15, 1980. The following methods of detecting inadequate core cooling were examined in this evaluation: (1) existing core thermocouples; (2) additional axial core thermocouples; (3) ultrasonic reactor vessel level indication; (4) neutron or gamma beam reactor vessel level indication; and (5) differential pressure transmitters for reactor vessel level indication. The B&W evaluation concluded that none of the proposed methods of detection would meet all of the Staff's criteria. The report also concluded that each proposed reactor vessel level measurement system concept fails to provide any additional aid to the operator for

detection of inadequate core cooling. Licensee Ex. 1, Supp. 1, Part 2, Answer to Q 95; Tr. 10,648 (Jones). In addition, the record includes the testimony of Licensee's witnesses on the shortcomings they perceive in the systems evaluated by B&W and under consideration by Westinghouse and Combustion Engineering. See Tr. 10,709-10 (Jones); Tr. 10,724-25 (Jones); Tr. 10,759-67 (Keaten, Jones)

668. Licensee has been following the efforts of other elements of the industry, including the Electric Power Research Institute, to investigate potential reactor water level instrumentation systems. Tr. 10,707-09 (Keaten). Licensee has also expressed its intent to continue to pursue possible methods of measuring level in the reactor vessel if they prove to be reasonable. Tr. 10,919 (Keaten). In addition to working with the other B&W owners on this matter, Licensee has agreed to cooperate with and assist a professor at Pennsylvania State University in developing a proposal to pursue, first on a research reactor, a concept for measuring water level on the basis of using existing neutron detectors. Licensee has also sought a proposal from a professor at U.C.L.A. to perform an independent evaluation of the ongoing work to develop reactor water level instrumentation. Tr. 16,521-23 (Keaten).

669. Licensee should not be penalized in a test of "reasonable progress" because it elected to litigate the need for water level instrumentation. As can be seen from the Chairman's separate statement, its litigative position was not frivolous; Licensee could have prevailed on the issue, although on grounds narrower than it argued. The Staff would have us find that before reasonable progress can be found, the Licensee must, *inter alia*, present:

- (3) Evidence of a tangible commitment to performance or participation in the appropriate test programs to execute the defined development program.

Staff PF ¶ 104, citing Staff Ex. 14, at 29-30.

670. We perceived a sense of pique with Licensee when Staff's witness commented that "plant owners who have devoted their resources to satisfying the II.F.2 [water level indication] requirement rather than resisting it expect to meet the scheduled requirements of NUREG-0737." D. Ross, ff. Tr. 15,915, at 7. While we understand why the Staff's technical personnel would not view resistance to their objectives as reasonable progress in meeting them, we view it somewhat differently. As noted above we refused to accept Licensee's testimony that water-level indication would mislead operators, whom we expect and require to be well trained. But we believe their witnesses when they testified that Licensee and B&W could not identify a present use for water-level indication in a small-break LOCA, and that unneeded instrumentation could detract from the control room

human factor design. Here we place the emphasis upon Licensee's good faith in believing the testimony it presented as compared to the actual desirability of water level indication. We would not expect Licensee to commit to this proposed design change without resistance when it has a *bona fide* belief that it would be useless and counterproductive to safety. We do not find Licensee concerned about the practicality of such instrumentation to be unreasonable, given its own B&W analysis. Licensee Ex. 1, Supp. 1, Part 2; Tr. 10,648, 10,724-25 (Jones).

671. Moreover, even the Staff's own witness testified that there is still the possibility that the Staff ultimately will conclude that no system proposed to measure water level is acceptable (Tr. 10,833 (Phillips)); before the Staff determines whether any system is acceptable it will review the potential use of the information provided and weigh it against any detriments (Tr. 10,861-62 (Phillips)); in order to be found acceptable a proposed system will have to be found to provide an overall enhancement to safety, and the Staff will not make such a determination until the systems are installed, the operating methods have been identified, the calibration and test data are available, and the Staff is certain that these systems are indeed a plus to safety and will not lead to unsafe actions. Tr. 10,811, 10,864, 10,909 (Phillips).⁷⁶

672. It is apparent that the Licensee will not meet the requirements of position 2 of NUREG-0578, Recommendation 2.1.3.b before restart. From the engineering point of view its progress toward that goal is minimal. Licensee has not progressed as rapidly as we would have liked. From the regulatory point of view, and in view of the state of the art, Licensee has demonstrated reasonable progress in meeting position 2 of Recommendation 2.1.3.b. Such progress is sufficient for restart.

673. In summary, the Board's position regarding the need to install additional instrumentation to detect inadequate core cooling is as follows: Instrumentation and procedures in place at the time of restart are adequate for the short term. A meter to measure water level in the core or its equivalent is required in the long term. It will assist the operator in diagnosing and recovering from unanticipated transients in that it monitors the coolant inventory from time zero to core uncover to refilling of the reactor vessel. Although the Licensee need not meet the Staff criteria at the time of restart, high priority should be given to the development and installation of a reactor coolant level meter. No particular time frame is being set. We leave it to the Staff and the Commission to require the

⁷⁶ We cite the Staff's testimony for the purpose of measuring the reasonableness of Licensee's progress, not as a finding on the feasibility of water-level indication. Dr. Ross, in testimony cited below believes that it is unlikely that water-level indication will prove to be infeasible. Tr. 15,995. We agree.

installation at TMI-1 consistent with the treatment of other similar reactors.

2. Separate Discussion on Standard for Determining Need

674. The dispute over the water-level indication issue brings into sharp focus for the first time in this decision the difficulty the Board and parties had with the meaning of the ultimate issues to be decided under the Commission's August 9, 1979 hearing order:

- (2) Whether the "long-term actions" recommended by the Director of Nuclear Reactor Regulation (set forth in Section II of this Order) are necessary and sufficient to provide reasonable assurance that the facility can be operated for the long term without endangering the health and safety of the public, and should be required of the licensee as soon as practicable.

10 NRC, at 148. A similar definition of "necessary and sufficient" obtains with respect to the short-term recommendations. In the foregoing paragraphs we have explained the factual basis for our conclusion on water-level instruments. We discuss and explain the background of the dispute additionally here at some length because it exemplifies the consideration given to the "necessary" standard in other plant modification issues, and it explains how we arrived at the criteria for "necessary" in deciding these issues.

675. The term "necessary" in normal English would be synonymous with the absolute concept of "indispensable" and "essential". A given "necessary" measure under the Commission's order could fairly be regarded as a *sine qua non* to reasonable assurances of public safety.

676. In support of its position that water-level indication is needed in the long term the Staff first presented Laurence Phillips of NRR's Thermal-Hydraulics Section whose testimony we have discussed extensively above. Under persistent questioning by the parties and the Board, Mr. Phillips described water-level indication in the long term as "a desirable enhancement of the safety margin" (Tr. 10,860); useful to "enhance safety" (Tr. 10,861; Tr. 10,864; Tr. 10,889); "[n]ecessary to obtain an additional margin of safety which we feel is needed" (Tr. 10,885); "necessary on the long range to provide this modification to enhance the safety of the plant" (Tr. 10,890); and "a direct and real enhancement to the operation of the reactor." *See also* Phillips-2, ff. Tr. 10,807, at 5.

677. From these and other answers, discussed below, the Board could not discern from Mr. Phillips that the Staff regarded its long-term demand for water-level indication as indispensable to the Commission's requirement

of "reasonable assurance that the facility can be operated in the long term without endangering the health and safety of the public. . . ". 10 NRC, at 148. We could infer from Mr. Phillips' testimony that the public health and safety would not in the long term be endangered without water-level indication in that the Staff seeks only an incremental improvement in an already safe condition. Mr. Phillips' testimony also raised the concern to the Board that the Staff, not understanding the limitations of our jurisdiction, was using inappropriately the TMI-1 restart hearing to force a routine backfitting measure upon Licensee. Tr. 10,886-88. Staff counsel correctly perceived that the Board wanted assurance that the Staff was not holding the restart of the plant as hostage to enforce its will upon Licensee in a dispute beyond the scope of the hearing. Tr. 10,882 (Cutchin).

678. Later, Dr. Denwood Ross, Director of NRR's Division of Systems Integration, testified to justify the Staff's position on water-level instrumentation. D. Ross, ff. Tr. 15,915, at 2. He noted that, until the Board's concerns came to his attention, the Staff had not focused on the distinction between "necessary" and "desirable" and that it was "incumbent upon the staff to determine in some unambiguous fashion whether [water level indication] was necessary or whether it was desirable." Tr. 15,929-30. Dr. Ross' conclusion is that the Staff believes that water-level instrumentation is "necessary to provide reasonable assurance of no undue risk to the health and safety of the public." D. Ross, ff. Tr. 15,915, at 2. This statement we take to be a restatement of the Commission's hearing order; its chief value is to assure us that the Staff believes that water level instrumentation (or its equivalent) must be installed.

679. Members of the Board, and apparently some of the parties, had difficulty with the concept of *comparative* necessity and with the idea that a design modification would be "necessary" to reasonably protect the health and safety of the public only if the modification proves to be feasible. *E.g.*, Tr. 10,884 (Phillips, Smith). There was, therefore, a tendency by the Board and parties to test the limits of the Staff witnesses' view of "necessary" partially in terms of whether this plant, or other plants, should even be permitted to operate in the long term without water-level instrumentation. *E.g.*, Tr. 10,882; 10,885-86 (Phillips, Smith); Tr. 10,888 (Phillips, Jordan); Tr. 15,956 (D. Ross, Baxter); Tr. 16,030-31 (D. Ross, Jordan).

680. It is fair, we believe, to summarize Mr. Phillips' view of the benefits of water-level indication as a reasonable enhancement to safety, the need for which would have to be reconsidered if it turns out that water-level indication is not feasible. Tr. 10,885-86 (Phillips).

681. The testimony of Dr. Ross, as well as his purpose, was to express in much stronger terms the view that water-level instrumentation should be required of Licensee and the industry in the long term:

I think it is necessary that additional instrumentation other than the ones presently existing in operating reactors is needed. Reactor vessel level seems to me to be an appropriate instrument to add to the armaments that the operating staff has.

If that turns out in a year to be technically infeasible — and I do not regard that as likely at all — then I would — my position would be that the regulators and the regulated are going to have to do some more searching and find some other way to provide the diversity and the confirmation and the diagnostic capability for the operating staff, if not level something else.

Tr. 15,995 (D. Ross, Dornsife).

682. The elusive nature of the “necessary” requirement in the Commission’s hearing order is evidenced by the frustration apparent in the cross-examination of Dr. Ross by the Commonwealth’s nuclear engineer Mr. Dornsife. Although Dr. Ross was willing to describe water-level instrumentation as “necessary”, he balked at redundant necessity:

Q Would it be correct to characterize the Commissions’ — the staff’s concern about vessel water level in that, although not absolutely necessary to ensure public health and safety, it increases the margin or decreases the risk from accidents, and therefore it is useful?

(Pause.)

A I have not used those words, “absolutely necessary.”

Q I know. That is why I used them.

Tr. 15,993-94 (Ross, Dornsife).

683. We do not make light of the Staff’s effort to apply reasonable quantification to the usually absolute meaning of the word “necessary” in the Commission’s order; our inquiries attempted the same. But neither the Commission’s order, nor the technical witnesses provided useful general standards the Board should employ in determining what is “. . . necessary . . . to provide reasonable assurance that the facility can be operated for the long term without endangering the health and safety of the public.” For guidance we have looked to the Commission’s backfitting regulation which, at 10 CFR 50.109(a), provides in pertinent part:

The Commission may, in accordance with the procedures specified in this chapter, require the backfitting of a facility if it finds that such action will provide substantial, additional protection which is

required for the public health and safety or the common defense and security.

684. Here again the Commission uses the absolute term "required" which we equate with "necessary" as used in the hearing order. We do not know if the use of the word "necessary" in the hearing order is a studied distinction from the word "required" in 10 CFR 50.109. Probably no difference was intended. We believe the Commission intended the same consideration in its hearing order as is intended in the backfitting regulation, and we have construed "necessary" accordingly.

685. In practice the Commission requires substantial improvements in the safety of nuclear facilities even where, under preexisting technology, the facility design had been considered adequate to protect the public health and safety. That is, the Commission need not find first that a nuclear facility is unsafe before it requires substantial improvements in safety where such improvements are practical.

686. Approaching the consideration from the other direction, Section 182 of the Atomic Energy Act empowers and requires the Commission to provide ". . . adequate protection to the health and safety of the public." In *Citizens for Safe Power v. Nuclear Regulatory Commission*, 524 F.2d 1291, 1297 (D.C. Cir. 1975), the Court recognized that "absolute or perfect assurances are not required [by the Act], and neither present technology nor public policy admit of such a standard."

687. As to existing licenses, the mandate of Section 182 of the Act is embodied in the backfitting regulation, Section 50.109. Despite its seemingly absolute language, Section 50.109 does not provide for "substantial, additional protection" without which "perfect" assurances of safety will want. Similarly "necessary" actions referred to in the Commission's hearing order are not actions indispensable to perfect and absolute assurances that the public health and safety will not be endangered.

688. The Board has taken additional direction from the Commission's December 28, 1980 Revised Statement of Policy on Further Commission Guidance for Power Reactor Operating Licenses (46 Fed. Reg. 7540, January 23, 1981), which approves NUREG-0737 as a basis for responding to the TMI-2 accident with respect to NTOLs. Observing the need for a balance between safety significance and practicality, the Commission stated:

As discussed above, many actions were taken to improve safety immediately or soon after the accident. These actions were generally considered to be interim improvements. In scheduling the remaining

improvements, the availability of both NRC and industry resources was considered, as well as the safety significance of the actions. Thus, the Action Plan approved by the Commission presents a sequence of actions that will result in a gradually increasing improvement in safety as individual actions are completed and the initial immediate actions are replaced or supplemented by longer term improvements.

Id., Policy Statement, PS-54.

689. Therefore, we have adopted a standard that "necessary" modifications as stated in the Commission's hearing order are modifications which would produce a substantial and additional protection to the public health and safety and which, based upon the record, are reasonable in view of the technology, resources and risk involved. In other words, we have done exactly what Staff witnesses have done, *i.e.*, measured necessity partially in terms of feasibility.⁷⁷

3. Separate Statement on Water-Level Indication by Mr. Smith

690. Although I join in the decision on water-level indication, particularly the result, there was a weakness in the evidence which I believe warrants discussion. The decision on this issue depends partly upon the expert and value judgments of the technical members of the Board and not solely upon the opinions of the expert witnesses. I do not suggest that the technical members have reached beyond the evidentiary record to arrive at our decision; they have not.⁷⁸ But, if this had been a private litigation between the Licensee and the Staff as adversaries without a strong public

⁷⁷ In fairness to Licensee, although it has, as we note, occasionally equated "necessary" to a *sine qua non* to operation to test the Staff's position, it has also directed its litigation in accordance to the standards we have developed, *i.e.*, reasonableness, practicality, and engineering judgment.

⁷⁸ I stress this point in light of *Seacoast Anti-Pollution League v. Costle*, 572 F.2d 872 (1st Cir. 1978). The sharp distinction should be made between the decision maker going beyond the record for expert advice, as in *Seacoast v. Costle*, and the consideration prevailing here where the decision makers apply their own expertise to the evidentiary record. The latter approach is authorized by the NRC's unique prerogative under Section 191a of the Atomic Energy Act permitting Administrative Procedure Act hearings by a three-member board with "qualifications . . . appropriate to the issues to be decided"

interest in the result, and without built-in adjudicators' expertise, the Staff might have lost on the issue of the long-term need for water-level indication in this proceeding.

691. It requires no scientific analysis to understand that operators of PWRs ought to know whether their nuclear fuel is covered with coolant and that direct instrumentation for this indication should be provided if it is safe, unambiguous, and practical. However, the Commission did not vest us with general backfitting jurisdiction. The Commission agreed with the Board's concept of its jurisdiction as having a "reasonable nexus between the issue and the TMI-2 accident" in its unpublished order of March 14, 1980. This is the jurisdictional standard we have applied throughout the proceeding. PID ¶ 24. If water-level indication does not have a reasonable nexus to the TMI-2 accident, we are without authority to require it at TMI-1.

692. There is no doubt that the factual matter of water level in the reactor vessel has a close nexus to the accident. The need for unambiguous, easy to interpret indication of inadequate core cooling is an undisputed learned lesson from the accident as stated in 2.1.3.b of NUREG-0578. The question before us now, however, is whether, in view of the post-accident plant design and operating procedures modifications, we have the authority to impose *remedies* which may not have a reasonable nexus to the accident.

693. The key word is "remedy". If the remedy cannot enhance the safety of TMI-1 with respect to a circumstance having a close nexus to the TMI-2 accident, we are without authority to impose it. The Staff may have that right outside this proceeding, but we do not.

694. The debate begins to unfold where the Licensee takes the position that water-level indication would not be helpful in an inadequate core cooling condition; that no additional or earlier action beyond procedures presently in place, including the procedures which justify restart in the short term, can be identified. Keaten, *et al.*, ff. Tr. 10,619. Licensee's Proposed Finding ¶ 63. The Board was never persuaded by Licensee's position that, because it could mislead the operators, water-level indication is worse than useless; if anything this testimony was disconcerting. However, the question of whether water-level indication is helpful or not is very much relevant to the question of the nexus to the TMI-2 accident.

695. The NRC Staff started out by recognizing that it has not identified differences in operator actions if water-level information were available versus those actions now required by existing guidelines for inadequate core cooling. Phillips-2, ff. Tr. 10,807, at 2. Staff's witness Phillips called for water-level indication to distinguish between anomalous transients due to cooling and shrinkage of coolant as compared to loss of coolant inventory. *Id.* This purpose has a connection to the TMI-2 accident. The Board has accepted any small-break loss-of-coolant accident as having sufficient nexus to the accident, in the context of this issue, and I do not question this standard.

696. The Staff goes on to identify other possibilities with a stronger nexus to the accident. The Staff stated that water-level instrumentation would indicate the effectiveness of HPI in recovering the system. *Id.*, at 3. Licensee rebuts this testimony with its B&W expert, Mr. Jones, who testified that the operators would not do anything with this information anyway. Tr. 10,687-88. The Staff has not addressed Mr. Jones' testimony, either by rebuttal testimony or by reference to it in proposed findings. Staff Proposed Findings ¶ 111. Mr. Jones' testimony remains unrefuted.

697. Staff witnesses Phillips (2nd set, ff. 10,807, at 4) and Ross (ff. Tr. 15,915, at 3) refer to a small-break LOCA event at St. Lucie in June 1980 as an example of the usefulness of water-level indication. Mr. Jones discussed the event at length in rebuttal (Tr. 10,688-91), and at least threw some doubt into the utility of water-level indication during that transient. The Staff, however, does not discuss this testimony in its proposed findings on the subject. It does not even discuss the St. Lucie event except to identify it and to assert its summary belief that water-level indication would have contributed to safe operation. Compare Staff proposed finding ¶ 107 with Licensee proposed findings ¶¶ 68-69.

698. A similar situation prevails with respect to Dr. Ross' testimony on the Sequoyah incident in February 1981 — another small-break LOCA event. Licensee points out that Dr. Ross did not identify any additional actions the operators might have taken on the basis of water-level information (Licensee proposed finding ¶ 70). But the Staff is silent on this point. Staff proposed finding ¶ 107. It was left to the Board to interpret the significance of the St. Lucie and Sequoyah events.

699. The Staff also states that water-level information might be useful, and "possibly essential" in emergency procedures relating to the use of the reactor vessel head vent, but concedes that it has not evaluated the conditions for which the head vent should be opened. Staff depends upon the Licensee for this information. Staff proposed finding ¶ 112. Staff again

ignores the testimony of Mr. Jones who testified that B&W guidelines under development for vent use do not rely upon water-level indication. Tr. 10,692. Licensee proposed finding ¶ 71.

700. I make these observations to point out, as I stated at the outset, that the Board depended on its internal expertise to arrive at its conclusion on water-level indication, not to praise the Licensee's presentation which, in fact, we have criticized above. Having decided initially that there was no use for water-level indication in a B&W reactor for an inadequate core cooling situation, it seemed that nothing could stimulate the witnesses' imagination as to the possible uses.

701. Licensee makes the observation that the Staff in its proposed findings has accurately cited the record, but that the findings are incomplete in that they do not discuss much of Licensee's testimony and the Licensee's cross-examination of Staff witnesses. Licensee's reply findings (1st Set) ¶ 43. This comports with my observations. Moreover, even though the Licensee submitted extensive proposed findings on the ICC issue (¶¶ 24-91) raising many contested sub-issues, including the deficiencies in Staff's case, the Staff filed no reply findings whatever on this issue. Even though this is a contested matter between the Licensee and the Staff, the issues were not joined in the proposed and reply findings. The Staff is largely in default.⁷⁹

702. When I state that the evidence of nexus between the need for water-level indication and the TMI-2 accident is weak, I intend no criticism of the efforts of Staff's witnesses. To the contrary, Mr. Phillips supplemented his original testimony in an effort to support the Staff's position and Dr. Ross, after examining the hearing transcripts, came to the hearing to emphasize the Staff's position that water-level instruments are needed. The fact that neither would exaggerate the particular uses to be made of water-level indication in a TMI-2 accident situation is commendable and, indeed, it enhanced their credibility as to the generic desirability and feasibility of water-level indication in PWRs. The problem is that the facts do not seem to strongly support the Staff as to the particular issue in this proceeding. This was revealed in the cross-examination of the Staff's witnesses. In cross-examining Mr. Phillips on this issue, the Commonwealth's nuclear engineer probed the criteria of what ". . . is acceptable for restart, but not acceptable for the long term." Tr. 10,875 (Phillips, Dornsife). The tenor of Mr. Phillips' testimony is that water-level indication, or its equivalent, is needed in the long term to detect anomalous

⁷⁹ On the other hand, Licensee failed to address the Staff's testimony and proposed findings concerning the utility of level indication that the core is covered during a TMI-2 type flow blockage condition. Phillips-2, ff. 10,708, at 4, Staff Proposed Finding ¶ 111. See Licensee Proposed Findings ¶¶ 66-72.

situations. Tr. 10,877; 10,891-92. Mr. Phillips believed that “. . . current instrumentation that is available at TMI-1 is sufficient to respond to TMI-2 type accidents and is adequate for those types of accidents, but may not be adequate for other unidentifiable accidents.” Tr. 10,891-92. Dr. Ross believed that water-level indication is necessary in that “. . . there needed to be more diverse instruments that would let operators cope with anomalous transients” and that level indication is required because “. . . not all transients could be postulated in advance . . .” Tr. 15,994; *See also* Tr. 16,017-18. Thus it is the *anomalous*, not the TMI-2 type transient for which the Staff sees a need for water-level indication.

703. I do not believe that I have over-emphasized the implications of the Staff testimony nor taken it from context. In its proposed finding on this issue ¶ 114) which we adopted verbatim in our decision the Staff itself characterizes the need as:

The Staff believes that while existing equipment may be sufficient to respond to TMI type accidents, it may not be sufficient to respond to other unidentifiable accidents. Tr. 10,892 (Phillips). One of the lessons learned from the TMI-2 accident was that there need to be more diverse instruments that would let operators cope with anomalous transients for which procedures and training do not exist. Tr. 15,994 (Ross). Thus, instrumentation other than that currently being used, is needed. Reactor vessel level is an additional and diverse method of determining inadequate core cooling. Tr. 15,995 (Ross).

704. Why then do I join the technical members in the decision to require implementation of position 2 of Section 2.1.3.b? First the Board found, based upon the convincing testimony of Mr. Phillips and Dr. Ross, that, in a small-break LOCA transient, water-level indication would be useful for as long as 30 minutes to 3 hours between the time that the saturation meter at first, and the core exit temperature indicators later, would provide accurate core information to the operators. ¶ 659, *supra*. While it may be that this interim information is needed only for anomalous, unidentified episodes, these episodes would be within a TMI-2 type transient. The determination of the Board that operators should be informed under these circumstances falls within the appropriate expertise of the technical members and is within our jurisdiction.

705. Second, the Board found from Mr. Phillips' testimony that water-level indication is useful to distinguish between anomalous accidents which cool and shrink the primary coolant as compared to loss-of-coolant transients. It is true that the state of the evidence, as adduced by Licensee, is that operator action between the two type transients would remain the same. Nevertheless, the expert judgment of the Board's technical members

that operators should have the instrumentation needed to diagnose the TMI-2 accident, even if for unidentified purposes, is sufficient, and this purpose falls within the scope of our jurisdiction.

C. Abnormal Transient Operating Guidelines

706. Board Question 11 states:

The board is not satisfied with the staff findings in the SER with respect to Recommendation 2.1.9.c (transients and accidents) of NUREG-0578. The Staff concludes that satisfactory progress has been made and the item is complete. SER, pp. B-10, C8-49. According to Table B-2, the analyses and procedures were scheduled for completion by early 1980. We observe that in May of this year [1980], it was reported that the "Staff is performing a generic review of transients and other accidents in accordance with Recommendation 2.1.9 of NUREG-0578" (NUREG-0667, p. 5-26).

We expect the licensee and the staff to present evidence that the requirements on p. A-45 of NUREG-0578 will be met and to explain the schedule for meeting those requirements. The board, as well as the staff, must have sufficient information to decide whether satisfactory progress is being made.

707. Recommendation 2.1.9.c of NUREG-0578 asks that the Licensee "[p]rovide the analysis, emergency procedures, and training to substantially improve operator performance during transients and accidents, including events that are caused or worsened by inappropriate operator actions." Page A-45 of NUREG-0578, which discusses Recommendation 2.1.9.c, sets out the requirements of the analyses of transients and accidents. The analyses are to include the design basis events specified in Section 15 of the FSAR, single active failures and consequential failures for each system involved in a particular event, operator failures to perform required control manipulations, and operator actions leading to the loss of function of a safety system. Further, the analyses are to incorporate event trees, computer calculations, and reactor simulators.

708. Both the Licensee and the Staff presented direct evidence in response to this question. The Licensee's testimony was sponsored by T. Gary Broughton (ff. Tr. 10,941), and the Staff's by Walton L. Jensen, Jr. (ff. Tr. 11,005). No other direct evidence was presented, but the Commonwealth of Pennsylvania participated in cross-examination of both witnesses. There was also extensive examination by the Board.

709. In his prefiled written testimony, the Licensee's witness testified that the Abnormal Transient Operating Guidelines (ATOG) program, developed by the Licensee with the other members of the B&W Plant Owners Group, is in progress to meet the requirements set forth on A-45 of NUREG-0578. ATOG is based on existing analysis and guidelines for loss-of-coolant accidents and will incorporate inadequate core cooling guidelines. Additionally, it incorporates new analyses of small steam line breaks, loss of feedwater, loss of off-site power, excessive feedwater addition, and steam generator tube rupture. These events are all less severe than design basis events previously analyzed, and were selected because (a) they are more likely to occur than design basis events, and (b) their direction provides for operator interaction. Broughton, ff. Tr. 10,941, at 2-3.

710. Mr. Broughton described how ATOG procedures would be used in diagnosing the nature of a transient by observation of symptoms and how the procedures will aid the operator in bringing the plant to a stable condition. Tr. 10,947-50 (Broughton). We can see how ATOG may be a great aid to operators in diagnosing design basis events. The ATOG program, had it been in existence at TMI-2 in March of 1979, might well have averted the accident.

711. However, our understanding of the intent of 2.1.9.c calls for procedures to deal with situations not covered in the customary safety analyses wherein a single failure of a safety system is considered in the design basis envelope. The recommendation calls for analyses of a single active failure. In addition, it requires that "Consequential failures shall also be included." "Operator Actions that could cause the complete loss of function of a safety system shall also be considered." NUREG-0578, p. A-45.

712. Our interpretation of the 2.1.9.c recommendations is consistent with that of the Staff as enunciated in Action Plan Requirement I.C.1 of NUREG-0737. Analyses of multiple and consequential failures are called for; ATWS events following a loss of off-site power are included; multiple tube ruptures in the steam generators should be dealt with; also operator errors of omission or commission. *See* below.

713. Mr. Broughton's prefiled testimony stated that a goal of ATOG was to "substantially improve operator performance during transients and accidents, including events that are caused or made worse by inappropriate operator actions." He further stated that the guidelines "provide guidance to mitigate failures." Broughton, ff. Tr. 10,941, at 2. He also discussed accident scenarios which take into account "equipment malfunctions and operator errors." *Id.*, at 3. However, his clear statement that "These events, all less severe than the design basis events previously analyzed, were selected for study because they are more likely to occur than design

basis events . . ." (*id.*) resulted in considerable concern by the Board as to whether ATOG indeed met the recommendations of 2.1.9.c as we interpreted them.

714. When asked by the Board whether it was Mr. Broughton's understanding that restriction of ATOG to design basis events was the intent of 2.1.9.c, he replied "yes, and let me amplify on that a little bit." In particular, the witness believed that the small break guidelines needed improvement and that 2.1.9.c was directed toward that; that ATOG did not include ATWS events or steam generator events other than single tube breaks; that multiple breaks were not included because history demonstrates that those are unlikely events. Tr. 10,971-72 (Broughton).

715. In reply to questions by Mr. Dornsife of the Commonwealth of Pennsylvania, asking whether ATOG met the requirements of Section I.C.1 of NUREG-0737, Mr. Broughton stated that some multiple failures were included in the first draft but others would be picked up in a later draft; he could not say whether ATWS, a non-design basis transient, would be included. He said that failure of main feedwater would not be considered along with failure of auxiliary feedwater and that multiple steam generator tube ruptures will not be included in the first issue of ATOG. Tr. 11,000-01 (Broughton).

716. We recognize that Section 2.1.9 of NUREG-0578 is not a model of clarity and that the ATOG program as described by the Licensee could well meet its understanding of the recommendations. The Board reads the requirements as going well beyond the single failure considerations included in design basis accidents and we therefore adopt the clarification enunciated by the Staff in Section I.C.1 of NUREG-0737, at 3-43:

The analyses conducted to date for guideline and procedure development contain insufficient information to assess the extent to which multiple failures are considered. NUREG-0578 concluded that the single-failure criterion was not considered appropriate for guideline development and called for the consideration of multiple failure and operator errors. Therefore, the analyses that support guideline and procedure development should consider the occurrences of multiple and consequential failures. In general, the sequence of events for the transients and accidents and inadequate core cooling analyzed should postulate multiple failures such that, if the failures were unmitigated, conditions of inadequate core cooling would result.

Consequently we find that the ATOG program as described by the Licensee is deficient.⁸⁰

717. In his prefiled written testimony, the Staff's witness, Walton L. Jensen, Jr., testified that the Babcock & Wilcox Plant Owners Group of which Met Ed is a member, has agreed to accomplish the requirements of Recommendation 2.1.9 as part of the ATOG program. A draft of operation guidelines and supporting analyses for Arkansas Power was presented to the Staff on August 21, 1980. Jensen (ATOG), ff. Tr. 11,005, at 3. Under Board examination, Mr. Jensen testified that NUREG-0737 requires that generic guidelines be submitted to the NRC by January 1, 1981 and that the NRC had agreed to consider this requirement met if the individual plant owners would adopt the draft Arkansas guidelines as generic. Tr. 11,016-17 (Jensen). At the time of testimony, Metropolitan Edison had not officially adopted the Arkansas guidelines as generic, but it has since stated that the plant-specific guidelines and the methods used to develop the guidelines will be essentially the same for each plant, and therefore it references the Arkansas guidelines to satisfy the January 1, 1981 requirement. Staff Ex. 14, at 46.

718. In replying to a Board question, Mr. Jensen stated that the long term recommendations of 2.1.9 have "been superseded by NUREG-0737, which on page 3-43 lists a number of multiple failure events and events beyond the design basis accident that the Staff will evaluate in the course of evaluating the ATOG program. This includes multiple tube ruptures, complete feedwater loss, loss of high pressure injection, ATWS, and operator errors of omission and commission." Tr. 11,014 (Jensen).

719. When asked if he was convinced that the Licensee was making reasonable progress in complying with Staff recommendations in NUREG-0737, Mr. Jensen replied that he had seen the draft Arkansas ATOG submittal, but that he had "not looked at the document in any great detail." Tr. 11,014. He had not been a prime reviewer of the guidelines; other Staff people have been involved in the review. Mr. Jensen had talked to the other Staff people and did not believe that "these people have looked at these guidelines in enough detail to know whether they are satisfactory or not." Tr. 11,016 (Jensen).

720. Since Mr. Jensen was not directly involved in reviewing the ATOG program, the Board inquired as to why he was chosen to represent the Staff. The witness did not know. Tr. 11,016. Staff counsel represented to the Board that Mr. Jensen was selected because he "was already going

⁸⁰ A recent (June 1, 1981) letter from Thomas Novak, Assistant Director for Operating Reactors, to all B&W licensees identifies a number of deficiencies in the ATOG program. This letter is not part of the record of this proceeding and has not been used as a basis for the foregoing finding. We only note here the letter's existence.

to be here as a witness . . . he has as good a view of what the status of the progress is as anyone else." Tr. 11,018 (Cutchin). Our finding (below) may, in part, be the consequence of less than adequate Staff testimony.

721. A careful review of the record of this proceeding convinces us that the evidence is inadequate to support a finding of reasonable progress with respect to item 2.1.9.c of NUREG-0578. It appears to us that the criteria enunciated by the Staff in Section I.C.1 of NUREG-0737 are adequate. We believe that there must be a commitment on the part of the Licensee to meet those criteria, and that immediate steps be taken to bring the ATOG program into compliance with 0737 requirements. We charge the Staff with the responsibility of analyzing the revised program and certifying to the Commission that the Licensee is making reasonable progress in meeting the criteria.

D. Safety Systems Bypass and Override

722. Contentions advanced by Mr. Sholly and UCS were the following:

UCS Contention 10:

The design of the safety system at TMI is such that the operator can prevent the completion of a safety function which is initiated automatically; to wit: the operator can (and did) shut off the emergency core cooling system prematurely. This violates §4.16 of IEEE 279 as incorporated in 10 CFR 50.55(a)(h) which states:

The protection system shall be so designed that, once initiated, a protection system action shall go to completion.

The design must be modified so that no operator action can prevent the completion of a safety function once initiated.⁸¹

Sholly Contention 3:

It is contended that as a result of Licensee's Operating Procedures, the emergency core cooling system can be defeated by operator actions during the course of a transient and/or accident at Unit 1, such defeat consisting of either throttling back the high-pressure

⁸¹ In its Prehearing Conference Order of December 18, 1979, the Board limited UCS Contention 10 to the core cooling and containment isolation systems. LBP-79-34, 10 NRC 828, 836 (1979). The Board subsequently accepted UCS's specification of the contention to address the emergency core cooling, emergency feedwater and containment isolation systems. Memorandum and Order of Prehearing Conference of August 12-13, 1980, August 20, 1980, at 6.

injection pumps or tripping these pumps. It is further contended that under the conditions of a loss-of-feedwater transient/loss of coolant accident at Unit 1, defeat of the emergency core cooling system high-pressure injection system by pump throttling and/or pump trip results in significant cladding metal-water reaction, causing the production of amounts of hydrogen gas in excess of the amounts required by NRC regulations to be considered in the design and accident analysis of nuclear power plants. It is contended further that such production of hydrogen gas results in the high risk of breach of containment integrity due to the explosive combustion of the hydrogen gas in the containment. Inasmuch as the emergency core cooling system is an engineered safety feature which is relied upon to protect the public health and safety, and because proper operation of the emergency core cooling system is required to provide reasonable assurance that Unit 1 can be operated without endangering the public health and safety, it is contended that the emergency core cooling system operating procedures must be modified in order to ensure compliance with the GDC 35 requirement of negligible clad metal-water reaction following a loss-of-coolant accident (LOCA). It is further contended that the emergency core cooling system operating procedures must be appropriately modified prior to restart in order to provide for protection of the public health and safety.

723. The Licensee's testimony of this subject was submitted by Phillip R. Clark, Michael J. Ross, and E. S. Patterson (ff. Tr. 6225). UCS also submitted testimony prepared by Robert D. Pollard (ff. Tr. 6410). Mr. Sholly did not present direct testimony but participated in cross-examination on this issue. The Staff's testimony was presented through Walton L. Jensen, Jr. (Sholly Contention 3, ff. Tr. 6600) and Donald F. Sullivan (UCS Contention 10, ff. Tr. 6602).

724. During the TMI-2 accident, the operators prevented a safety system which had been automatically initiated from performing its safety function by terminating full flow from the high pressure injection system to the reactor coolant system. This reduction in emergency cooling water flow significantly contributed to the severity of the TMI-2 accident. Pollard, ff. Tr. 6410, at 10-1. Intervenors UCS and Sholly suggest different ways to correct this concern regarding manual bypassing of safety systems. UCS, in its Contention 10, suggests the modification of the design of these systems "so that no operator action can prevent the completion of a safety function once initiated." Mr. Sholly, on the other hand, proposes in his Contention 3 that the plant operating procedures governing ECCS should be modified prior to plant restart to avoid operator defeat of the ECCS.

725. UCS Contention 10 asserts in support of its proposed design modification that: "[t]he design of the safety systems at TMI is such that the operator can prevent the completion of a safety function which is initiated automatically," and that "[t]his violates §4.16 of IEEE 279 as incorporated in 10 CFR 50.55(a)(h) which states: 'The protection system shall be so designed that, once initiated, a protection system action shall go to completion.'" See also, Pollard, ff. Tr. 6410, at 10-2 (referring to sections of IEEE Std 279 as "requirements of the Commission's regulation").

726. The Commission's regulation, 10 CFR 50.55a(h), states that it applies to protection systems at plants for which a construction permit was issued after January 1, 1971. The construction permit for TMI-1 was issued on May 18, 1968. Sullivan, ff. Tr. 6602, at 2, 3. Consequently, the regulation cited by UCS does not apply to TMI-1 and the facility is not in violation of 10 CFR 50.55a(h).

727. But, in view of the TMI-2 experience on safety system overriding, evidence was accepted nevertheless, and the Board has considered whether TMI-1 conforms to IEEE Std 279, even though this standard does not apply under NRC regulations. IEEE Std 279 is entitled Criteria for Protection Systems for Nuclear Power Generating Stations. There are two versions, IEEE Std 279-1968 (UCS Ex. 16), which contains proposed criteria, and IEEE Std. 279-1971 (Licensee Ex. 16), an approved standard which revises IEEE Std 279-1968. Both of these are incorporated by reference in the NRC regulations. Sullivan, ff. Tr. 6602, at 2. The quotation in UCS Contention 10 is from section 4.16 of IEEE Std 279-1968. UCS Ex. 16, at 5.

728. Section 1 of IEEE Std 279-1968 defines the scope of the protection systems addressed by the standard as follows:

For purposes of these Criteria, the nuclear power plant protection system encompasses all electric and mechanical devices and circuitry (from sensors to actuation device input terminals) involved in generating those signals associated with the protective function. These signals include those that actuate reactor trip and that, in the event of a serious reactor accident, actuate engineered safeguards such as containment isolation, core spray, safety injection, pressure reduction, and air cleaning.

UCS Ex. 16, at 3; Clark, *et al.*, ff. Tr. 6225, at 3 (Patterson). Except for the term "plant" (1968) versus "generating station" (1971), both versions of IEEE Std 279 define "system" as follows:

Where not otherwise qualified, the word "system" refers to the nuclear power plant protection system, as defined in the scope section of the criteria.

UCS Ex. 16 at 3; Licensee Ex. 16, at 7; Clark, *et al.*, ff. Tr. 6225, at 4 (Patterson). The definition of the protection system given in the Scope section of the standard, quoted above, remained essentially unchanged from the 1968 to 1971 versions. *Id.*

729. Section 4.16 of IEEE Std 279-1968 states that: "The protection system shall be so designed that, once initiated, a protection system action shall go to completion." There is a distinction between a safety function (such as the actual pumping of water into the reactor) and the protection system that *actuates* the equipment which performs the safety function. Sullivan, ff. Tr. 6602, at 3. There is no basis to apply the IEEE Std 279 to the completion of a subsequent safety function. Clark, *et al.*, ff. Tr. 6225, at 4 (Patterson). As further explained by Mr. Patterson, the purpose of paragraph 4.16 of IEEE Std 279 was to force the designer to incorporate a latching or reset mechanism in a protection system. Tr. 6228 (Patterson). Mr. Sullivan commented that IEEE Std 279 is a design document as opposed to an operations document and that it cannot mandate actual operations. Tr. 6605 (Sullivan). The Board notes that both Mr. Sullivan and Mr. Patterson have had extensive experience in the preparation of IEEE standards. Statement of professional qualifications, E. S. Patterson, attached to Clark, *et al.*, ff. Tr. 6225; Licensee Ex. 16 at 3. Statement of professional qualifications, Donald F. Sullivan, attached to Sullivan testimony, ff. Tr. 6602; Tr. 6675-76. We do not mean to infer by these statements that Mr. Pollard does not have experience in the preparation of IEEE standards. See below.

730. Consequently, IEEE Std 279 does not seem to apply to the situation which concerns UCS — *i.e.*, operator interference with emergency core cooling, containment isolation or emergency feedwater systems functions once they are initiated automatically. UCS concedes that such a design meets the literal language of the standard (UCS PF ¶ 288) but opines that such an interpretation ignores the purpose of the standard. *Id.*, at 289.

731. The protection system at TMI-1 is designed with the "seal-in" feature such that the protection system goes to completion in the sense described above. Return to normal plant operation (removal of the "seal") requires subsequent deliberate operator action. Thus, the TMI-1 protection

system is in conformance with section 4.16 of IEEE Std 279-1968.⁸² Sullivan, ff. Tr. 6602, at 4. Consequently, even if 10 CFR 50.55a(h) were to be applied to TMI-1, the TMI-1 design meets the requirements of section 4.16 of IEEE Std 279-1968.

732. UCS asserts that:

[i]n relying on the definition of protection system, Met Ed and the Staff ignore the purpose of the standard which is to "establish minimum requirements for the safety-related functional performance and reliability of protection systems . . ." (IEEE Std 279, "Scope").

Pollard, ff. Tr. 6410, at 10-4. The standard itself does not state a purpose. In fact, the Scope section quoted by UCS witness Pollard continues: "Fulfillment of these requirements does not necessarily fully establish the adequacy of protective system functional performance and reliability." UCS Ex. 16, at 3; Licensee Ex. 16, at 7. The standard does not purport to establish the functional performance of entire safety systems. Therefore, we reject the notion that such systems need to be governed by an IEEE standard in order to be found to be adequate.

733. UCS urges that the Board use the subsequent work of IEEE standards committees in developing IEEE Std 603 for interpreting IEEE Std 279-1968. IEEE Std 603-1977, entitled Criteria for Safety Systems for Nuclear Power Generating Stations, was published as a trial use standard in March 1977. Pollard, ff. Tr. 6410, at 10-8. (The corrected edition, dated October 25, 1977, is in this record as UCS Exhibit 15.) UCS witness Pollard testified that the purpose of developing IEEE Std 603 was to apply the requirements of IEEE Std 279-1971 to the systems actuated by the protection system.⁸³ Pollard, ff. Tr. 6410, at 10-8, 10-9.

734. Mr. Pollard testified that he served as the NRC representative on the IEEE standards committee that developed IEEE Std 603-1977, and that the intent was to have IEEE Std 603 replace IEEE Std 279 after two years of trial use, *i.e.*, in March 1979. Pollard, ff. Tr. 6410, at 10-8, 10-9. While this was the intent at the time Mr. Pollard was associated with the authoring committee,⁸⁴ since the time the standard was issued for trial use the committee has reaffirmed IEEE Std 279 for another four years and has revised and approved IEEE Std 603 to be developed as a full standard

⁸² Also, since, as we noted above, the 1971 version of IEEE Std 279 does not differ in its scope and definitions from the 1968 version, it follows that the TMI-1 protection system also meets the related requirements of the later version.

⁸³ If Mr. Pollard's interpretation of IEEE Std 279 were correct, such an extended application would not be needed.

⁸⁴ Mr. Pollard's statement of qualifications also shows that he left the NRC in February 1976. Pollard, ff. Tr. 6410.

without replacing IEEE Std 279. Tr. 6231-32 (Patterson). The Board notes that draft IEEE Std 603-1977 has not been codified in the Commission's regulations nor endorsed in a Staff regulatory guide, and therefore it has no regulatory force within this agency. Tr. 6606-07 (Sullivan); Tr. 6232 (Patterson).

735. UCS witness Pollard drew from IEEE Std 603-1977 no firm support for UCS Contention 10 in his prefiled testimony, other than to observe from the section on "operating bypasses" that it illustrates "the widespread technical support for the position that if the protective system determines there is a need for a protective function, every effort should be made to ensure it will be accomplished." *Id.*, at 10-11. Operating bypasses, however, are irrelevant to UCS Contention 10. Operating bypasses are devices to physically bypass an engineered safety feature system to keep it from inadvertently actuating during a normal plant transition from one condition to another. Tr. 6233-34 (M. Ross).

736. On redirect examination Mr. Pollard asserted the view that application of IEEE Std 603 would require the design modifications called for by UCS Contention 10. Tr. 6573 (Pollard). Staff witness Sullivan contradicted that view, testifying that if applied, IEEE Std 603-1977 would require no change to the TMI-1 design, and would not prevent operators from interfering with the completion of safety functions. Tr. 6609, 6616, 6681-82 (Sullivan).

737. The Board heard considerable testimony on these conflicting interpretations of IEEE Std 603. Section 4.4 of IEEE Std 603-1977, "Completion of Protection Action," provides as follows:

The safety system shall be designed so that, once initiated automatically or manually, the intended sequence of protective actions at the system level shall continue until completion. Deliberate operator action shall be required to return the safety system to normal. This requirement shall not preclude the use of equipment protective devices or the provision for those deliberate operator interventions which are identified in 3.10 of the design basis.

UCS Ex. 15, at 14.

738. Section 3.10 of IEEE Std 603-1977, entitled Design Basis, provides that the design basis shall document, as a minimum:

3.10 The critical points in time or the plant conditions, after the onset of a design basis event, including:

3.10.1 The point in time by which the protective action at the system level must be initiated.

3.10.2 The point in time after which some protective actions may be manual.

3.10.3 The plant conditions after which a deliberate operator intervention may prevent the completion of protective action at the system level.

3.10.4 The point in time, or plant conditions, which define the proper completion of the protective action at the system level.

UCS Ex. 15, at 11, 13. Mr. Pollard, citing section 3.10.3 above, concludes: "Therefore, TMI-1 should be designed such that, until the set of conditions defined above is met, the operator cannot interfere with operation of the high pressure injection system." Pollard, ff. Tr. 6410, at 10-18.

739. The Board, however, concludes that IEEE Std 603-1977 expressly contemplates the opportunity for operator intervention to prevent the completion of protective action at the system level. Noting that the words from subsection 3.10.3 are ". . . after which a deliberate operator intervention may prevent the completion of protective action . . .", we cannot see how this standard supports the UCS position that the design should preclude operator interference.

740. UCS witness Pollard cited the lessons learned from the TMI-2 accident as support for UCS Contention 10 and suggested specific plant design changes to correct the alleged unsafe design and to make the design conform with IEEE 279. He stated:

This [modification to the plant] could be accomplished, for example, by interlocking the operator's controls for the high pressure injection system with the signals from low pressure injection flow, a 20 minute timer and the saturation meters such that the controls would be ineffective in stopping high pressure injection until the conditions specified above were met. The same type of design changes need to be undertaken for the auxiliary feedwater system and the containment isolation system. Met Ed must define completion of the safety function for each system and then design the plant so that the operator can not stop the auxiliary feedwater system or open containment isolation valves until it is safe to do so. [Footnote omitted]

Pollard, ff. Tr. 6410, at 10-18, 10-19.

741. Licensee's witness expressed disagreement with the basic philosophy underlying this proposed design modification. He asserted that the provision of automatic circuitry to prevent the operator from modifying any protective action once it has been initiated is not impractical, but would seriously complicate the plant and detract from safety. In Licensee's view, the need, and the lesson learned from the TMI-2 accident, is to prepare the operators to correctly diagnose the plant condition and carry out the appropriate actions. Clark, *et al.*, ff. Tr. 6225, at 4 (Clark).

742. The UCS proposed findings state that:
255. The procedures are quite specific regarding when a safety system like high pressure injection may be throttled. Tr. 6246 (Ross).
256. The Licensee's witness testified that for design basis accidents the operator is instructed to follow the procedures strictly and not depart from them. Tr. 6245 (Ross); Tr. 6245-51 (Clark); Tr. 6299 (Clark).
257. UCS' position is that, given that the Licensee, with B&W's assistance, has clearly defined the conditions constituting completion of a safety function (or the goal of the safety system), the plant can and should be designed to preclude termination of the safety system until those conditions are attained.

The Board observes that UCS proposed finding ¶ 256 above is not entirely complete by itself in view of Licensee witness Clark's comments:

The operator is to follow the procedures as written with one overriding principle which is that in the event that in his judgment safety of the public or personnel requires him to do something not in the procedure, he should so do.

Tr. 6248 (Clark), and

We are talking about situations which are unforeseen. We believe that the design basis analyses cover the events which he will encounter and that the procedures cover those events. However, when you ask for an absolute statement that the operator is told never to do something that is not in the procedure, I cannot answer that affirmatively but only as I have answered it.

Tr. 6249 (Clark).

743. Though UCS acknowledges these Clark statements (UCS proposed finding ¶ 259), the Board disagrees with UCS' view and agrees with the Licensee on the point that though procedures may be developed for all postulated design basis accidents, flexibility needs to be reserved so the operator can cope with the unforeseen.

744. Licensee witness Clark also pointed out that from the very beginning of the nuclear power industry the plant operator has been recognized as a required element in correct plant operation. The principal criterion for selecting actions assigned to the operators is that they must be actions operators can reasonably be expected to perform and for which they can be adequately trained. Very rapid actions required for immediate response

to sudden unanticipated changes in plant conditions, for example, do not meet this criterion. For this reason the immediate actions of protective systems (e.g., reactor trip, ECCS actuation and containment isolation) are automated and the operator action is simply to verify that the automatic circuitry has functioned properly. Subsequent bypass of such circuits, on the other hand, proceeds on a much more deliberate basis. The operators have ample opportunity to verify that the conditions prerequisite to bypass are in fact met. They can, as appropriate, refer to written operating procedures and/or consult with their immediate supervisor prior to bypassing an automatic system. It is fully appropriate, therefore, that this type of action remains under operator control. Clark, *et al.*, ff. Tr. 6225, at 5-6. The Board generally agrees with these observations, but again notes the importance of operator training.

745. The Board decides against UCS Contention 10. First, the Commission regulation incorporating IEEE Std 279 does not apply to this facility. Second, the TMI-1 protection system conforms to IEEE Std 279 and the language of the standard does not prevent operator interference with safety system operation. Third, nothing in IEEE Std 279 suggested by UCS persuades us that it is necessary or appropriate to extend application of the standard. Fourth, one lesson learned from the TMI-2 accident is not to eliminate the operator's role by the increased use of automation, but to improve the operator's understanding and capability to cope with the unusual and unexpected. Though the Board agrees with UCS that during the TMI-2 accident operator intervention in the operation of the high pressure injection system was premature and was the cause of core damage (UCS proposed finding ¶ 244), the Board does not agree with the remedy suggested by UCS for the reasons discussed above. In summary, the Board concludes that the plant design changes suggested in UCS Contention 10 and discussed in the hearing are not justified and that these changes should not be made.

746. The Board recognizes that the UCS position, in light of the specific instance of TMI-2 accident, has merit. The Licensee has written procedures to assure that the safety functions will proceed to completion without unwarranted operator interference. The Licensee strongly opposes a design which removes operator intervention under any and all circumstances. Their position also has merit. Upon the record of this hearing Licensee and Staff prevail. However, we also note the extreme importance of adequate procedures and thorough training of the operators.

747. Intervenor Sholly's contention is concerned not with the design capability for operator intervention, but rather with providing the operator the correct information and procedural guidance on which to take subsequent actions. The operators at TMI-1 have been provided with specific instructions as to when it is necessary or allowable to intervene and

override the automatic operation of the emergency core cooling, containment isolation, and emergency feedwater systems. The operators have been trained on these requirements. Clark, *et al.*, ff. Tr. 6225, at 7-11 (M. Ross); *see also*, Jensen, ff. Tr. 6600. Consequently, the Board finds that the concerns raised in Sholly Contention 3 have already been satisfied at TMI-1. However, this finding underscores the safety importance of the reopened proceeding on the issue of cheating on operators tests and the reliability of the operator testing.

E. Pressurizer Heaters

748. UCS advanced the following contention:

UCS Contention No. 3:

The staff recognizes that pressurizer heaters and associated controls are necessary to maintain natural circulation at hot stand-by conditions. Therefore, this equipment should be classified as "components important to safety" and required to meet all applicable safety-grade design criteria, including but not limited to diversity (GDC 22), seismic and environmental qualification (GDC 2 and 4), automatic initiation (GDC 20), separation and independence (GDC 3 and 22), quality assurance (GDC 1), adequate, reliable on-site power supplies (GDC 17) and the single failure criterion. The staff's proposal to connect these heaters to the present on-site emergency power supplies does not provide an equivalent or acceptable level of protection.

Direct testimony on this contention was presented by UCS (Pollard, ff. Tr. 8182), the Licensee (Keaten, *et al.*, Safety Classification, ff. Tr. 7558, at 16-18), and the Staff (Jensen, ff. Tr. 8712).

749. The pressurizer heaters function as part of the normal control system for reactor coolant system pressure. When the pressurizer heaters are activated, boiling occurs within the pressurizer, producing steam which acts to increase reactor system pressure. The reactor system pressure may be reduced by operation of the pressurizer sprays, which condenses the steam in the pressurizer. Jensen, ff. Tr. 8712, at 3. These heaters and their control system are not safety grade in the context normally used by the Staff. The design was not intended to be safety grade and hence does not meet the relevant staff requirements such as independence, single failure capability, seismic and environmental qualification, etc., for such equipment. We will discuss in the following paragraphs whether it is necessary, as UCS contends, for the pressurizer heaters and associated controls to

meet all applicable safety-grade design criteria. A related question, whether and how the heaters should be connected to the emergency power supply, is discussed in section F on UCS Contention 4, *infra*.

750. UCS' witness Robert Pollard testified that there is only one proven effective way of removing the decay heat at TMI-1; *i.e.*, water must be circulated through the reactor, the main coolant piping, and the steam generator tubes. The decay heat transferred from the fuel to the reactor coolant is thus transferred to the secondary system through the steam generator tubes. Pollard, ff. Tr. 8182, at 3-1 and 3-2; UCS proposed finding ¶ 40.

751. UCS further notes that the NRC's Task Force on the TMI-2 accident concluded that one of the significant lessons learned from the accident is that the maintenance of natural circulation capability is important to safety:

Maintenance of safe plant conditions, including the ability to initiate and maintain natural circulation, depends on the maintenance of pressure control in the reactor coolant system. Pressure control is normally achieved through the use of pressurizer heaters. Experience at TMI-2 has indicated that the maintenance of natural circulation capability is important to safety, including the need to maintain satisfactory natural circulation during an extended loss of offsite power.

Pollard, ff. Tr. 8182, at 3-4; NUREG-0578, at A-2.

However, UCS omits the next sentence in NUREG-0578:

Without the availability of pressurizer heaters, it may be necessary to operate the high pressure emergency core cooling system to maintain satisfactory natural circulation conditions.

NUREG-0578, at A-2.

752. Licensee's witness testified that while natural circulation is the normal and preferred mode of cooling if the reactor coolant pumps are not available, this mode is not required at all times because means other than natural circulation exist to remove core decay heat. This is true both for conditions with loss of reactor coolant pumps or following a small-break LOCA. Keaten and Brazill, ff. Tr. 7558, at 16. Licensee added that core cooling can be accomplished by the feed-and-bleed mode utilizing only safety-grade systems and components; *i.e.*, the borated water storage tank, the high pressure injection (HPI) system, the pressurizer safety valves, the containment, and the low pressure injection system. *Id.*; Tr. 7562-65 (Brazill).

753. UCS would have us find that neither method of controlling the reactor coolant pressure, use of pressurizer heaters or use of HPI in feed-and-bleed, uses a safety-grade system. UCS proposed finding ¶ 57. However, we believe that UCS may be somewhat confused regarding feed-and-bleed cooling since they refer to such cooling using the "emergency core cooling system and the *power operated relief valve*". [Emphasis added.] Pollard, ff. Tr. 8182, at 3-13. The Board agrees that the power operated relief valve is not safety grade as this term is used by the Staff. But, what was described by the Licensee and discussed above is a feed-and-bleed procedure using the pressurizer safety valves which *are* safety grade. We find nothing in the record which controverts Licensee's statement that the feed-and-bleed cooling mode can be achieved utilizing only safety-grade systems and components. Therefore, the Board accepts these conclusions by the Licensee.

754. In addition, Licensee testified that natural circulation can be accomplished without the pressurizer heaters by maintaining reactor coolant pressure with the makeup or HPI system while the reactor coolant system is "solid".⁸⁵ Keaten and Brazill, ff. Tr. 7558, at 14. Thus, safety-grade HPI equipment can provide both feed-and-bleed cooling and can provide reactor coolant pressurization for natural circulation without the need for pressurizer heaters. See Section A above for a discussion of natural circulation cooling.

755. We see from these discussions the importance of being able to control reactor coolant pressure using the HPI system. This pressure control is important for maintenance of natural circulation cooling or, if such cooling is interrupted, for core cooling by feed-and-bleed through the safety valves. The Board feels, therefore, that as a minimum, the Licensee should perform a demonstration of satisfactory reactor coolant pressure control using the HPI system. This demonstration should be performed under the conditions of simulated or actual loss of normal offsite power, at a reactor coolant average temperature close to the normal operating temperature, but may be done using the normal letdown system to avoid unnecessary wear and tear on the safety valves. Such demonstration should be performed prior to restart and should be performed to the satisfaction of the Staff.

756. However, other than indicated by this requirement, the Board finds UCS' arguments regarding safety-grade requirements for pressurizer heaters and their controls as being unpersuasive. The Board agrees with

⁸⁵ "Solid" in this usage means filled with liquid water without a steam bubble in the pressurizer.

UCS that if these requirements were instituted there could be fewer future demands for operation of the emergency core cooling system. The Board agrees with this general philosophy of reducing demands on a safety system. However, the feed-and-bleed mode has not been shown to be an unacceptable way of cooling the core, and reactor coolant system pressure can be maintained by the HPI system. Consequently, and given a satisfactory demonstration of reactor coolant pressure control by the high pressure injection and letdown systems, UCS Contention 3 is rejected.

757. Before leaving the subject of pressurizer heaters entirely, the Board observes that UCS has testified that the feed-and-bleed cooling mode cannot be used to achieve cold shutdown conditions using safety-grade equipment because the reactor coolant system cannot be depressurized. UCS proposed finding ¶ 33. Late in the hearing we heard testimony on environmental qualification of equipment (Board Question, UCS-12) and considerable testimony on the subject of taking the plant from hot to cold shutdown. Tr. 21,861-22,087. On this latter subject, we note that there is a longterm requirement to provide by June 1982 an environmentally qualified way of achieving cold shutdown. Tr. 21,946 (Rosztochy). However, UCS is correct in that cold shutdown requires the use of the EFW system which will not be fully safety grade at the time of restart.

F. Connection of Pressurizer Heaters to Diesels

758. The following contention was advanced by UCS.

USC Contention No. 4:

Rather than classifying the pressurizer heaters as safety-grade, the staff has proposed simply to add the pressurizer heaters to the on-site emergency power supplies. It has not been demonstrated that this will not degrade the capacity, capability and reliability of these power supplies in violation of GDC 17. Such a demonstration is required to assure protection of public health and safety.

759. The NRC TMI-2 Lessons Learned Task Force recommended in NUREG-0578, TMI-2 Lessons Learned Task Force Status Report and Short-term Recommendations, that provision be made for connection to the on-site emergency power supply an adequate number of pressurizer heaters in order to maintain natural circulation in the hot standby condition. The Task Force further recommended that redundant heater and power supply capability be provided, that each redundant heater group have access to only one Class 1E division power supply, that the emergency power

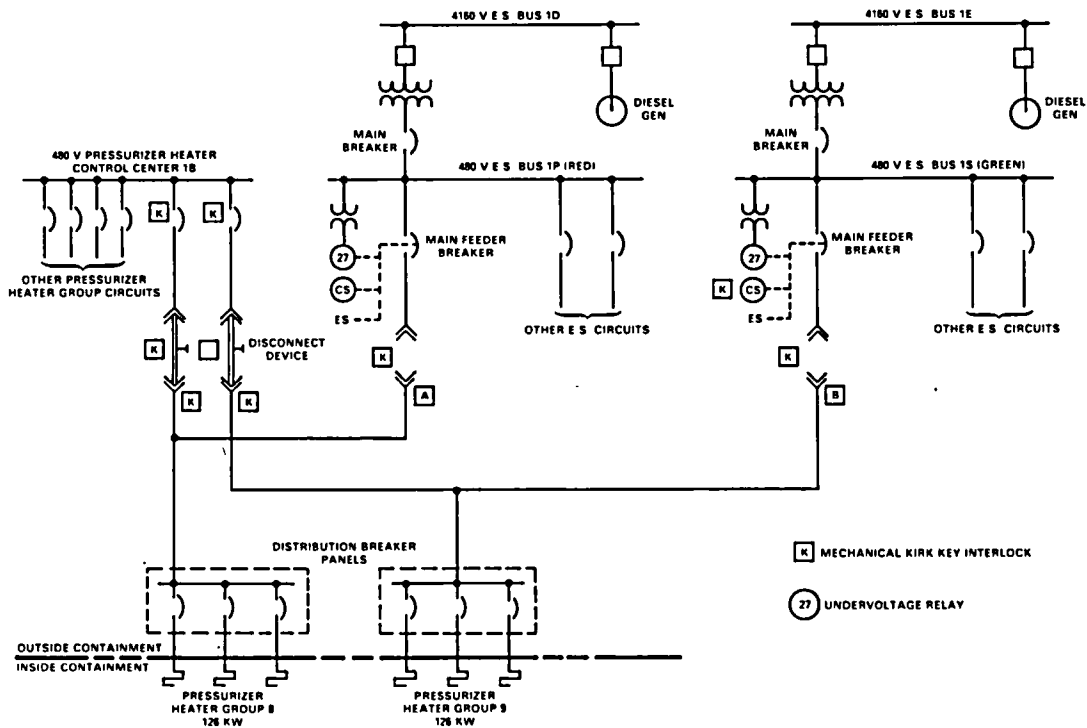
supplies need not have the capacity to provide power to the pressurizer heaters concurrent with the loads required to cope with a loss-of-coolant accident (LOCA), that the interfaces between Class 1E emergency power sources and the non-Class 1E pressurizer heaters be protected by devices that have been qualified in accordance with safety-grade requirements, and that the pressurizer heaters be automatically shed from the emergency power sources upon the occurrence of a trip signal to the engineered safety feature actuation system (ESFAS). Staff Ex. 1, at C8-3 and C8-6.

760. Testimony on this contention was presented by UCS (Pollard, ff. Tr. 9607), the Licensee (Torcivia and Shipper, ff. Tr. 9098), and the Staff (Fitzpatrick, ff. Tr. 9700).

761. The Licensee's witnesses, Joseph A. Torcivia and Paul J. Shipper, Jr., in their prefiled written testimony, testified that in response to the Staff recommendation in NUREG-0578 the TMI-1 design provides for manual connection by the operator, upon loss of off-site power, of one group of pressurizer heaters to one on-site emergency power source or a different group of pressurizer heaters to the other on-site emergency power source. Procedures are to be used that prevent the simultaneous connection of more than one heater group to the on-site emergency power supply and that assure that sufficient capacity exists at the time of connection to power the heater group without overloading the diesel. The Licensee's witnesses also testified that the TMI-1 design has appropriate means, including an ESFAS (engineered safety feature actuation system) trip, for automatically separating the non-Class 1E pressurizer heaters from the Class 1E emergency power sources to assure that the capacity, capability, and reliability of the on-site emergency power supply is not degraded. They stated that the design complies with GDC 17. Torcivia and Shipper, ff. Tr. 9098, at 2-8. A single-line diagram of these connections entitled Pressurizer Heater Circuits is included here to assist the reader in understanding the subject. (See p. 1272)

762. The UCS witness, Mr. Robert D. Pollard, in his prefiled written testimony, testified that the TMI-1 design described in the Licensee's Restart Report violates GDC 17 because a single failure of safety-grade equipment can result in the loss of both on-site power supplies. Pollard (UCS Contention 4), ff. Tr. 9607, at 4-2. He reasoned that this conclusion

DIAGRAM OF PRESSURIZER HEATER CIRCUITS
 (Source: Torcivia and Shipper, ff. Tr. 9098 at 9)



- K MECHANICAL KIRK KEY INTERLOCK
- 27 UNDERVOLTAGE RELAY

1272

is compelled because one on-site emergency power source must be assumed to be inoperable in accordance with the single failure criterion and the other must be assumed to fail because the pressurizer heaters are not safety-grade and the isolation device between the heaters and the power supply does not, in his view, satisfy the guidance of Regulatory Guide 1.75 (RG 1.75) (UCS Ex. 29). *Id.*, at 4-5 to 4-10. Thus he concludes that the design does not meet the Commission's regulations and that TMI-1 cannot be safely operated as designed. *Id.*, at 4-13.

763. The Staff's witness, Robert G. Fitzpatrick, in his prefiled written testimony, testified that connection of non-Class 1E electrical loads like pressurizer heaters to the Class 1E on-site emergency power supplies is not prohibited by NRC regulations and is acceptable to the Staff if the design guidance provided in RG 1.75 and Section 8.3.1 of the Standard Review Plan for making such connections is followed. He further testified that the TMI-1 design has been evaluated by the Staff and, as reported at pages C8-6 to C8-8 of NUREG-0680 (Staff Ex. 1), found to be in conformance with that guidance. Thus he concludes that connection of the pressurizer heaters to the on-site emergency power supply will not degrade the capacity, capability, and reliability of that power supply. Fitzpatrick, ff. Tr. 9700, at 3-5.

764. The Licensee rebutted Mr. Pollard's statements that a fault in the pressurizer heaters would result in a loss of the emergency power supply to which those heaters are connected because the TMI-1 design does not provide safety-grade isolation devices between the non-safety-grade heaters and the safety-grade on-site emergency power supply. Licensee's witness, Mr. Torcivia, described TMI-1 design provisions for preventing such an occurrence and indicated that the main feeder breaker for each heater group is a fully safety-grade isolation device. (See diagram: Pressurizer Heater Circuits). Tr. 9099-9111 (Torcivia); Torcivia and Shipper, ff. Tr. 9098. He also testified that, in his view, the failure scenario postulated by Mr. Pollard and discussed above would involve failure of not one but two safety-grade pieces of equipment (a pressurizer heater main feeder breaker and a diesel generator). Tr. 9120-22 (Torcivia). The Licensee also responded to Mr. Pollard's challenge of the capability of a diesel to reliably power the pressurizer heater loads that may be connected to it. Mr. Torcivia testified that procedures to be in effect at the time of restart will instruct the operators not to connect the pressurizer heaters to the emergency power supply unless the loads on it are at a level at which adding the pressurizer heater load would not cause the rated capacity of the diesel to be exceeded. Tr. 9122-24 (Torcivia). In addition, the Licensee presented testimony demonstrating that one diesel generator is able, without exceeding its rated capacity, to power the pressurizer heater load in addition to all the safety-related loads required to be powered by it following a loss of

off-site power, both with and without an accompanying small-break LOCA. Hartman and Torcivia, ff. Tr. 16,493. Mr. Torcivia also testified that the diesel generators are tested every month to verify their ability to operate at their rated capacities. Tr. 9130, 9175 (Torcivia).

765. In his rebuttal testimony, the UCS witness, Mr. Pollard, disagreed with the Licensee and Staff position that the TMI-1 design provisions for isolation of the pressurizer heaters from the emergency power supplies comply with GDC 17. He did not challenge the provisions for automatic separation of the heaters from the emergency power supply when an ESFAS signal occurs. His disagreement was based on his view that the guidelines of RG 1.75 are applicable to those situations involving the need to automatically isolate the heaters if they have been reconnected following an accident resulting in the tripping of the ESFAS. Tr. 9611-15 (Pollard). He argued that position C.1 of RG 1.75 which states that "[i]nterrupting devices actuated only by fault current are not considered to be isolation devices within the context of this document" is not satisfied by the TMI-1 design in that the main feeder breaker trip signal after reclosure following the occurrence of an ESFAS would be caused by fault current or the effects of fault current. Tr. 9611-16 (Pollard). However, he recognized that the writers of RG 1.75 did not foresee the situation involving reconnection of non-Class 1E loads after they had been isolated by the ESFAS. Tr. 9626 (Pollard).

768. The Staff's witness, Mr. Fitzpatrick, in his rebuttal testimony, disagreed with Mr. Pollard's view that RG 1.75 is applicable to situations involving reconnection of non-Class 1E loads to Class 1E buses after they have been automatically disconnected on the occurrence of an ESFAS. He testified that it has long been Staff practice to allow reconnection of such non-Class 1E loads to Class 1E power supplies if there is sufficient diesel capacity available and if the systems have stabilized following the transient which initiated the signal that automatically disconnected those loads. In Mr. Fitzpatrick's view, RG 1.75 does not address and thus does not apply to reconnection of non-Class 1E loads that have been automatically disconnected. Tr. 9701-03 (Fitzpatrick). Mr. Fitzpatrick also testified that even if RG 1.75 were to apply to such situations, he disagrees with Mr. Pollard's view that these guidelines would not be satisfied, because the main feeder breaker between the Class 1E bus and the non-Class 1E pressurizer heaters would open on undervoltage on the bus caused by a fault in the heaters and such undervoltage is not really owing to the fault current but is instead the result of the conformance of the electrical system involved to Ohm's law. Reliance on that result is not, in Mr. Fitzpatrick's view, impermissible. Tr. 9704-5 (Fitzpatrick).

766. However, on cross-examination by UCS, Mr. Fitzpatrick agreed with Mr. Pollard that it would not be permissible in accordance with RG 1.75 to reconnect the pressurizer heaters to the on-site emergency power supply after their automatic separation upon the occurrence of an ESFAS signal until stabilization has been achieved following the accident that caused the ESFAS signal. Mr. Fitzpatrick also indicated that he based his acceptance of the TMI-1 design provisions on the assumption that plant procedures would prevent such impermissible reconnections. Tr. 9717-9719 (Fitzpatrick).

767. With respect to the requirements of RG 1.75, the Board believes that Mr. Pollard is correct in his statement that the pressurizer heater main feeder breakers do not meet the provisions of RG 1.75 pertaining to isolation devices. UCS PF ¶ 98. The Regulatory Guide states that:

However, because the main breakers are in series with the fault and could experience momentary currents above their setpoints, it is prudent to preclude the use of interrupting devices actuated only by fault current as acceptable devices for isolating non-Class-1E circuits from Class-1E or associated circuits.

Breakers that trip on receipt of a signal other than one derived from the fault current or its effects (*e.g.*, an accident signal) are acceptable since the downstream circuits would already be isolated from their respective power sources under accident conditions and could pose no threat to these sources.

Id., UCS Ex. 29, at 1.75-2. Hence, reconnection of the heaters after receipt of the ESFAS signal would make tripping of these circuits dependent on either fault current or low voltage induced by the fault, a condition not considered "prudent" by the authors of this Regulatory Guide. (We reject the Staff witness' conclusion that the undervoltage trip is not really due to the overcurrent but is just in conformance with Ohm's law and, therefore, the Regulatory Guide is not interpreted by Staff to say that this effect cannot be used for protective devices. Tr. 9704-05 (Fitzpatrick). On this point we feel the Regulatory Guide is reasonably clear.) Moreover, as pointed out by Mr. Pollard, the design involves the connection of substantial non-safety-grade loads to emergency power supplies. UCS PF ¶ 74.

769. There are some competing interests and counter-arguments, however, which we should discuss. First, the drafters of RG 1.75 and its basis, IEEE Std 384-1974, probably did not foresee reconnection of non-Class 1E loads after isolation. Tr. 9626 (Pollard). The Board observes that the drafters probably assumed that, once isolated, the loads would remain so until power conditions returned to normal. Second, it seems to have long

been Staff practice (at least since the mid-1970's) to allow reconnection of such non-Class 1E loads to Class 1E power supplies if adequate diesel-generator capacity is available and if the systems have stabilized. Tr. 9701-03 (Fitzpatrick). In the absence of specific guidance in RG 1.75 on this matter, the Staff used the guidance contained in Standard Review Plan Section 8.3.1. Fitzpatrick, ff. Tr. 9700, at 4. Tr. 9718 (Fitzpatrick). This guidance permits the interconnections approved by the Staff. Third, the observation that the design does not meet the specific guidance of RG 1.75 does not mean that the design will not protect the emergency power equipment as intended. Both Staff and Licensee witnesses believe the pressurizer heater main feeder breakers meet safety-grade requirements. Fourth, one of the TMI-2 accident lessons-learned recommendations was that provision be made for connection of heaters to the diesel generators to "establish and maintain circulation at hot standby conditions." Staff Ex. 1, at C8-3. Finally, Regulatory Guides are issued, as explained on the first page of each Guide, to describe methods acceptable to the NRC Staff. Methods and solutions different from those set out in the Guides will be acceptable under certain conditions. In the specific case of TMI-1 pressurizer heater connections, the Staff itself has sought guidance beyond the Regulatory Guides. We find no fault with this procedure.

770. After review of the record on this matter, the Board is of the opinion that the views of Staff and Licensee should hold sway. We conclude that, subject to the conditions and required demonstration described below, the Licensee has shown that the desired pressurizer heater loads can be connected to the on-site emergency power supplies without degrading the capacity, capability, and reliability of these power supplies.

771. Prior to restart of TMI-1, the Staff shall verify that the plant procedures include provisions to assure that desired pressurizer heater loads will not be reconnected to the on-site power supply after they have been automatically separated until stabilization has been achieved following the event that caused their disconnection.

772. We direct the Licensee to demonstrate in a test the connection and energization of the pressurizer heaters from the emergency buses. The test shall be conducted under conditions which might reasonably be expected at the time such connection would be desirable. The test shall be monitored and the results evaluated by the Staff.

773. The Board concludes that, when the conditions specified above are met satisfactorily, the issue of connection of pressurizer heaters to the diesel generators will have been resolved. The underlying safety concerns raised by UCS Contention 4 are thus answered.

G. Valves

774. The following contention advanced by UCS was:

UCS Contention No. 5:

Proper operation of power operated relief valves, associated block valves and the instruments and controls for these valves is essential to mitigate the consequences of accidents. In addition, their failure can cause or aggravate a LOCA. Therefore, these valves must be classified as components important to safety and required to meet all safety-grade design criteria.

775. As a preliminary matter, we note that both Licensee and Staff in their reply finding on plant design and modification issues urge us to reject much of the UCS proposed findings of fact on UCS Contention 5 because of the extensive reference to NUREG-0578, a document not introduced into evidence in this proceeding. Licensee reply PF ¶ 77; Staff Reply PF ¶ 6. Licensee would limit our consideration to Table B-1 since that table contains the recommendation referred to in the Commission's August 9, 1979 order noticing this proceeding. We reject such a limitation. Table B-1 has only titles and references to the text; the table is meaningless without a reading and understanding of the basis for the recommendations. We therefore take official notice of NUREG-0578, not for the "facts" therein but rather for the reasoning behind the task force recommendations. No party will be prejudiced by this action. Having made these observations, we will now discuss the merits of Contention No. 5.

776. The PORV and two safety valves are connected to the top of the pressurizer. See Licensee Ex. 17. All three valves are designed to open if reactor coolant system pressure increases to their respective setpoints, thereby releasing steam and/or water from the reactor coolant system and limiting further pressure increase. As the reactor coolant system pressure decreases, the PORV and safety valves are designed to reclose. The PORV is electrically controlled by an actuation signal derived from a measurement of reactor coolant system pressure and in addition to its normal automatic opening and closing can be remote manually operated with a keylock switch in the control room. The safety valves are opened by reactor coolant system pressure acting directly on the valves. Pollard, ff. Tr. 9027, at 5-2, 5-3; Tr. 8917-18 (Zudans); Tr. 8933 (Correa); Tr. 9013 (Urquhart).

777. Testimony on this contention was given by UCS (Pollard, ff. Tr. 9027), the Licensee (Correa, *et al.*, ff. Tr. 8746), and the Staff (Jensen, ff. Tr. 8821).⁸⁶

778. The original design function of the PORV was to provide a pressure relief capability which, in conjunction with plant control system actions to reduce reactor power and/or adjust steam generator feedwater flow, would prevent a reactor trip on reactor system coolant high pressure during various operational transients.⁸⁷ In this manner, generating unit availability would be improved. The relief capability of the PORV was not designed to fulfill a safety function. The high pressure trip function of the Reactor Protection System and the pressurizer safety valves provide the required over-pressure protection for the reactor coolant system. The reactor protection system and the pressurizer safety valves are safety-grade equipment. Correa, *et al.*, ff. Tr. 8746, at 2, 3 (Jones).

779. The opening of the PORV and its failure to reclose when reactor coolant pressure dropped were key factors in the TMI-2 accident. In addition, for several hours the operator failed to detect the open PORV and terminate the loss-of-coolant accident by closing the block valve. As a result of these events, the Commission has directed that certain generic improvements or upgrading be made to the PORV, the block valve and the instrumentation and controls for these valves. Pollard, ff. Tr. 9027, at 5-1. (These improvements are discussed further below.)

780. Since the TMI-2 accident the setpoints for PORV actuation and high pressure reactor trip have been inverted as follows. In the original design and operation of TMI-1, the opening pressure for the PORV was 2255 psig and the high pressure reactor trip setpoint was 2355 psig. These setpoints are now 2450 psig and 2300 psig, respectively. As a result, actuation of the PORV is not now expected during operational transients provided that main or emergency feedwater is delivered to the steam generators in a timely manner. Thus, the frequency of PORV actuation has been reduced. Correa, *et al.*, ff. Tr. 8746, at 3 (Jones). The Staff concluded that this change significantly reduces the likelihood of automatic PORV actuation. Staff Ex. 1, at C2-11.

781. According to Licensee witnesses, the PORV is fully qualified (*i.e.*, to GDC 1, 14, 15 and 30) as a reactor coolant system pressure boundary device. Tr. 8770, 8779, 8005-06 (Urquhart). Despite this, there are still

⁸⁶ A qualification testing program which is in progress for relief and safety valves is related to UCS Contention 5. This subject, withdrawn as a UCS Contention, was adopted as a Board Question, and is discussed in Section R, below.

⁸⁷ The chief transient the plant was designed to handle without a reactor trip was a turbine trip. A direct, anticipatory reactor trip on turbine trip has now been installed at TMI-1, as recommended by the Director of NRR and referred to in the Commission's Order and Notice of Hearing. Tr. 8773-74 (Jones); Staff Ex. 1, at C1-12, C2-12 to C2-14.

circumstances where the PORV can be actuated and potentially remain open, creating or aggravating a loss-of-coolant accident, as asserted in UCS Contention 5. Correa, *et al.*, ff. Tr. 8746, at 3 (Jones); Jensen, ff. Tr. 8821, at 4. We now address the questions of the probability of failure of the PORV in the open position and of the ability to safely mitigate these failures.

782. UCS correctly notes that the Staff concluded on the basis of PORV failure statistics that the probability of a small-break LOCA caused by valve failure in a B&W plant was considerably higher than the probability of a small-break LOCA caused by pipe rupture. UCS PF ¶¶ 161, 162; Board Ex. 4, at 3-3. Indeed, PORV failure to close when called on to do so was one of the causes of the TMI-2 accident.

783. These statistics, of course, predate the post-TMI-2 modifications which required inverting the setpoint of the PORV and the reactor trip and adding additional reactor trip signals. The Staff expressed its belief that these changes have reduced the frequency of PORV challenges. Board Ex. 4, at 3-6. Experience since the accident bears this out. We note, however, as does UCS, that these modifications do nothing to reduce the rate of inadvertent PORV openings from control system failures or the rate at which PORVs, once opened for any reason, will fail to reclose. UCS PF ¶ 163.

784. The Staff found that it was not possible to make a quantitative judgment of the frequency of future PORV actuations and therefore called for additional analyses directed toward answering this question. Board Ex. 4, at 3-6. This was endorsed by the Commission in NUREG-0737 and translated into the requirements contained in items II.K.2.14 (Lift Frequency of PORV and Safety Valves) and II.K.3.7 (Evaluation of Power Operated Relief Valve Open Probability During Overpressure Transient). Staff Ex. 12, at II.K.2.14-1 ff. In brief, the Licensee will demonstrate that the PORV will lift in less than 5 percent of overpressure transients. This demonstration has not yet been made, although as we note in our discussion on Board Question 2, Section S, *infra*, the Licensee has made reasonable progress toward complying with this item. *Id.*, at II.K.2.14-3; Tr. 21,325, 21,441 (Jacobs); Tr. 21,438 (Silver).⁸⁸

785. The defense in depth principle, a regulatory cornerstone of the AEC and now the NRC, requires both that the probability of a LOCA be kept low and also that adequate protection to mitigate a LOCA be provided. This reflects the recognition that it is not desirable to place a reactor into conditions requiring use of emergency systems. Repeated

⁸⁸ Contrary to the position of NRC Staff Counsel in the cover letter to Staff Exhibit 12, the Board does not regard item II.K.2.14 to be "outside the content" of the Commission's hearing orders in this proceeding.

challenges to emergency systems are unacceptable. Both aspects of this defense in depth policy are reflected in the General Design Criteria (GDC), Appendix A, 10 CFR Part 50. For example, GDC 14 requires that “[t]he reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an *extremely low probability* of abnormal leakage, of rapidly propagating failure, and of gross rupture” (emphasis added), while other GDC such as 35, 36 and 37 set forth the requirements for ECCS design and performance. The existency of ECCS does not in any way relax the extremely strict requirements for integrity of the reactor coolant pressure boundary. Pollard, ff. Tr. 9027, at 5-6 and 5-7.

786. The Board agrees with UCS’ general comments in the paragraph above regarding the defense in depth principle and repeated challenges to emergency systems. We also note with interest the words quoted from GDC 14 regarding extremely low probability of abnormal leakage from the reactor coolant boundary. Given a hindsight look at the TMI-2 accident and at PORV performance, given Staff’s position which “requires that the safety and relief valves function as expected during design transient and accident conditions” (Zudans, ff. Tr. 8824, at 4), and given the words of GDC 14, one could easily reach the same conclusion as UCS that these valves must be classified as components important to safety and required to meet all safety-grade design criteria. However, TMI-1 is a plant which has been fully operational for more than 4 years and is now being modified on the basis of TMI-2 experience. It is not one which currently is evolving on the drawing board. Again as this Board notes in the paragraph above, the modified plant probably is not the same as if one were to set out to design a new plant of the basis of present-day knowledge. Moreover, if it is decided that the current arrangement of PORV and its block valve does not meet the requirements of GDC 14, then the Commission could specify changes in design or, specify operation with the block valve closed and de-activated. The Board does not recommend either of these options since it seems to the Board that the Staff has made a reasonable interpretation of the regulatory requirements by specifying documentation — “that the PORV will open in less than 5% of all anticipated overpressure transients —” (Staff Ex. 12, at II.K.2.14-1), in addition to the other requirements discussed below.

787. Turning now to mitigation of PORV-induced LOCAs, analyses have been performed to demonstrate that these transients involving a stuck-open PORV can be safety mitigated (as defined by 10 CFR 50.46) with the emergency core cooling system. These analyses included both a stuck-open PORV case (*i.e.*, the PORV causes a LOCA), and an accident in which a small-break LOCA occurs simultaneously with a loss of all feedwater and results in a subsequent stuck-open PORV (*i.e.*, the PORV aggravates a LOCA). Correa, *et al.*, ff. Tr. 8746, at 3 (Jones); Jensen, ff.

Tr. 8821, at 4, 5. In addition, the B&W small-break LOCA analyses do not rely on the PORV or its block valve to mitigate the accident. Jones and Broughton, ff. Tr. 5039, at 14; Tr. 5254-55 (Jones). Consequently, proper operation of the PORV, its associated block valve, instruments and controls is not required to mitigate the consequences of design basis accidents. Jensen, ff. Tr. 8821, at 3.

788. Nevertheless, there have been several changes made at TMI-1 to enhance the operator's ability to recognize and terminate a transient caused by a stuck-open PORV. Specifically, an accelerometer which senses discharge line flow and discharge line flow measurement instrumentation is being provided. These, along with PORV position demand indication and PORV discharge line temperature measurement, will provide additional assurance that PORV position will be recognized. Correa, *et al.*, ff. Tr. 8746, at 3, 4 (Jones). *See also*, Staff Ex. 1, at C8-11 to C8-14; Staff Ex. 14, at 26, 27. Thus, a stuck-open PORV accident would be terminated by closure of the block valve, which is an immediate action to be taken by the operator in the event of a small-break LOCA. Even if the block valve were not isolated, as discussed above, the capability of the ECCS is sufficient to permit safe shutdown of the reactor with no core uncover or core damage. Jensen, ff. Tr. 8821, at 4.

789. The PORV and block valve have power supplied by the emergency power system. Correa, *et al.*, ff. Tr. 8746, at 4 (Jones); Staff Ex. 14, at 24. This provides the capability for closing the block valve upstream of the PORV in the event of a stuck-open PORV and loss of off-site power. Correa, *et al.*, ff. Tr. 8746, at 4 (Jones). The PORV is designed to close upon loss of power. Tr. 8765, 8769 (Correa).

790. UCS witness Pollard asserts, as another reason for upgrading the PORV and block valve to safety-grade, that during low temperature operation (such as start-up, shutdown, and recovery from accidents) the PORV performs a safety function — *i.e.*, protection against overpressuring the reactor vessel. Pollard, ff. Tr. 9027, at 5-10, 5-11. While the PORV opening setpoint is set at a low pressure when the reactor coolant system is in low temperature operation, the HPI system is de-activated at this time. The licensing basis for mitigating transients in this mode therefore was operator action — *i.e.*, it is assumed that there are more than ten minutes available for the operator to terminate an overpressure transient at low temperatures. The PORV serves only as a back-up to the operator action, and its use was not given credit as a licensing basis for TMI-1. Tr. 8756 (Jones).

791. Mr. Pollard also argued that the "bleeding" function in the feed and bleed cooling mode is a safety function, and that "[w]hile it may be true that the safety valves can be relied on during bleed and feed, their use has significant disadvantages compared to use of the PORV," so that the

PORV should be safety-grade. Pollard, ff. Tr. 9027, at 5-15, 5-16. While Licensee will use the PORV for feed-and-bleed cooling if it is available, reliance is placed on the safety valves only. The analyses that have been performed to demonstrate the capability of feed and bleed cooling have been done using the safety valves only, which are safety-grade, and not the PORV. Tr. 8761 (Jones). It is the pressurizer safety valves which perform the critical safety function during feed-and-bleed cooling. The PORV is not required. The Board has already noted the importance to safety of the feed-and-bleed mode using the safety valves (Section E above), and in view of Board comments there, agrees with the Licensee in this matter, UCS witness Pollard also stated that use of the PORV to depressurize the reactor coolant system under inadequate core cooling conditions is a safety function for which no alternative using safety-grade equipment is available. Pollard, ff. Tr. 9027, at 5-17. While using the PORV is a way of depressurizing the plant, depressurizing with the operative steam generator is another way. Tr. 8761-62 (Jones) (See also ¶ 757 above). In sum, procedures have been developed for coping with inadequate core cooling conditions without dependence on the PORV. The Board feels that the PORV must be considered to be possibly useful equipment for depressurizing under these conditions but not to be required for safety reasons.

792. Therefore, in the Board's view, contrary to UCS' contention, proper operation of the PORV and associated block valve, and the instruments and controls for these valves is not required to mitigate the consequences of design basis LOCAs and, although the failure of the PORV can create or aggravate a LOCA, the consequences of such an accident can be safety mitigated by safety-grade equipment. The Board finds, therefore, that the PORV and its block valve should not be required to meet all safety-grade design criteria, except for those applicable to their role as a part of the reactor coolant system pressure boundary. For the reasons presented above, the Board agrees that the NRC-imposed requirements for the PORV and block valve are both necessary and sufficient to provide reasonable assurance that the public health and safety will not be endangered by the operation of TMI-1.

H. Integrated Control System

793. Intervenor Steven C. Sholly advanced the following contention:

Sholly Contention 6.a:

It is contended that the short-term actions identified in the Commission's Order and Notice of Hearing dated 9 August 1979 are insufficient to provide the requisite reasonable assurance of operation

without endangering public health and safety because they do not include the following items:

a. Completion of a failure mode and effects analysis (FMEA) of the Integrated Control System.

794. The Commission, in its August 9, 1979 Order and Notice of Hearing in this matter and in its confirmatory shutdown orders issued to all licensees owning B&W reactors, required as a long-term action the submittal of a failure modes and effects analysis (FMEA) of the integrated control system (ICS) to the NRC Staff as soon as practicable. D. Ross, ff. Tr. 15,855, at 3; 10 NRC 141, 145 (1979).

795. Sholly Contention No. 6.a, on its face, would require the completion of the FMEA prior to restart of the unit (*i.e.*, as a short-term action). B&W's report, Integrated Control System Reliability Analysis (Licensee Ex. 18), a portion of which consists of a failure modes and effects analysis of the ICS responsive to the Commission Order, was submitted to the Staff on August 17, 1979 and was later determined to be applicable to TMI-1. D. Ross, ff. Tr. 15,855, at 3. Therefore, the relief requested in Sholly Contention 6.a, *i.e.*, that an ICS FMEA be completed prior to restart, has been granted. However, compliance with the order requires a demonstration that the analysis and the recommendations are adequate and that the Licensee has made reasonable progress in fulfilling the recommendations. Mr. Sholly's contention goes to that issue.

796. Prior to addressing the concerns which gave rise to the performance of the ICS FMEA, the Board believes it would be helpful first to examine the functions performed by the ICS. The basic purpose of the ICS is to match the unit's power generation to power demand via a feed-forward control system and to assist in increasing the unit's generating capacity by preventing reactor trips for many anticipated plant upsets (*i.e.*, load changes, loss of a single reactor coolant pump, etc.). Broughton, *et al.*, ff. Tr. 6949, at 2; Thatcher, ff. Tr. 7122, at 2, 3.

797. The TMI-1 ICS is composed of five subsystems: the unit load demand control, the integrated master control, turbine control, steam generator control and reactor control. The unit load demand control serves as an interface between the operator and the integrated master control; the operator inputs to the unit load demand control the demand for megawatts electric required from the nuclear steam supply system (NSSS). The unit load demand control then signals this power demand information to the integrated master control. The unit load demand control also senses operating conditions that limit power production (*i.e.*, status of the reactor coolant pumps); these limiting conditions would cause the unit load demand control to decrease the operator demand, if necessary. The integ-

rated master control, in turn, processes this information to determine the output required by three separate component systems: turbine control, steam generator control and reactor control. The turbine control manipulates the atmospheric dump valves, turbine throttle valves and the turbine bypass valves in order to control steam pressure at a constant value. The steam generator control manipulates the startup and main feedwater valves and the main feedwater pumps in order to control the flow of water to the steam generators.⁸⁹ The function of the reactor control is to control the regulating rod groups in the reactor core by issuing a signal to the control rod drive system to insert or withdraw rods from the core, thereby controlling neutron flux. Broughton, *et al.*, ff. Tr. 6949, Figure 1; Tr. 6950-59 (Joyner). The control system thus provides limiting actions to ensure proper relationships between generated power, steam pressure, feedwater flow and reactor power. Thatcher, ff. Tr. 7122, at 3.

798. The ICS, as described above, receives information from various sensors throughout the plant such as temperature, flow, pressure, reactor power, steam generator level. These are the input signals. The ICS processes this information by comparing the input information on level, pressure, etc., with the desired pressure, temperature, etc., and sends signals to valves, motors, and control rods to move in such a way that the desired and measured levels match. Tr. 6951-59 (Joyner). The ICS is the unit that receives signals from sensors, processes the signals and sends output signals to controllers. The sensors and controllers are not part of the ICS. The boundary of the ICS was so defined by the Licensee in BAW-1564 (Licensee Ex. 18), and was agreed to by the Staff. Tr. 7126 (Thatcher). Mr. Sholly, for reasons that we will address later, would have us include the sensors and controllers as part of the ICS. We decline. The need for an FMEA was agreed to by headquarter NRC Staff and Licensee whom this Board relies upon for defining the scope of the analysis.

799. The ICS *is* a control system — not a safety system. The basic function of the ICS is matching megawatt generation to unit load demand. Licensee Ex. 18, at 4-3. The ICS was designed strictly to be a non-safety system and does not meet the single failure criterion or physical separation and electrical isolation criteria. *Id.*, at 4-2. Single failures in the ICS can lead to a mismatch between power generated and power extracted and hence to overheating or overcooling of the reactor coolant system. Such transients usually result in actuation of the reactor protection system and/or other safety system. Occasional challenges to the safety systems are to be expected — frequent challenges do have adverse safety significance since safety systems have a statistical probability of failure, even if small.

⁸⁹ Following a reactor trip, if main feedwater is not available, the ICS is capable of automatically supplying emergency feedwater to the steam generators. Tr. 7104 (Broughton).

800. The usefulness of a reliability and FMEA is in identifying components of the ICS which lead to unnecessary challenges to the safety systems so that these challenges can be minimized. As with any control system there is always the possibility of more subtle and more serious interactions between the control and safety systems. There have been many instances of failures in control systems which produce a transient and at the same time disable the safety system which is designed to protect against the transient. Such interaction between control and safety are a major concern of the NRC and is listed among the Unresolved Safety Issues, Task A-47.⁹⁰ An FMEA is of limited value in uncovering control-safety interactions. Sholly Ex. 2, at 3 and 4.

801. We turn now to the bases for the inclusion of the ICS FMEA requirement in the Commission's August 9, 1979 Order. Following the TMI-2 accident, the Staff undertook a study of the sensitivity of B&W reactors to feedwater transients and the role that control and safety equipment might play in such a transient. The preliminary results of this study raised the following concerns with respect to the ICS:

- (1) Was the reliability of the ICS satisfactory?
- (2) The failure modes and effects of the ICS had not been systematically analyzed.
- (3) The ICS may initiate 10-15 percent of all feedwater transients.
- (4) The ICS controls the emergency feedwater system in some plants and could thus contribute to a total loss of feedwater.
- (5) Even when the ICS works well, there may be, in response to a feedwater transient, wide swings in reactor pressure, pressurizer level, and average reactor coolant temperature.

D. Ross, ff. Tr. 15,855, at 1, 2.

802. In view of the concern regarding the possibility that an ICS failure could lead to a loss of emergency feedwater (EFW), the Director of NRR recommended, as a short-term action, that Licensee develop and implement operating procedures for initiating and controlling EFW independent of ICS control. Short-term action 1(b), Commission Order and Notice of Hearing, CLI-79-8, 10 NRC 141, 144 (1979). Pursuant to this requirement, Licensee will implement, prior to restart, automatic initiation

⁹⁰ 1980 Annual Report, USNRC, at 45. See also our finding on Board Question 3 concerning the IREP studies.

of the EFW pumps,⁹¹ which is completely independent of the ICS and, further, will provide separate manual EFW flow control capability in the control room, which will allow the operators to manually control EFW flow to the steam generators in the event of an ICS malfunction. The NRC Staff has reviewed Licensee's designs for these modifications and has concluded that Licensee has met the requirements for this short-term item. D. Ross, ff. Tr. 15,855, at 6; Staff Ex. 1, at C1-1, C1-11. Additionally, Licensee has committed, as a long-term action, to provide a safety-grade automatic steam generator level control system for EFW independent of the ICS. The reliability of the EFW system was the subject of Board Question 6, Section Q, *infra*. Complete separation of the EFW system from the ICS was an important consideration during the review of that question. However the actions described above meet the short-term recommendation 1(b) of the Commission's order and will provide a significant improvement in safety. These short-term and long-term actions are identical to those approved by the Staff for the other B&W operating reactors. Ross, ff. Tr. 15,855, at 6; Staff Ex. 1, at C1-12. The Board, therefore, concludes that these actions taken by Licensee meet the short-term requirement in the Commission's Order and will alleviate the Staff's concern regarding the effect of the ICS upon EFW operability.

803. On the basis of the concerns raised by the Staff, B&W agreed, in a formal submission to the Staff dated April 28, 1979, to perform a reliability study of the ICS. Ross, ff. Tr. 15,855, at 2, 3; Sholly Ex. 2, App. B, at 29. The study agreed to by B&W and the Staff was to include: (1) a survey of the field performance of the ICS, (2) a failure modes and effects analysis of the ICS, and (3) B&W recommendations for improvements based on the study. Tr. 7050-51 (Joyner); Sholly Ex. 2, App. B, at 29.

804. Pursuant to its agreement, B&W submitted BAW-1564, Integrated Control System Reliability Analysis (Licensee Ex. 18), consisting of both an FMEA and an operating experience review of the ICS, to the Staff on August 17, 1979. Thatcher, ff. Tr. 7122, at 5; Ross, ff. Tr. 15,855, at 3. Licensee has reviewed the B&W generic ICS study, by comparing the inputs, outputs and functional description of the system as described in BAW-1564 to the existing system at TMI-1, and has deter-

⁹¹ The original EFW system design provided an automatic initiation of the turbine-driven pump; as modified, the turbine-driven pump and both motor-driven pumps will be provided with automatic start signals. Licensee Ex. 15, at 6.

mined that the study is applicable to the TMI-1 ICS. Broughton, *et al.*, ff. Tr. 6949, at 3; Thatcher, ff. Tr. 7122, at 5; Ross, ff. Tr. 15,855, at 3; Tr. 7011-12 (Broughton).

805. The failure modes and effects analysis of the ICS (Section 4 of Licensee Exhibit 18) was performed according to the guidance of IEEE Standard 352 in order to determine the effects upon the nuclear steam supply system from *single failures* of ICS inputs, outputs and internal modules. In order to analyze the failures which would cause the most drastic transient, each input and output to the ICS was assumed to have failed high and low. (An input high failure would be the maximum transmitter output, a low failure would be the minimum transmitter output; for the ICS outputs, high would be the output signal that fully opened valves, caused pumps to reach maximum speed, pulled control rods, etc., while the low failure would cause the opposite of these actions.) Tr. 6963-66 (Joyner); Licensee Ex. 18, at 4-19, 4-20.

806. In addition to considering ICS input and output failures, B&W developed a functional block diagram of the ICS (Licensee Ex. 18, Figure 4-3) and analyzed high and low failures of each major functional point of the ICS. (The high and low failures of the functional blocks are similar to those for ICS outputs. A high failure will cause final control elements such as feedwater valves and pumps to open or increase speed, while a low failure would cause the valves and pumps to close or decrease speed.) Tr. 6964-65 (Joyner); Licensee Ex. 18, at 4-4, 4-20.

807. Licensee Exhibit 18 also includes a review of ICS operating experience. Reactor trip data from each operating B&W reactor (including TMI-1) were analyzed and sorted on the basis of initiating events. Six major categories of initiating events were identified: ICS response; ICS internal failures; ICS input failures; ICS actuated equipment failures; operator/technician action; and other-plant events, usually balance-of-plant (BOP) failures. Tr. 6965 (Joyner); Licensee Ex. 18, at 5-1, 5-2. The operating data showed the ICS hardware failures caused only a small percentage of reactor trips (6 out of 310 trips or 1.9 percent), while operator/technician actions and failures in BOP equipment accounted for the majority (two-thirds) of the trips experienced at B&W reactors. Licensee Ex. 18, Figure 5-1 at 5-18. Further, data available from one plant demonstrates that the ICS performed some 47 successful "runback" operations (preventing reactor trips) compared to 37 trips (from all causes) experienced during 5.5 years of operation, thereby enhancing plant operability and reducing challenges to plant safety systems. Licensee Ex. 18, at 2-2, 5-6, Tables 5-7 at 5-14.

808. Mr. Sholly, in his proposed findings ¶¶ 31, 32 and 33, also relying on Licensee Ex. 18, finds considerably higher failure rates. However, as he notes in proposed finding ¶ 31, the differences are largely due to the difference in the definition of ICS boundary. As explained above, we adopt the Staff and Licensee definition.

809. In reply finding ¶ 22 Mr. Sholly notes that Table 5-8 of Licensee Ex. 18 shows that 47 hardware failures in ICS systems led to 6 reactor trips; *i.e.*, 12.8 percent of the failures produce trips. We can't disagree with his calculations, nor can we attach much relevance to them. The fact remains, of 310 reactor trips, only 6 were due to ICS malfunctions. Whatever merits and demerits the ICS system possesses, challenges to the reactor protection system from this cause are relatively rare.

810. On the basis of the FMEA and the analysis of ICS operating experience, B&W concluded that: the reactor core remains protected throughout any of the ICS failures studied and the safety systems operate independently of the ICS malfunctions; and, as we note above, the ICS hardware performance has not led to a significant number of reactor trips (6 trips out of a total of 310 trips analyzed) and, indeed, has prevented more reactor trips than it has caused. Broughton, *et al.*, ff. Tr. 6949, at 3; Thatcher, ff. Tr. 7122, at 5; Licensee Ex. 18, at 2-1, 2-2, 5-6. The only event identified in the FMEA which could potentially cause a loss of main and emergency feedwater is an NNI/ICS⁹² power supply failure or malfunction. Ross, ff. Tr. 15,855, at 8; Licensee Ex. 18, at 5-7. Mitigative measures for this event being undertaken by Licensee as described below.

811. The FMEA identified a number of generic improvements to systems or components which interface with the ICS and recommended that these improvements be evaluated by B&W owners on a plant-specific basis. Licensee Ex. 18, at 3-1. The Licensee has made such an evaluation for TMI-1. Broughton, *et al.*, ff. Tr. 6949, at 3. The prefiled testimony of Licensee's witnesses gave no details of the proposed modifications to be implemented at TMI-1; they referenced the Licensee's restart report for details. However, in response to questions by the Board and other parties, much of the information was elicited. Tr. 6950-7118 (Broughton).

812. The Licensee's response to the FMEA recommendations has been reviewed by the Staff. The staff's review was summarized as follows:

The licensee has: (1) committed to modify the electrical distribution systems to the ICS to ensure that the operator can take prompt action to minimize the consequences of a failure in the normal power supply, (2) committed to investigating other modifications which

⁹²NNI - non nuclear instrumentation.

would increase the reliability of the ICS power supply, (3) described actions taken at TMI to minimize feedwater oscillations and (4) described procedures and operator training for operation of the ICS.

In its review of the licensee's response to the B&W recommendations, the staff has not identified any ICS related malfunctions that cannot be adequately mitigated by plant safety systems. Based on the licensee response to B&W recommendations and its commitments, [the staff finds] that the licensee's response to date constitutes reasonable progress towards completion of this long-term item, and therefore the licensee is in compliance with this part of the Order. Further progress on this item will be monitored in accordance with the provisions of NUREG-0737, Item II.K.2.9.

Staff Ex. 14, at 49.

813. It is the position of Staff and Licensee that the evidence cited above demonstrates that the reliability and failure modes and effects analysis included in Licensee Ex. 18 is an adequate response to the Staff's concerns and that the commitments by the Licensee to implement the B&W recommendations are sufficient to meet the requirements of the Commission's August 9, 1979 Order. Mr. Sholly argues that FMEA was inadequate in that the ICS system was too narrowly defined and that the analysis did not look deeply enough into control-safety systems interaction. Sholly PF ¶¶ 30, 31, 64.

814. In support of his position, Mr. Sholly produced an ORNL report entitled, Review of Babcock & Wilcox Report, Integrated Control System Reliability Analysis, BAW-1564, Aug. 1979. The report was authored by three engineers from Oak Ridge National Laboratory (ORNL) and three engineers from Science Applications, Inc. (SAI). Sholly Ex. 2. The ORNL review was done at the request of the NRC Staff. Tr. 7257-58 (Thatcher). A draft of the report was submitted to NRC Staff on December 4, 1979. Sholly Ex. 2, cover letter. The NRC Staff reviewed the draft and submitted comments to ORNL. Tr. 7260-61 (Thatcher). The final report was transmitted on January 21, 1980. Sholly Ex. 2, at 2.

815. Mr. Sholly has called to our attention the fact that the notice for this hearing pointed out that "B&W designed reactors appear to be unusually sensitive to certain off-normal transient conditions . . ." Among the features that contribute to this sensitivity is "reliance on an integrated control system (ICS) to automatically regulate feedwater flow; . . ." And finally "[b]ecause of these features, B&W designed reactors place more reliance on . . . the integrated control system . . . to recover from frequent

anticipated transients . . . than do other PWR designs". 10 NRC 141 at 142-43. We recognize that such concerns were the basis for many of the items in the Commission's Order including the one regarding the FMEA.

816. The ORNL report is, in part, highly critical of the B&W FMEA. Other parts of the report are relied upon by the Licensee and Staff in support of their position that the B&W report, plus the Licensee's commitments, have met the requirements of the Commission Order. In order to understand how this can be, we have had to study carefully the scope and basis of the ORNL report. First of all it is clear that the NRC Staff did not provide specific guidance to ONRL but they did supply a copy of NUREG-0560.⁹³ Tr. 7247 (Thatcher).

817. NUREG-0560 was the report of a task force organized soon after the TMI-2 accident. The task force recommendations, eighteen in total, covered plant design, operations and licensing. Sec. 8.2.3 addressed plant control systems and made a number of recommendations; one of these was paraphrased, broken into four parts and cited in the introduction to the ORNL Report as concerns to be addressed in an FMEA. The paraphrased concerns follow:

- (a) The role of control systems (in this case the ICS) and their significance to safety.
- (b) The rate at which transients initiated by control failures challenge the plant safety systems.
- (c) The rate at which transients initiated outside the control system are not successfully mitigated by the control system.
- (d) Identification of realistic plant interactions resulting from failure in nonsafety systems, safety systems, and operator actions. (Failure modes and effects analysis is indicated.)

818. It appears that the basis for ORNL criticism of the B&W FMEA was failure to meet the above concerns. Section 2 of the ORNL review reads as follows:

The B&W analysis submitted in response to the NRC orders deals only narrowly with the ICS itself and not at all with the plant systems it controls and with which it interacts. With note of the concerns expressed and the guidance given in the NRC orders, the B&W analysis is more notable for what it does not include than for what it does include. With reference to the "Executive Summary" of the NRC orders, the B&W analysis does not deal with interactions or

⁹³ NUREG-0560, Staff Report on the Generic Assessment of Feedwater Transients in Pressurized Water Reactors Designed by the Babcock & Wilcox Company, May 1979.

with transients, except those that might be initiated by limited signal or component failures (one at a time) within the ICS. Neither does the report deal with mitigating systems such as HPI, as suggested. In fact, consideration of all events is concluded with reactor trip; interactions with ECCS are not mentioned, even though to some extent the ICS (auxiliary feedwater) is a part of the ECCS.

The significance of the ICS to safety (item a) is not addressed.

The rate at which transients initiated by control failure challenge the plant safety systems (item b) is dealt with only to a limited extent. Only control failures within the ICS cabinets are considered, and then only to reactor trip. No significant control, instrument, or power failures external to the ICS cabinets are considered, even though several such failures have occurred in operating plants.

Transients initiated outside the control system (item c), whether or not successfully mitigated by the ICS, are not addressed, except in tabulations of operating experience.

Identification of interactions (item d) resulting from failures in safety or nonsafety systems or operator actions is notably absent.

Also notably absent is any consideration of the sensitivity of the B&W plant design to feedwater transients, to performance—either normal or abnormal—of the ICS, or to reliance on the pilot-operated relief valve for successful maneuvering.

In summary, the report deals only with a very limited scope of failures, essentially within the ICS cabinets; the only significant measure of response is whether a reactor trip would occur. Because of this limited scope, the results are necessarily of limited value. The following ORNL review takes into account this limited scope and attempts to evaluate the analysis presented and, also, to suggest additional work which might be needed.

819. We have quoted at length from the ORNL review since statements from that review formed the basis of most of Mr. Sholly's cross-examination of the Licensee and Staff witnesses and are referred to in many of his proposed findings. He urges us to reject the B&W FMEA in view of the criticism by ORNL. Our reasons for not doing so are addressed in the following paragraphs.

820. We do not disagree with the recommendations of NUREG-0560. A thorough study of the interactions between control and safety systems should be carried out for TMI-1 and all other nuclear plants. However, we

do not think that was the intent of the Commission order concerning the ICS. We have already reviewed the evidence in support of Staff and Licensee's position that the B&W report did meet the concerns of the NRC Staff which led to the FMEA requirement. ORNL was never directed to limit their review to the admittedly narrow concerns of the NRC Staff immediately following the accident. ORNL was given a free hand in the preparation of the report. Tr. 7247 (Thatcher). The Staff felt that it would be useful to let ORNL critique the FMEA report considering the greater concerns of NUREG-0560. Tr. 7258-60 (Thatcher). The Staff realized that ORNL was asking questions beyond an FMEA, that their guidance came mainly from NUREG-0560. Tr. 7266 (Thatcher). We conclude that the ORNL review was directed at concerns much beyond those forming the basis of the Commission's order and does not support a finding that the B&W FMEA analysis is inadequate for the purpose for which it was intended.

821. While we have above focused on the ORNL criticisms of the B&W report, many of the conclusions reached by ORNL in Section 6 agree with the conclusions reached by B&W. For example, ORNL states ". . . the control system itself has a low failure rate and that it does not instigate a significant number of plant upsets." Sholly Ex. 2, at 14. "[T]he (ICS) system prevents or mitigates more upsets than it creates." *Id.*, at 15. "[F]ailures within the ICS itself do not constitute a significant threat to plant safety and that further analysis of this type may not be economically justifiable." *Id.*, at 15. These statements appear to address the safety of the system itself rather than the adequacy of the B&W report which, according to the ORNL standards, did have shortcomings.

822. The Staff, in determining the adequacy of the B&W ICS study, considered the concerns expressed by ORNL, and concluded that the ICS Reliability Analysis as performed by B&W served the purpose for which it was intended. Ross, ff. Tr. 15,855, at 4, 5; Tr. 7126-27 (Thatcher).

823. The ORNL review of the B&W report certainly found many deficiencies and Mr. Sholly urges us to deny restart until they are corrected. No evidence has been adduced that the analysis fails to meet any Commission criteria or indeed that a more thorough analysis of control-safety interactions has been done at other PWRs. To require TMI-1 to make such an analysis prior to restart would mean different treatment of TMI-1 than other operating reactors. We believe that system interaction studies using fault tree methods, as urged by ORNL and Mr. Sholly, should be undertaken and are indeed part of the IREP program and Task 47 of Unresolved Safety Issues.

824. We have not attempted to address each and every one of Mr. Sholly's proposed findings. While we might agree with many of them as a general matter of safety, the contention was extended only to include the

adequacy of the B&W response to the order item. Most of Mr. Sholly's concerns address matters well beyond the scope of the contention. There are indeed possible common mode failures which could lead to severe challenges to the safety systems. There are undoubtedly failures that could lead to overcooling events and pressure vessel shock as stated in Sholly proposed findings ¶¶ 70-84.

825. While the Board acknowledges the significance of the vessel thermal shock issue, we view this as a generic issue which is not within the scope of this hearing. Reactor vessel thermal shock would be initiated by an overcooling transient (*see, generally*, UCS Ex. 35), which the Board views as having no nexus to the TMI-2 accident.⁹⁴ In that this is a generic concern applicable to all PWRs (*see* Staff Ex. 12, at II.K.2.13-1) which is being pursued by the Staff, and in view of the fact that vessel thermal shock was not one of the contested issues in this proceeding,⁹⁵ the Board believes that the resolution of this matter is one which should be left to the Staff in the normal course of its duties.

826. We believe that the B&W report satisfies the concerns of the NRC Staff concerning ICS reliability and has identified failures that challenge the safety systems. The Licensee has stated and Staff has agreed that the report is applicable to TMI-1 and that the recommended changes in some of the equipment associated with the ICS will contribute significantly to the safety of the plant. We agree. Further, the Licensee has committed to make those changes on a schedule consistent with other operating licenses. Thus, we find that the requirements of long-term item 1 have been met.

⁹⁴ We recognized that thermal shock was a serious issue which could not be adequately addressed by the witnesses at hand. We also questioned its relevance to the proceeding. Tr. 21,452, 21,454 (Smith).

⁹⁵ The issue of vessel thermal shock arose in this proceeding due to the Commonwealth's and UCS' desire to cross-examine the Staff regarding its finding in Staff Exhibit 12 that Licensee has complied with the requirements of item II.K.2.13 of NUREG-0737. While the Board allowed this testimony, the issue of vessel integrity was not subsumed within the scope of the contentions which had previously been admitted. As pointed out in Sholly PF ¶ 81, NUREG-0737 was issued in draft form in September 1980; had any of the parties believed that this issue was one of sufficient significance, the Board would have entertained motions to admit new contentions on this issue, subject to a showing of relevance to the scope of this proceeding.

I. Containment Isolation

827. Sholly Contention 1 stated as follows:

It is contended that in order to adequately protect the public health and safety, the containment isolation signals for TMI-1 must include the following:

1. A safety-grade high radiation signal for the reactor building vent and purge system.
2. A safety-grade high radiation signal for the reactor building sump discharge piping.

It is further contended that such additions to the containment isolation signals must be made prior to the restart of TMI-1 in order to adequately protect the public health and safety.

828. The Licensee's testimony on this subject was presented by Louis C. Lanese (ff. Tr. 7349). The Staff's testimony was submitted by Peter C. Hearn (ff. Tr. 7376). Mr. Sholly presented no direct testimony but did cross-examine the Staff and Licensee witnesses. *See generally* Tr. 7350-59, 7375-87.

829. At the time of the TMI-2 accident, both TMI-1 and TMI-2 were designed so that containment isolation followed receipt of a containment building high pressure (four psig) signal. Based upon concerns raised by the TMI-2 accident that significant fuel damage can occur in the absence of containment high pressure, the NRC Staff required that all containment isolation systems employ diversity in the parameters sensed for the initiation of isolation. Lanese, ff. Tr. 7349, at 3; Tr. 7392 (Hearn); Staff Ex. 1, at C8-21.

830. In response to this requirement, Licensee has chosen to install an additional containment isolation signal which actuates on trip of the reactor protection system. Containment isolation will now occur on containment building high pressure or on trip of the reactor protection system. Both of these initiating mechanisms are safety grade. This modification will assure automatic isolation prior to the release of radioactivity from the reactor building under all postulated accident conditions. Lanese, ff. Tr. 7349, at 3; Hearn, ff. Tr. 7376, at 3; Tr. 7393 (Hearn). The Staff has agreed that the reactor trip signal is an acceptable parameter to initiate containment isolation. Staff Ex. 1, at C8-23.

831. All lines which are directly connected to the containment atmosphere or to the reactor coolant system (including the containment purge system and the reactor building sump) are closed automatically upon

reactor trip, with the exception of the containment air sample line and the reactor coolant pump seal injection line.⁹⁶ Tr. 7367-72 (Lanese); Staff Ex. 14, at 30-33.

832. Narrative description of the design and operation of the current containment isolation system may lead to some confusion. Therefore, the Board has constructed the table found on p. 1296. This table represents our understanding of the current design and should be helpful in the subsequent discussion.

833. Mr. Sholly expressed his concern, as read from NUREG-0667, during a containment vent and purge operation, that the PORV or pressurizer safety valves may be actuated and release radioactivity prior to reaching the containment building high pressure isolation setpoint. Tr. 7351-52 (Sholly). However, the reactor trip isolation signal chosen by Licensee will provide timely containment isolation in the event of such a scenario. This is true because the high pressure reactor trip setpoint (2300 psi) is well below the PORV and safety valves setpoints (2450 and 2500 psi, respectively); therefore, containment isolation (resulting from reactor trip) would occur prior to any release from these valves. Tr. 7353-54 (Lanese); Tr. 7383 (Hearn). In the event of a spurious PORV opening causing a release to the reactor coolant drain tank, a low pressure reactor trip (with resulting containment isolation) would occur prior to the drain tank relieving water to the reactor building sump. Tr. 7355-56 (Lanese). In both cases, a reactor trip signal would be generated (and the containment would isolate) before radioactivity could be released to the containment. Tr. 7354 (Lanese). In view of this testimony, the Board believes that Sholly was not correct when he stated that this assessment (of the use of a reactor trip isolation signal) is based on the assumption that no spurious PORV opening occurs, Sholly PF ¶ 110.

⁹⁶ Licensee PF ¶ 214 does not mention the reactor coolant pump seal injection lines which connect to the reactor coolant system but which are not isolated on reactor trip. See next paragraph and the table.

TABLE
CONTAINMENT ISOLATION FEATURES

<u>SIGNAL</u>	<u>WHAT HAPPENS ON SIGNAL</u>	<u>REFERENCE</u>
Reactor Protection System (RPS) Trip	Containment isolation: close all lines directly connected to contain. atmosphere or reactor coolant system, <i>except</i> containment air sample line which closes on ESFAS actuation at RC pressure of 1600 PSI, and except for RCP seal injection lines which close on containment building high-high pressure (30 psig).	Evidence cited in Licensee PF 1214; Tr. 7367-72; Staff Ex. 14 at 31.
Containment Building High Pressure (4 psig)	Containment isolation: close all lines directly connected to contain. atmos. or RCS, except for RCP seal injection lines.	Evidence cited in Licensee PF 1213.
Containment Building High-High Pressure (30 psig)	<ol style="list-style-type: none"> 1. Close isolation valves in RCP seal injection lines. 2. Close isolation valves in RCP motor cooling water lines. 	Staff Ex. 14 at 31. <i>ID.</i> at 32.
Containment Building High-High Pressure (30 psig) <i>AND</i> Intermediate Cooling Water Line Break Isolation Signal (Level change in ICW surge tank <i>and</i> ESFAS)	Close isolation valves in intermediate cooling water lines.	Staff Ex. 14 at 32.
Level Change in RCP Motor Cooling Water System Surge Tank <i>AND</i> ESFAS	Close isolation valves in RCP motor cooling water lines.	Staff Ex. 14 at 32.

834. In summary, the Board finds that the diverse isolation signals implemented by Licensee are sufficient to provide adequate protection against the possible release of radioactivity to the atmosphere and that the further addition of safety-grade high radiation isolation signals is not required. Sholly Contention No. 1 fails.

J. Filters

835. Intervenors Mr. Lewis and ANGRY advanced the following contentions:

Lewis Contention:

- B. Filters: There are new filters on the auxilliary building of TMI#2. There are no similar structures on the auxiliary building of TMI#1. Further, preheaters must be placed on the filters of the auxiliary building because they got wet during the accident on 3/28/79 in TMI#2. To mitigate a similar accident in TMI#1, preheaters on the filters in the auxiliary building of TMI#1 are necessary.

ANGRY Contention V(D):

The NRC Order fails to require as conditions for restart the following modifications in the design of the TMI-1 reactor without which there can be no reasonable assurance that TMI-1 can be operated without endangering the public health and safety:

- (D) Installation in effluent pathways of systems for the rapid filtration of large volumes of contaminated gases and fluids.

836. The Lewis contention asserts the need to increase the capacity of the filtration systems for gaseous radioactive releases outside the reactor building. In order for such radioactive material (which is produced in the reactor fuel) to be released from the reactor building, one must postulate that the material had penetrated the fuel cladding and been transported from the containment to the auxiliary building via a plant auxiliary system. Therefore, the concerns addressed herein deal with the capability of the filtration systems to minimize the radioactive releases from these auxiliary systems. Itschner, *et al.*, ff. Tr. 9919, at 2 (Moore).

837. In our first Special Prehearing Conference Order of December 18, 1979, the Board accepted ANGRY Contention V(D) with the understanding that ANGRY must further specify the contention during the course of discovery. 10 NRC 828, 843 (1979). On October 3, 1980, ANGRY

pre-filed the direct testimony of Dr. Jan Beyea in support of this contention, which testimony proposed that a controlled filtered venting system for the containment building be installed at TMI-1 prior to restart. The Board, in denying the admission of Dr. Beyea's testimony due to the pendency of a rulemaking proceeding in which the need for controlled filtered venting systems will be considered, also stated that ANGRY Contention V(D) deals with the capacity of filters in conventional effluent pathways in the event of an accident. Memorandum and Order Denying Admission Testimony of Beyea in support of ANGRY Contention V(D), March 12, 1981, at 2-3 and n. 2. Therefore, we consider here only the need to supplement existing filtration systems in conventional pathways.

838. The Licensee presented testimony by William Itschner, Richard Barley, James Moore, and Charles Pelletier on both contentions (ff. Tr. 9919). The Staff filed testimony by Phillip G. Stoddart (ff. Tr. 9963). Neither Mr. Lewis nor ANGRY presented any direct testimony on their contentions but did participate in cross-examination.

839. The primary method for controlling the normal release of gaseous radioactive material at TMI-1 and TMI-2 is to collect the gas in the waste gas disposal system (WGDS) where it is compressed and stored in tanks until the radioactivity from the noble gases has decayed to an acceptable level. At that point, the gas is released at a controlled rate (defined by the plant Technical Specifications) to the plant filter system, in the following stages: a pre-filter or roughing filter; a high efficiency particulate air (HEPA) filter; and finally through impregnated charcoal adsorbers (or filters). Itschner, *et al.*, ff. Tr. 9919, at 2 (Moore); Stoddart-1,⁹⁷ ff. Tr. 9963, at 5; Stoddart-2,⁹⁸ ff. Tr. 9963, at 5, 6.

840. The combined efficiency of the pre-filters and HEPA filters is nearly 100 percent for particulate matter; the charcoal filters at TMI-1 have a design rating efficiency of 90 percent or greater for all forms of radioiodine; and, by storage for up to 90 days in the WGDS tanks, approximately 99.8 percent of the noble gases initially removed from the primary system will have decayed away. The only remaining radioactive noble gas in significant quantity is krypton-85, which is released to the atmosphere, after passing through the filter system, under "carefully controlled meteorological conditions."⁹⁹ Stoddart-2, ff. Tr. 9963, at 7-9.

⁹⁷ NRC Staff Testimony of Phillip G. Stoddart regarding Need for Heaters on Ventilation Exhaust Filters for TMI-1 (Lewis Contention) (Stoddart-1).

⁹⁸ NRC Staff Testimony of Phillip G. Stoddart regarding Rapid Filtration for Large Volumes of Contaminated Gases and Fluids in Effluent Pathways (ANGRY Contention V(D)) (Stoddart-2).

⁹⁹ The Board assumes that the meteorological conditions are carefully monitored rather than being carefully controlled.

841. One source of radioactive gas releases during the first week of the TMI-2 accident (but certainly not the only source) occurred when, in the process of transferring gas from the makeup tank to the WGDS for storage, leaks in the pipe flanges and a compressor caused gas to be released to the auxiliary building atmosphere. This gas and other gases released inside the auxiliary building were then collected by the auxiliary and fuel handling building ventilation systems, passed through the filter system discussed above and then released. Itschner, *et al.*, ff. Tr. 9919, at 3 (Moore).

842. During the early stages of the TMI-2 accident, there were indications that the charcoal adsorbers in the auxiliary and fuel handling building ventilation system were not removing as much iodine as they should have been. Based upon the concerns during the accident recovery regarding the efficiency of the auxiliary and fuel handling building ventilation system for removing iodine, and to minimize potential future releases, Licensee installed four trains of a supplemental gaseous effluent treatment system on the roof of the TMI-2 auxiliary building. These new treatment trains were connected in series to the pre-existing ventilation system. This supplemental system was successful in reducing the amount of iodine released following its installation. The supplemental system has since been disconnected. Itschner, *et al.*, ff. Tr. 9919, at 7 (Itschner); Stoddart-1, ff. Tr. 9963, at 2, 3.

843. In order to prevent future releases of the sort experienced during the TMI-2 accident, Licensee has taken the actions described below to assure the effectiveness of the TMI-1 charcoal filters and to minimize the amount of gas leakage from the auxiliary systems. In addition to these actions, the type of charcoal used in the ventilation and filtration systems will be changed prior to restart from potassium iodide impregnated charcoal to a charcoal co-impregnated with potassium iodide and triethylenediamine. This mixture of impregnants is more effective than just potassium iodide impregnant in retaining organic (methyl) iodide. Stoddart-1, ff. Tr. 9963, at 4; Tr. 9933-34 (Barley, Itschner); Tr. 9985-86 (Stoddart).

844. As described above one of the sources of radioactive gas during the TMI-2 accident was leakage from auxiliary systems. These releases were largely the result of poor operating practice in permitting the continued existence of known leaks of primary coolant systems and primary coolant system cover gas recirculating systems. Stoddart-2, ff. Tr. 9963, at 11. Licensee has implemented a leak reduction program for systems outside containment, which will serve to significantly reduce the liquid and airborne radioactive contamination levels in these areas. Itschner, *et al.*, ff. Tr. 9919, at 8 (Barley); Lewis proposed finding ¶ 10. Prior to restart, and at each refueling interval, tests of these systems will be conducted under

normal operating pressure and temperature conditions to identify and quantify any leakage, and necessary corrective maintenance will be performed to reduce any such leakage to as low as reasonably achievable amounts. The Staff has reviewed Licensee's leak reduction program and has found that this program meets the requirements of Item 2.1.6.a of NUREG-0578 and is adequate to assure the safe operation of TMI-1. Tr. 9935-42 (Barley); Licensee Ex. 1, §2.1.1.8; Staff Ex. 14, at 33-35.

845. Licensee has also implemented improved testing and maintenance requirements for the auxiliary and fuel handling building ventilation system filters and for the WGDS. In accordance with the plant Technical Specifications, the charcoal filters in these systems will be tested for their efficiency in removing iodine at every refueling outage or every 18 months, whichever comes first, as well as following any event which may reduce the charcoal's capability (*i.e.*, significant fires or painting). Itschner, *et al.*, ff. Tr. 9919, at 7, 8 (Itschner); Tr. 9948 (Itschner). This Technical Specification requirement is beyond criteria usually imposed by the Staff (which only requires testing of ESF system filters). But, the NRC Staff will audit and enforce Licensee's compliance with this Technical Specification. Tr. 9926-27 (Barley); Tr. 9969-71 (Stoddart). These commitments agree with Lewis' recommendations in his proposed finding ¶ 17. We see no need for special Board ruling on this matter as Lewis suggests.

846. The Board finds that Licensee has taken sufficient action at TMI-1 to identify and compensate for the deficiencies encountered during the TMI-2 accident in the systems for filtering radioactive releases to the environment. The actions outlined above will tend to minimize release of radioactive gas from containment and will help to assure that the efficiency of the systems for filtering such releases are adequate to maintain release levels as low as reasonably achievable. Therefore, we do not believe that the installation of a supplemental filter system is required in order to provide reasonable assurance that the public health and safety will not be endangered.

847. Mr. Lewis also urges that preheaters be added to the auxiliary and fuel handling building ventilation system, alleging that these filters became wet during the TMI-2 accident. There has been no evidence presented that the TMI-2 filters were wet during the accident. Itschner, *et al.*, ff. Tr. 9919, at 6, 7 (Pelletier); Stoddart-1, ff. Tr. 9963, at 6.

848. Preheaters are useful and required only where the influent air has a humidity of greater than 70 percent for an extended period of time, thereby allowing iodine releases to exceed guidelines. Stoddart-1, ff. Tr. 9963, at 8. The humidity to which the TMI-2 filters were exposed during the accident is thought to have been approximately 30 percent. Itschner, *et al.*, ff. Tr. 9919 (Pelletier); Tr. 9929-31 (Pelletier). Further, there has been no suggestion on the record that the TMI-1 filters would be exposed to

such high levels of humidity for extended periods of time. Nor was there any evidence presented by any of the parties which would indicate the need for preheaters. Therefore, the Board finds that the installation of preheaters on the TMI-1 auxiliary and fuel handling building ventilation system is not necessary to provide reasonable assurance that the health and safety of the public will not be endangered.

849. ANGRY Contention V(D) asserts that an unspecified rapid filtration system for contaminated gases and fluids should be installed in the effluent pathways at TMI-1 prior to restart. We note that with respect to those radioactive gaseous effluent pathways which were a significant source of releases at TMI-2, the comparable pathways at TMI-1 are currently provided with exhaust air filtration systems which have been improved and which will be closely monitored as discussed above. In our opinion no further improvements are necessary. Therefore, the Board rejects ANGRY's proposal for the addition of an unspecified rapid filtration system for gaseous effluents.

850. Filtration of radioactively contaminated liquid effluents is considered to be only a marginally effective method of decontamination. The Staff assumes that such filters are ineffective in removing radioactivity from a liquid stream prior to its release. The currently installed liquid radioactive waste treatment systems at TMI-1 utilize storage and processing methods which have been shown to be effective in management and removal of radioactivity from liquid effluents. Stoddart-2, ff. Tr. 9963, at 2-4. Therefore, the Board finds that a liquid effluent rapid filtration system is not required nor desirable at TMI-1.

851. In summary, the Board finds that the systems in place at TMI-1 for minimizing the release of radioactive materials are sufficient to protect the public health and safety, and require no further modifications. We also find that the requirements of Item 2.1.6.a of NUREG-0578 have been met.

K. Computer

852. The Board admitted two contentions concerning the TMI-1 plant computer. Mr. Sholly's Contention 13 states:

It is contended that the Unit 1 computer system does not meet the requirements for instrumentation and control specified in GDC 13, and is inadequate to insure proper operation of the Unit 1 reactor under all conditions of normal operation, including anticipated operational occurrences and postulated accident conditions. It is further contended that the lack of real-time printout capability during accident conditions and the lack of sufficient redundancy in the

computer system place the public health and safety at significant risk during accident conditions, especially if computer function is lost and no backup unit is available. It is contended that until the Unit 1 computer system is upgraded to meet the standards of GDC 13 and until suitable redundancy is provided within the computer system to assure real-time printout capability at all times, permission for restart must be denied on the basis of risk to public health and safety due to inadequate availability of operational information to Unit 1 operators.

ECNP's Contention 1(a) contends that:

The plant computer for TMI-1 is old, obsolete, and inadequate to respond appropriately in emergency situations. During the accident at the adjacent TMI-2, the alarm printer on the similar computer at Unit 2 had a delay time of over two and one-half hours at one point, and ran more than one hour behind events for over seven hours. This delay cannot be viewed as having adequately served the needs of the operators of TMI-2, and there is no reason to believe that a similar accident situation, with as severe or worse consequences, cannot occur at TMI-1 and be severely aggravated by slow and ambiguous computer alarm printer readings.

853. The NRC Staff presented testimony by Joseph P. Joyce (ff. Tr. 7467) and the Licensee presented testimony by William P. Hamilton and Robert W. Keaten (ff. Tr. 7397). No direct evidence was presented by either Mr. Sholly or ENCP although Mr. Sholly conducted extensive cross-examination of both the Staff and Licensee witnesses.

854. The TMI-1 computer system is designed to be used only as a tool for the operators and the fuel management engineers. Hamilton and Keaten, ff. Tr. 7397, at 3. It makes available to the operator on a convenient basis or on demand the status of individual plant parameters and certain calculated values such as heat balance, power level and power tilt, and imbalance which can affect the efficient performance of the plant. *Id.*

855. A computer system such as the one at TMI-1 need not be available at any nuclear power-generating station in order to demonstrate compliance with General Design Criterion (GDC) 13 requirements or with any other regulatory requirements. Joyce, ff. Tr. 7467, at 3. GDC 13 requires that instrumentation be provided to monitor certain variables and systems but it does not specify the type of instrumentation or the need for that instrumentation to have readout capabilities on a computer. *Id.* That criterion also requires that instrumentation be provided to ensure proper operation under normal conditions, anticipated operational occurrences, and postulated accident conditions. *Id.*, at 3-4. The Licensee has complied with

the GDC 13 requirements by providing instrumentation such as meters, gauges, recorders, alarms, and displays to indicate the current status of the plant's essential systems during normal and abnormal occurrences. *Id.*, at 4. This instrumentation, which is all hard-wired and safety-grade as required by GDC 13 (Hamilton and Keaten, ff. Tr. 7397, at 3), provides the operator with real-time information as to the status of the parameters such as temperature, pressure, flow rates, liquid level, and radioactive releases of each of the essential systems. Joyce, ff. Tr. 7467, at 4.

856. In a transient situation, operators at TMI use the computer very little and do not rely upon it. Tr. 7413 (Keaten). The operators do rely on the hard-wired instrumentation that is provided for that purpose; they rely on the main annunciators rather than on the computer alarms. Tr. 7413 (Keaten). The computer historical record is used in a reconstruction of events following a transient and, in fact, was used for this purpose in the TMI-2 accident. Tr. 7413 (Keaten).

857. The operators at TMI-1 have instrumentation available to follow the course of an accident. An abnormal occurrence initiates an alarm alerting the operators that a significant change has occurred in one of the monitored parameters; the operators check the instruments to determine what changes have taken place. They then rely on their training and on approved emergency procedures to analyze the event and determine the necessary steps to follow to mitigate the event. Joyce, ff. Tr. 7467, at 5.

858. The loss of the computer during a transient or accident would not impede the ability of the operator to carry out the basic functions that are necessary to maintain the safety of the plant, of the plant personnel, and of the general public. Tr. 7419 (Keaten). All of the information the operator needs in order to make timely decisions to maintain plant safety is readily available to him, independent of the computer. Tr. 7419 (Keaten). The Licensee trains its operators and writes its procedures to ensure that the operators maintain the safety of the plant without reliance on the computer system. Tr. 7421 (Keaten); Tr. 7474-75 (Joyce). The philosophy of relying on the hard-wired and safety-grade instrumentation as the basis for making the decisions that must be made to protect the safety of the public, rather than on the computer, is communicated to the operators in their training. Tr. 7422 (Keaten). The computer could, of course, be used during normal operations to call up certain parameters (Tr. 7418 (Keaten)), to run the plant more efficiently (Tr. 7421 (Keaten)), or to compare parameters with those obtained from the hard-wired instrumentation. Tr. 7477-82 (Joyce).

859. The accident at TMI-2 demonstrated that the plant computer did not adequately provide real-time information. Joyce, ff. Tr. 7467, at 4. The TMI-2 computer system as it existed at the time of the accident did not have the capability of keeping the alarm history current. In addition, the

printout of the alarm history ran late by varying amounts of time during the accident. Tr. 7399 (Keaten). There was delay in the printing of the alarms. Tr. 7405 (Hamilton). Additionally, in-core thermocouple temperatures could not be read with the computer since the temperatures were higher than the maximum range of the computer.

860. Although the operators do not rely on the computer for necessary information, the Licensee is in the process of developing a new computer system. Tr. 7416 (Keaten). The functions being developed for the new system are analogous to the functions performed by the original system but the new one will be able to do them in a form that is clearer to the operator. Tr. 7416 (Keaten). The printer output will be much faster than the older system was. Tr. 7416 (Keaten). In addition, the computer has been modified to read in-core thermocouples through their entire useful range. Staff Ex. 2, at 22. The Licensee will, however, still maintain the philosophy that the reactor operator does not need to and should not rely on the computer as a necessary part of the operation of the plant and that he must be able to do all of the actions and receive all of the information he needs in order to safely operate the plant, independent of the computer. Tr. 7416 (Keaten).

861. In his proposed findings on this subject, Mr. Sholly made a number of observations and recommendations which the Board has reviewed. Sholly proposed findings ¶¶ 114, 115, 135-38. In the following paragraphs we address each one.

862. In his proposed findings ¶¶ 114 and 115, Mr. Sholly acknowledges that both Staff and Licensee agreed that reliance on the plant computer is not necessary in order to demonstrate compliance with GDC 13. The Board agrees with this conclusion for the reasons presented in the arguments above. In proposed finding ¶ 115 the additional comment is made that the testimony on the plant computer raised novel issues regarding the reliance of plant operators on non-safety grade plant computers for information. We comment further on this subject below.

863. In proposed finding ¶ 135, Mr. Sholly suggests that the Licensee be directed to:

. . . establish a schedule for completing its computer upgrade and submit this schedule to the NRC Staff for approval. The schedule shall identify the components which remain to be obtained and installed, shall specify a schedule for implementing each of these items, and shall provide details of operator training to be provided on each of these components. The Staff shall monitor Licensee's adherence to this schedule through the Office of Inspection and Enforcement, and the Staff shall assure that the Human Factors Branch of NRR is involved

in evaluating the human factors adequacy of the new installation as it proceeds.

During the hearing, Board member Jordan commented that he believed that all plants, including TMI-1, should have good modern computers, that the state of the art is changing and that there is much to be gained in having such a computer. He urged the Licensee to get their new computer system installed as fast as possible. Tr. 10,540. The Board affirms these comments. Nevertheless, the questions regarding use of the computer during plant emergency situations have in the Board's opinion been well answered during Staff and Licensee testimony. The Board agrees that these emergencies can be safely handled without dependence on the computer. The Board considers the related safety issue of safety-grade readout of in-core thermocouples to be resolved by Licensee's commitment to a backup readout system meeting Staff requirements. Tr. 21,432 (Baxter). In view of all this, we lean away from Mr. Sholly's suggestion that a schedule for computer upgrading is required though, as noted previously, we urge the Licensee to give this work continuing high priority.

864. In his proposed finding ¶ 136, Mr. Sholly suggests that:

The Licensee is also directed, through negotiations with the Staff, to design and implement prior to restart a monitoring program to assess the reliability (both in terms of availability and accuracy) of the computer system.

Mr. Sholly also urges incorporation of this requirement into the Technical Specifications along with certain reporting requirements and Staff monitoring requirements. However, other than the computer limitations on speed of data retrieval and on the limited temperature readout from the in-core thermocouples, both discussed earlier in this decision, the Board is unaware of significant previous problems of computer availability. In fact, we note the Licensee's testimony that the availability of plant computers for both TMI-1 and TMI-2 has been very high averaging "nearly 100%." Keaten, ff. Tr. 7397, at 4. We also find no indication from the record that accuracy of the computer system has been a significant problem. For all of these reasons, we do not believe the requirements suggested here by Mr. Sholly are warranted.

865. Mr. Sholly would have us, in his proposed finding ¶ 137, direct the Staff:

to undertake periodic routine observations of TMI-1 plant operators during normal (and emergency operations to the extent feasible) operations to ascertain the degree to which plant operators rely on the process computer, for which functions the operators rely upon the

plant computer, and to what purposes the information from the plant computer is utilized.

We feel that Mr. Sholly's point here is well taken. We recommend that the Staff Office of Inspection and Enforcement verify the conclusions of Staff and Licensee witnesses that operators do not rely solely on computer information as a basis for making operational decisions, especially in upset conditions.

866. Finally, in proposed finding ¶ 138, Mr. Sholly suggests the initiation of investigations and studies related to the reliability of the power supply to the computer system. The Licensee explained that the power supply is an "uninterruptible" one which is backed up by batteries for the event of loss of AC power. Tr. 7433 (Hamilton). The Board is satisfied with this provision.

867. The Commonwealth, in its proposed findings ¶¶ 114-123, discusses the subject of monitoring of in-core thermocouples particularly as this monitoring is needed to detect inadequate core cooling (ICC). Central to the argument is the statement in proposed finding ¶ 116 that the only means of obtaining in-core thermocouple readings in the control room relies on the plant computer system. We think that the Commonwealth is mistaken since we note that late in the hearing, Licensee committed to the meeting of Staff requirements on this matter. Tr. 21,432 (Baxter). The requirements here involve the installation of data logging or recording instrument displays of certain in-core temperature information complete with its own power source, all independent of the plant computer. The system is required to be operational prior to escalation beyond 5 percent of rated power. Staff Ex. 15, at 12. The Board agrees that this commitment is an important one and that the new equipment is necessary before operation beyond 5 percent of rated power is permitted.

868. Based on these findings and subject to the conditions specified above, the Board finds that:

- (a) The computer system need not meet the requirements of General Design Criterion 13.
- (b) Improvements in the computer system which are being made and are planned by the Licensee are appropriate.
- (c) Sholly Contention 13 and ECNP Contention 1(a) are moot.

L. In-Plant Instrument Ranges

869. Excerpts from two contentions admitted on this subject follow. Summary excerpt from Sholly Contention 5:

It is contended that Licensee has not provided radiation monitoring instruments in effluent discharge pathways which are capable of remaining on-scale during anticipated operational occurrences, postulated accidents, and Class 9 accidents as specified in Contention #17.¹⁰⁰

.....

It is further contended that protection of public health and safety requires that the high-range effluent monitoring system be installed prior to Restart of TMI-1, and that the high-range effluent monitoring system be capable of remaining on-scale under conditions specified in this contention.

Summary excerpt from ECNP Contention 1(d):

The TMI-2 accident showed that many monitoring instruments were of insufficient indicating range to properly warn control room operators of ambient conditions All monitoring instruments for TMI-1 must be calibrated to provide full and accurate readings of the complete range of possible conditions under both normal and worst-case conditions.

870. The Licensee submitted testimony by T. Gary Broughton, Richard W. Dubiel, and Victor H. Willems (ff. Tr. 7509). The Staff presented its testimony on these contentions by affidavit when the other parties indicated that they had no plans to cross-examine the Staff witnesses. Tr. 7218-19, 7527. The testimony of Phillip G. Stoddart which responds to Sholly Contention 5 and partially responds to ECNP Contention 1(d) follows Tr. 7548. Testimony of Walton L. Jensen, Jr., John C. Voglewede, Bruce A. Boger, and Peter L. Hearn which completes the Staff's testimony on ECNP Contention 1(d) follows the Stoddart testimony. Affidavits by Messrs. Jensen, Voglewede, and Boger follow the Staff's testimony on this subject. An affidavit by Mr. Hearn follows Tr. 8262 and an affidavit by Mr. Stoddart follows Tr. 8263.

¹⁰⁰Mr. Sholly withdrew Contention 17 in a written memorandum dated December 23, 1980.

871. Neither Mr. Sholly nor ECNP presented any direct testimony. Mr. Sholly did, however, cross-examine the Licensee witnesses. Neither Mr. Sholly nor any other intervenor filed proposed findings on these contentions. Therefore the intervenors are in default. However the issue is a mandatory consideration in this proceeding in that it is the subject of Recommendation 2.1.8.b of NUREG-0578. Therefore we have decided the matter despite the intervenors' default.

872. Radiation monitoring systems used at TMI-1 can be classified as follows: gaseous effluent monitors (which include radioiodine and particulate monitoring instruments); liquid effluent monitors; and area radiation monitors. The capability of these instruments is addressed below. We also consider the radiation monitoring of spaces outside containment which could contain LOCA fluids.

873. During the initial phases of the TMI-2 accident, the noble gas readings from the main plant gaseous effluent monitor were off-scale; actual release concentrations have been estimated to have been on the order of 1 uCi/cc. Subsequently, as part of its TMI-2 Lessons Learned review, the Staff has required all licensees to increase the range of their noble gas effluent radiation monitors. Stoddart-1, ff. Tr. 7548, at 4-6.

874. Licensee has committed to install, prior to restart, supplemental high-range radiation monitors for the gaseous effluent discharge paths at TMI-1, in accordance with the requirements of item 2.1.8.b of NUREG-0578.¹⁰¹ The radiation monitors installed at the time of the TMI-2 accident for the condenser off-gas, auxiliary and fuel handling building exhaust and containment exhaust pathways were capable of monitoring noble gas concentrations of up to 10^{-1} μ Ci/cc; the main steam line discharge path was not equipped with a gaseous effluent monitor. The new extended range monitors will be capable of measuring noble gas concentrations up to 10^5 μ Ci/cc in the condenser off-gas and containment exhaust pathways, and up to 10^3 μ Ci/cc in the auxiliary and fuel handling building exhaust and main steam line discharge paths. Broughton, *et al.*, ff. Tr. 7509, at 4.

¹⁰¹ NUREG-0737 relaxed the implementation date for the installation of the long-term radio-effluent monitors required by item II.F.1 until January 1, 1982. Licensee expects to have the extended range gaseous effluent monitors and radioiodine instrumentation installed prior to restart; however, if Licensee becomes unable to install this final monitoring equipment prior to restart, the Staff will assure that acceptable interim methods, procedures and evaluations are submitted and reviewed prior to restart. Staff Ex. 14, at 40-42; *see also* Ross, ff. Tr. 15,555, Table 2; Licensee Ex. 1, at 2.1-46 to 2.1-48.

875. As noted above, the noble gas releases during the TMI-2 accident were thought to have been approximately $1 \mu\text{Ci/cc}$; therefore, the new, extended range monitors will be capable of measuring noble gas release rates of at least a factor of 10^3 times greater than that experienced during the TMI-2 accident. *Id.*, at 5. The Staff has reviewed Licensee's design for the extended range gaseous effluent radiation monitors and has concluded that the design meets the Staff's requirements and is therefore acceptable. The Staff will review the installed equipment and associated operating procedures prior to restart. Staff Ex. 14, at 42. Licensee objects in reply finding ¶ 145 to the Staff statement that these monitors must be installed prior to restart. Licensee relies instead on the requirement in NUREG-0737; namely, installation by January 1, 1982. The Board directs that if Licensee cannot meet this NUREG-0737 commitment, the matter shall be brought promptly to the Commission's attention.

876. The range of the previously existing gaseous effluent radiation monitors is suitable for monitoring anticipated transients and the postulated accidents analyzed in the TMI-1 Final Safety Analysis Report (FSAR). The extended range monitors will be able to provide accurate estimates of off-site radiation releases for anticipated operational occurrences and for accidents significantly beyond those analyzed in the FSAR. Broughton, *et al.*, ff. Tr. 7509, at 3-5. The new monitors are capable of measuring noble gas concentrations equivalent to the source term of Regulatory Guide 1.4, which assumes a 100 percent release of the noble gases from the core. Tr. 7520-21 (Willems). By comparison, the TMI-2 accident is estimated to have released from the core only 40 to 50 percent of the core noble gases. Stoddart-2, ff. Tr. 7548, at 3.

877. Turning now to the liquid effluents, the TMI-1 liquid effluent discharge path from the plant is through the plant discharge line to the river. This discharge line is monitored by a continuous liquid monitor. In addition, the principal source of radioactive effluent to the discharge line, the liquid waste disposal system, is separately monitored and automatically isolated whenever pre-established limits are exceeded. These monitors are designed to provide adequate sensitivity and range for releases associated with normal operation and anticipated operational occurrences. Broughton, *et al.*, ff. Tr. 7509, at 4, 5.

878. The TMI-1 containment building interior is currently monitored for normal operation and anticipated operational occurrences by three Area Gamma Detectors. A wide-range Area Gamma Monitor (capable of monitoring concentrations up to 10^6 R/hr), located in the reactor building, provides information on post-accident conditions. Additionally, pursuant to the long-term requirements of item 2.1.8.b. of NUREG-0578, Licensee will install, in accord with the schedule set forth in NUREG-0737, item II.F.1, for all operating reactors (currently January 1, 1982), two additional

safety-grade, high-range, post-accident Area Gamma Detectors in the reactor building. Broughton, *et al.*, ff. Tr. 7509, at 9; Stoddart-2, ff. Tr. 7548, at 3; Tr. 7523 (Willems); *see also*, Staff Ex. 14, at 41.

879. The two additional in-containment monitors, which will be provided with readout and recording displays in the control room, will be capable of monitoring radiation levels up to 10^7 R/hr¹⁰² and will detect low-energy photon (gamma) radiation down to 60 Kev. Licensee Ex. 1, §2.1.2.1.1. The upper range capacity of these detectors is adequate to measure an instantaneous 100 percent release of all TMI-1 reactor core noble gases, accompanied by a release of 25 percent of the core radioiodines. This capacity is well in excess of the releases experienced at TMI-2 (40 to 50 percent of the core noble gases and a small fraction of the radioiodines). The design of the in-containment, wide-range monitor installed at TMI-2 at the time of the accident was not responsive to much of the low energy radiation that was present. Thus, the new monitors' ability to detect low energy photon radiation will provide assurance of the capability to accurately measure in-containment radiation while staying on-scale. Stoddart-2, ff. Tr. 7548, at 3, 4.

880. The Staff has reviewed Licensee's design for the new wide-range containment building monitors and has concluded that Licensee has made reasonable progress in meeting the long-term requirements of this item. The Staff has taken exception, however, to Licensee's proposal to locate these two monitors adjacent to each other and has recommended that Licensee must widely separate the monitors in order to fully meet this requirement. Staff Ex. 14, at 41. The Board concurs that Licensee's actions constitute reasonable progress. The parties have not presented the separation matter to us for determination; therefore, we leave it to the Staff to appropriately resolve with Licensee the issue of the separation of these monitors.

881. The release of radioiodine and particulate matter is continuously monitored for each release point at TMI-1 and is indicated and recorded in the control room. This type of direct reading is suitable to monitor routine releases during normal operations; however, in a TMI-2 type accident, such direct measurements may not be practicable. Therefore, under accident conditions, the method employed to measure radioiodine and particulate concentrations is to remove the sample media to a high level radiation measurement facility for an analysis. Stoddart-1, ff. Tr. 7548, at 5; Tr. 7519 (Dubiel).

¹⁰² The original recommendation in NUREG-0578 was for a range extending to 10^8 R/hr. This was changed to 10^7 R/hr in NUREG-0737.

882. In recognition of the impracticality of obtaining accurate radioiodine and particulate measurements via a direct monitor, the Staff, in item 2.1.8.b of NUREG-0578, recommended that all licensees develop the capability to collect and analyze samples of radioactive iodines and particulates in plant gaseous effluents during and following an accident. Licensee has committed to install, prior to restart, three additional sampling stations and to expand the capability of the sampling system by the addition of silver zeolite sample cartridges. The cartridges will be analyzed by a sodium iodide detector connected to a single or dual channel analyzer (with settings appropriate for the gamma energy levels associated with I-131), or by use of an intrinsic germanium detector in conjunction with a multi-channel analyzer. Additionally, for very high levels of radioiodines and particulates, Licensee has the capability of performing a dose rate calculation at a specific distance from the cartridge by analyzing the radiation release related back to the number of curies or microcuries on the cartridge. Licensee Ex. 1, §2.1.2.1.1; Tr. 7512-17 (Dubiel).

883. The expanded sampling system will have the capability of monitoring radioiodine and particulate concentrations up to 10^2 $\mu\text{Ci/cc}$; this value is a factor of more than 100,000 times greater than the radioiodine and particulate releases observed during the TMI-2 accident. The range of the expanded sampling system provides on-scale capability for any conceivable accident. Stoddart-1, ff. Tr. 7548, at 7. The Staff has reviewed Licensee's proposed design and procedures for the expanded sampling system and has concluded that Licensee is in compliance with the Staff's requirements. Staff Ex. 14, at 42. As with the noble gas effluent monitors discussed above, Licensee relies on the modified installation date requirement of January 1, 1982 as specified in NUREG-0737. For these monitors the Board also directs that if this NUREG-0737 requirement cannot be met, the matter shall be brought promptly to the Commission's attention.

884. Components needed for the recirculation of LOCA fluids are located in the TMI-1 containment and auxiliary buildings. The capacity of the in-containment radiation monitors was discussed previously. The components located in the auxiliary building are shielded by concrete and access to these areas is controlled. These shielded areas are monitored for radioactive particulates, iodine and noble gases during normal operation, anticipated occurrences and accident conditions by the radiation monitors in the auxiliary building ventilation system. A high radiation signal from these monitors results in automatic isolation of the auxiliary building ventilation system or the waste gas disposal system. Additionally, radiation in the vicinity of, but external to, the shielded spaces is monitored by the Area Gamma Monitors. The Staff views these methods of monitoring

spaces containing LOCA fluid recirculation components as acceptable and satisfying the requirements of General Design Criterion 64. Broughton, *et al.*, ff. Tr. 7509, at 10; Stoddart-1, ff. Tr. 7548, at 6.

885. Based upon our review of the evidence presented, the Board finds that, with the modifications being implemented by Licensee, the systems for monitoring radiation fields and radioactive concentrations at TMI-1 as discussed above have sufficient capability for accurately measuring radioactive concentrations during accident conditions in excess of those experienced at TMI-2 and that the monitor readings will remain on-scale for such events.

886. The Board finds the concerns expressed in Sholly Contention 5 and ECNP Contention 1(d) to be resolved. We also find the Commission requirements for increased ranges of radiation monitors (NUREG-0578, item 2.1.8.b) to be met.

M. Safety System Status Panel

887. Board Question/UCS Contention 9 was:

The accident at TMI-2 was substantially aggravated by the fact that the plant was operated with a safety system inoperable, to wit: two auxiliary feedwater system valves were closed which should have been open. The principal reason why this condition existed was that TMI does not have an adequate system to inform the operator that a safety system has been deliberately disabled. To adequately protect the health and safety of the public, a system meeting the Regulatory Position of Reg. Guide 1.47 or providing equivalent protection is required.

888. Summary excerpted from ECNP Contention 1(c) follows:

The electronic signals sent to the control room in many cases record the wrong parameters and may, thereby, mislead the reactor operator It is the obligation of the Suspended Licensee to provide sufficient information on the performance capability of all pertinent components of the control system to reasonably ensure that electronic signals will record, accurately and in a timely manner, all necessary and correct parameters.

889. In our First Special Prehearing Conference Order of December 18, 1979, we limited the scope of UCS Contention 9 to the core cooling and containment isolation systems. 10 NRC 828, 836 (1979). By letter dated January 5, 1981, UCS withdrew its sponsorship of this contention. The Board then adopted UCS Contention 9 as its question and requested

Licensee and the Staff to present witnesses on this contention. Tr. 9434. UCS did not present testimony on this issue, cross-examine the witnesses for Licensee and the Staff, or file proposed findings on the issue.

890. In accepting ECNP Contention 1(c), we limited this contention to (1) those signals sent to the control room and (2) the core cooling systems and containment isolation systems, and we observed that this contention is parallel to and complementary to UCS Contention 9. First Special Prehearing Conference Order, 10 NRC 828, 844. In our June 12, 1980 Memorandum and Order on Licensee's Motion for Sanctions Against Environmental Coalition on Nuclear Power, the Board further reduced the scope of ECNP Contention 1(c) to the adequacy of the Class 1E control room instrumentation following a feedwater transient and small break LOCA. LBP-80-17, 11 NRC 893, 905. ECNP presented no testimony on this issue, nor did its representatives even appear at the hearing to participate in cross-examination of the witnesses presented by the Staff and Licensee. ECNP filed no proposed findings on the issue and is in default.

891. The Licensee presented its testimony through Patrick S. Walsh and Ronald J. Toole (ff. Tr. 9840). The Staff's testimony was submitted by Donald F. Sullivan (two sets) and Bruce A. Boger (ff. Tr. 9893).

892. The Licensee questioned the underlying assumptions by UCS Contention 9, arguing that the EFW system was not classified as a safety system during TMI-2. Tr. 9864-65 (Walsh). The Licensee also stated that closure of the EFW valves did not have a substantial effect on the outcome of TMI-2. The Licensee noted an analysis by GPU which indicated that even if EFW had operated correctly, the condition of the plant would have been identical 20 minutes after the accident started. Tr. 9854-55 (Walsh). Other analyses of TMI-2 concluded that the brief isolation of EFW had no significant effect on the accident's outcome. Walsh and Toole, ff. Tr. 9840, at 2, 4.

893. Despite this testimony by the Licensee, the Board emphasizes at the outset in this section, as we have elsewhere in this Initial Decision, that the EFW system is important to safety whether or not it was classified as a safety system at the time of the TMI-2 accident. Significant changes are being made to the EFW system for this reason.

894. The control room operator at TMI-1 is informed of the operability of safety systems through a variety of means, including both electronic displays and administrative controls. The existing automatic indicators (described below) in conjunction with the additional administrative controls being implemented by Licensee (also described below) will serve to verify the operational readiness of systems important to safety. *Id.*, at 5.

895. The main control console in the control room includes indicating lights for the engineered safety features actuation system (ESFAS), which indicate whether the high pressure injection (HPI) and low pressure injection (LPI) systems are enabled and whether the actuation bistables are reset or bypassed. These indicators are supplemented by annunciators which, in the event that either of these actuation systems is disabled, provide information to the operator on the nature of the disabling condition (*i.e.*, indicating "not reset", "not bypassed", or "ES actuation trouble"). Additional annunciators are also available to inform the operator if the core flood tank isolation valves, a component within the emergency core cooling system, are in an off-normal configuration. *Id.*, at 4, 5.

896. The TMI-1 control room is also equipped with an "ES Status Panel", a dedicated control panel that automatically indicates the status (actuated/non-actuated), by means of color coded display lights, of all individual components which are required to start upon receipt of an ESFAS signal. *Id.*, at 5; Tr. 9865-66 (Toole), Tr. 9869 (Walsh). For example, if the LPI system were actuated by an ESFAS signal, the display lights for the LPI pumps would change from yellow to blue, indicating that the pump had reached the position needed to support an ESFAS actuation. Tr. 9869 (Walsh). Thus, by monitoring the display lights, the operator is able to determine any exception to an automatic ESFAS actuation. Walsh and Toole, ff. Tr. 9840, at 5.

897. At the end of each eight-hour shift, the off-going control room operator and his shift foreman complete the Engineered Safety Features (ESF) Checklist, which documents the readiness of the ESF and emergency feedwater (EFW) system components by verifying the control room valve position and control switch positions for these systems. *Id.*, at 5; Tr. 9858 (Toole); Boger, ff. Tr. 9893, at 7. The oncoming licensed operators are required to sign the checklist, verifying that they understand the condition of the plant and are aware of the status of all safety-related systems. Walsh and Toole, ff. Tr. 9840, at 5; Boger, ff. Tr. 9893, at 7; Tr. 9858-59 (Toole).

898. The proper positioning of critical valves in the ESF and EFW systems is assured by either physically locking these valves in the position needed to support a system actuation, or by placing the valve under routine surveillance to verify correct positioning. Those valves which are locked into position are also visually inspected at defined intervals (based on their importance and frequency of use) to be certain they are still locked in the correct position. Additionally, for those valves equipped with manual overrides, the overrides are either locked or the manual override status is routinely checked by an Auxiliary Operator as part of his shift log sheet

entries. Walsh and Toole, ff. Tr. 9840, at 5; Tr. 9871 (Toole). For those ESF and EFW valves located in the main flow path and whose position is not indicated in the control room, Licensee has instituted a procedure whereby these valves will be checked at defined frequencies (on a shift or daily basis, depending on location) to assure correct positioning. Walsh and Toole, ff. Tr. 9840, at 6; Tr. 9848 (Toole).

899. Item 5 of Inspection and Enforcement Bulletin 79-05A required all licenses to ". . . review all safety-related valve positions and positioning requirements to assure that valves are positioned (open or closed) in a manner to ensure the proper operation of engineered safety features. . .".¹⁰³ The Staff, in its review of Licensee's compliance with this requirement, found that the procedural controls being implemented ensure that proper valve positions in safety-related systems are consistent with the process flow diagram and are maintained in proper position during power operations and following maintenance and testing. Boger, ff. Tr. 9893, at 6; Staff Ex. 1, at C2-5. As an additional method of ensuring that valves in safety-related systems have been properly positioned, Licensee will, prior to restart of the unit, perform a complete review of the safety-related system valve lineup to verify valve position in accordance with the systems' operating procedure lineup checklist. The Staff will perform an independent verification of this valve lineup to ensure proper positioning of all safety-related valves. Subject to performing this verification, the Staff has determined that Licensee is in compliance with Item 5 of IE Bulletin 79-05A. Boger, ff. Tr. 9893, at 5, 6; Staff Ex. 1, at C2-6.

900. Licensee has also revised its procedures to assure that, prior to and following the performance of surveillance testing and/or maintenance, all components in the ESF and EFW systems affected by testing or maintenance are in the proper position. Prior to taking a system out of service for testing or maintenance, the operator must verify that components in the redundant system are in position to support a system actuation. Following completion of the required activity, the operator who performed the test or maintenance must verify that he has restored the components to their proper position; a second operator would then perform an independent verification that all components manipulated or affected by the activity are in the proper position to support system actuation. Walsh and Toole, ff. Tr. 9840, at 6; Boger, ff. Tr. 9893, at 8-11; Tr. 9857-58 (Toole). Further, knowledge that a safety system has been taken out of service is assured by

¹⁰³ IE Bulletin 79-05A was incorporated by reference into the short-term recommendations actions of the Commission's August 1979 hearing order. 10 NRC, at 144.

Licensee's revised "tagging" procedures, which require the Shift Foreman to approve the performance of surveillance testing on safety-related systems and to approve all applications for the removal from or return to service of these systems. Additionally, control room log entries (which are reviewed by oncoming shift personnel) must be made when equipment required by the Technical Specifications is taken out of or returned to service, thereby assuring that the operators will be alerted to changes in the status of this equipment. Boger, ff. Tr. 9893, at 4-5, 9-10; Staff Ex. 1, at C2-7, 8.

901. Item 10 of IE Bulletin 79-05A required all licensees to:

Review and modify as necessary your maintenance and test procedures to ensure that they require:

- a. verification, by inspection, of the operability of redundant safety-related systems prior to the removal of any safety-related system from service;
- b. verification of the operability of all safety related systems when they are returned to service following maintenance or testing; and,
- c. a means of notifying involved reactor operating personnel whenever a safety-related system is removed from and returned to service.

In determining Licensee's compliance with this item, the Staff reviewed the administrative controls described in the previous paragraph. The Staff has verified that these administrative controls satisfy, and are in compliance with, the requirements imposed by this item. Staff Ex. 1, at C2-7, 8; Boger, ff. Tr. 9893, at 3-5.

902. The major thrust of UCS Contention 9 is that Licensee's methods of determining the operability of safety systems is inadequate in that they do not meet the regulatory position of Regulatory Guide 1.47 (RG 1.47). Since RG 1.47 was issued in May 1973, about 5 years after granting of the TMI-1 construction permit, it is clear that the designer did not take this Regulatory Guide into account. Nor does the Staff call for the TMI-1 plant to meet these Regulatory Guide requirements. Sullivan-1¹⁰⁴, ff. Tr. 9893, at 3.

903. Regulatory Guide 1.47 would require that safety system status be indicated to the operator via continuous automatic visual indication, supplemented by alarms. Walsh and Toole, ff. Tr. 9840, at 7. Though the current plant design does not meet this requirement, it is the opinion of the

¹⁰⁴ NRC Staff Testimony of Donald F. Sullivan Regarding Bypass and Inoperable Status Indication (UCS Contention 9) (Sullivan-1).

Licensee that the administrative controls being implemented in conjunction with the present automatic displays, provide the operator with sufficient information to determine the operability of plant safety systems. Licensee proposed finding ¶ 285. Both the Staff's and Licensee's witnesses agree that the administrative controls provide a functional equivalent to Regulatory Guide 1.47 in terms of the operators' knowledge of system availability. Tr. 9848 (Toole), 9894-95 (Boger).

904. Pending any decision on backfitting Regulatory Guide 1.47,¹⁰⁵ the Staff has required all licensees and applicants to upgrade their administrative controls for monitoring and verifying system status. Item I.C.6 of NUREG-0660, as clarified by NUREG-0737, Clarification of TMI Action Plan Requirements, requires review and revision, as necessary, of procedures to assure that an effective system of verifying the correct performance of operating activities is provided at each reactor. The NRC Office of Inspection and Enforcement will review Licensee's compliance with this item prior to restart. Boger, ff. Tr. 9893, at 3; Tr. 9908-09 (Boger).

905. Based upon our review of the evidence presented, and in specific response to the concerns expressed in UCS Contention 9, the Board finds that, while the Staff review continues as discussed above, the administrative controls being implemented by Licensee are sufficient to provide reasonable assurance that TMI-1 operations personnel are informed of the operability of those safety systems needed to respond to plant upsets.

906. The Board notes in closing its discussion on this subject, the reliance of plant safety on the administrative controls discussed above. The future installation of a safety systems status panel could possibly assist in the monitoring of important systems but is not a replacement for a good operational quality assurance program intended to monitor the administrative procedural aspects of plant operation. It was, after all, administrative and procedural failures which first initiated and second, aggravated the TMI-2 accident. Hence, undue reliance on a safety system status panel is to be avoided. A safety system status panel will aid the operator in diagnosing upset conditions but is not a replacement for adequate procedures.

¹⁰⁵ The Staff has been directed (by item I.D.3, NUREG-0660, NRC Action Plan Developed as a Result of the TMI-2 Accident) to study the need for all licensees and applicants to implement an automatic status monitoring system similar to that prescribed by Regulatory Guide 1.47. This study is not expected to be completed until 1982 or later. Boger, ff. Tr. 9893, at 2. The NRC draft schedule for implementation of the recommendations from that study is June 1983. Tr. 15,600 (Capra).

N. Control Room Design--Human Factors Engineering

907. Two contentions in this proceeding, Sholly Contention 15 and ANGRY V(C), concern control room design and human factors engineering. Mr. Sholly's Contention 15 states that:

It is contended that the design of the Unit 1 Control Room, instrumentation, and controls is such that operators cannot maintain system variables and systems within prescribed operating ranges during feedwater transients and LOCAs. It is further contended that this violates the provisions of GDC 13 regarding instrumentation and controls. It is contended that in view of the numerous operating difficulties encountered with Unit 2, and the similarities in design and construction between Units 1 and 2, a thorough human factors engineering review of Unit 1's Control Room is called for in order to provide assurance that the operator-instrumentation interface is such that the operators can exercise adequate control over the reactor and prevent off-site consequences from anticipated operational occurrences and postulated accidents. It is further contended that in order to assure maximum protection for the public health and safety, the human factors engineering review and any necessary changes recommended as a result of this review must be completed prior to restart.

Further, ANGRY Contention V(C) asserts that:

The NRC Order fails to require as conditions for restart the following modifications in the design of the TMI-1 reactor without which there can be no reasonable assurance that TMI-1 can be operated without endangering the public health and safety:

. . .

Performance of an analysis of and implementation of modifications in the design and layout of the TMI-1 control room as recommended in NUREG-0560.

908. The Staff and the Licensee presented testimony on this issue. The Licensee's testimony was presented by Patrick S. Walsh, William E. Meek, Herbert Estrada, Jr., Julien M. Christensen, and Thomas B. Sheridan, ff. Tr. 10,234. The Staff's testimony was presented by Raymond C. Ramirez and Harold E. Price, ff. Tr. 10,452. Neither Mr. Sholly nor ANGRY submitted any direct testimony. Mr. Sholly did, however, conduct cross-examination of all the witnesses on behalf of himself and ANGRY. Tr. 10,245 (Sholly). Proposed findings on these contentions were submitted by Mr. Sholly, the Licensee, and the Staff. Reply findings were filed by Mr. Sholly, the Licensee, and by the Commonwealth, but not by the Staff.

909. Extensive testimony was presented and considerable cross-examination was conducted on these contentions. The Staff's proposed findings summarize the record as well as we can and the Staff's conclusions generally agree with ours. Therefore, and in accordance with our statement that we would "adopt . . . findings substantially verbatim if they are complete, accurate, balanced, and supported by the . . . [evidentiary] record" (Board Memorandum to the Commission, February 9, 1981), we adopt Staff's PF ¶¶ 280-299 as our own with only minor changes and deletions. These modified findings follow.

910. The Licensee has performed a thorough review of the TMI-1 control room. Walsh, *et al.*, ff. Tr. 10,234, at 6. This review involved developing guidelines and objectives, constructing a full-scale control room mock-up, walking through key operational and emergency procedures, reviewing individual displays and controls on the principal panels and consoles, viewing alarm systems, and surveying environmental conditions in the control room. *Id.*, at 6-8. This in-depth review revealed areas where the design could be enhanced. *Id.*, at 9.

911. As a result of the control room design review, the Licensee is evaluating various modifications. All of the proposed modifications are being evaluated by a control room design review team. Certain improvements in the controls and displays will enhance the ability of the operators to react to feedwater transients and LOCAs. In addition, modifications to the controls and displays made as a result of lessons learned from the TMI-2 accident will improve the operators' ability to assimilate information and act upon such information in transients. Walsh, *et al.*, ff. Tr. 10,234, at 10-11. The following improvements are planned:

The emergency feedwater system will have mimic arrangement of the controls and displays of EFW clearly indicating the flow path from water sources through the pumps and major valves to the steam generators.

Instrumentation measuring the flow of emergency feedwater to each steam generator has been added with the displays integrated into the above described mimic.

Primary relief valves will have accelerometers attached to each valve as well as downstream flow measuring devices with indicators located on the main control boards.

The reactor building sump will have wide range level instrumentation installed with indicators in the control room.

An unambiguous indicator of the margin to saturation for both reactor hot legs will be installed in the control room.

The Engineered Safeguards Features Actuation System status panel in the Control Room will be modified to have more readable labels and brighter lights on the status indicators, improving the operators' ability to note abnormal status after system actuation.

Id., at 11-12.

912. In addition to the Licensee's control room design review, the NRC Staff performed its own review of the TMI-1 control room from July 21-25, 1980. Ramirez and Price, ff. Tr. 10,452, at 4; Tr. 10,437-95 (Ramirez). The purpose of the Staff's review was to identify human factors deficiencies and to require, prior to restart, the correction of those deficiencies which have an increased potential for causing operator error. Ramirez and Price, ff. Tr. 10,452, at 5. The review was performed by means of inspections of control room layout, environment, and consoles/panels; interviews with operators; and observation and videotaping of operators as they walked through selected emergency procedures. *Id.*, at 4; Tr. 10,487-94 (Ramirez).

913. As a result of its review, the Staff found certain design deficiencies in the TMI-1 control room. These design deficiencies are documented in NUREG-0752, Control Room Design Review Report for TMI-1 (Staff Ex. 2). The Staff is requiring the Licensee to correct these prior to restart or before 5 percent power operation. There are also some longer term requirements. Staff Ex. 2, at 23; Staff Ex. 15, at 12; Ramirez and Price, ff. Tr. 10,452, at 6-7. These deficiencies to be corrected as listed in NUREG-0752 are:

1.0 Annunciators and Alarms

The licensee's system lacks a separate acknowledge/silence control and permits operators to acknowledge alarms without reading alarm windows.

There is minimal annunciator prioritization. Some blue markings on ESAF alarm tiles are not readily identifiable.

Some annunciator tiles have busy legends.

2.0 Process Computer

The CRT display was of poor quality and could increase the probability of reading error.

The process computer capability is limited and its vintage raises the question of reliability of information presented to operators.¹⁰⁶

3.0 Controls (General)

A number of controls (J handle, etc.) located near the front edge of the operating console could be inadvertently activated.

Set point knobs on Bailey controllers do not lock, and can be accidentally rotated.

Plant convention is violated for auto/manual positions on some multiple position rotary controls (Sync. Scope and Voltage Regulator).

Legend switch covers are interchangeable.

Legend indicators contain numerous burned-out bulbs.

Many illuminated legend switches are difficult to read.

4.0 Displays (General)

Panel legend lights do not provide positive status indication because of poor contrast with panel background.

Glare is present on all vertical indicators resulting in reduced readability.

Bailey controllers indicate demand signal rather than valve position.¹⁰⁷

Normal operating ranges or set points are not indicated on vertical meters.

Most meters fail at mid-scale position.

For some motor driven valves, an open circuit breaker inhibits valve position indication because indicators are powered from the bus that the breaker drops.

Backlighted legends are difficult to read. Room lighting is dim, contrast is minimal, lettering is crowded and busy and discoloration on scratched surfaces is frequent.

¹⁰⁶ The Licensee is installing a new process computer. The new computer will not be fully operational prior to restart but some functions which will back up features of the original computer are expected to be operational. Staff Ex. 2, at 7.

¹⁰⁷ This item was originally listed in a different section in Staff Ex. 2.

No lamp test capability on control boards or panels.

5.0 Labeling (General)

Color meaning is not consistent.

In general, labels are used only at the component level, not at the group, function, system, or panel level.

The use of color labels is not consistent, for example, black/white background and print.

Makeshift labeling was observed on many components including penciled on switch nomenclature, hand lettered labels and vertical meter scale values and the use of dymo tape.

Labels are not all permanently attached.

Little or no use of demarcation lines to separate systems, sub-systems, functional grouping, etc.

Labels are wordy, because the function of a system is repeated on each switch of a group.

6.0 Control Display Relationship

6.1 General:

Related controls and displays do not consistently have both nomenclature and component designation.

6.2 Makeup and Purification System:

Makeup pumps are not grouped together.

Lacks positive indication of flow when makeup pump is running in the make-up mode.

It is impossible to verify a required reading of 3 gpm flow on the RC Makeup Flow Meter which has Scale Values of 0 to 16 ($\times 10$).

There is no Engineered Safeguards/Safety Injection annunciator window.

Engineered Safeguards Actuation Panel has blue status lights which are difficult to interpret as being "on."

DHR temp and DHR cooler temp indicators are side by side but have different scale multipliers.

DH, 5, 6, 7 valve controls are not included in mimic.

6.3 HVAC Systems:

No separation or demarcation of grouped J Handle control switches (9 in a row).

Labeling does not contain information which indicates time required for depressing and holding manual fan start control to start fan (varies by fan, 30 to 90 sec.).

7.0 Sound Levels

Main control board alarms is below ambient noise level.

Panel Left (PL) alarm is only 1 dbA above ambient noise level.

Right Panel Front (RPF) alarm is only 1 dbA above ambient noise level.

Liquid Waste System alarm is below the ambient noise level.

8.0 Other Observations

Diesel Generator Governor has no indication on J handle switch for fast/slow speed control which is inconsistent with other speed controls.

On DHR system, controls for loop A and B were not associated with their displays which are located approximately 8 feet away.

One DHR indicator and control switch are part of loop A panel are located on loop B panel.

Discrimination between systems and subsystems is difficult because of lack of use of demarcation lines and color coding.

Auxiliary Feedwater system lacks a flow meter.

Control/Display arrangements for the ICS (feedwater, steam level) are not apparent.

9.0 Remote Shutdown Panel (RSP)

The panel is not independent of the Control Room - all actions other than the starting and stopping of RC pumps are required to be performed in the control room and local areas of the plant.

Emergency lighting is not provided at this panel.

Communication from the RSP is by sound powered microphone with no microphone/head set located in the area.

10.0 Communications in the Control Room

Sound powered microphones/headsets are not readily available.

There are weaknesses in the radio communications system when communicating with a technician outside the CR area.

There are some inoperable page telephones in the plant area. Some areas in the plant are not reachable by telephone.

11.0 Operator Emergency Equipment

Three Scott Air Packs are kept in the CR; however, during emergency operations there are eleven people planned to be in the CR.

12.0 Emergency Procedures

Immediate action steps in some procedures are too detailed and some require an excessive number of steps to be completed immediately.

Some immediate action steps which require two operators to implement are not so noted.

Some procedures, have "notes" which are actually immediate action steps.

Some procedures reference control and display labels which have functions different from the functions actually used on the labels.

13.0 Lighting

Normal and emergency lighting was not specifically designed for reading labels, displays and meters, *i.e.*, problems with contrast, glare and illumination levels.

Direct glare from overhead lights on both controls and displays make readability difficult.

14.0 General Comments

Sub-cooling instrumentation is not in place and operating.

In-core thermocouples (tc_s) have been connected to the process computer, a monitoring program (software) has been written and the system is in the checkout process. The applicant's system contains 52 in-core thermocouples with readout range of 2300°F. Thermocouple information will be displayed on the Bailey computer console by use of a CRT, and hard copy printed on demand. A back-up system display with a capability for selective reading of a minimum of 16 operable thermocouples, 4 from each quadrant, all within a time interval no greater than 6 minutes, power from a power source independent of the process computer/CRTs will be required prior to restart.

Staff Ex. 2, at 6 through 23.

914. The Licensee committed to performing all the NUREG-0752 recommended corrections prior to restart with three exceptions. See Tr. 10,281 (Walsh); Tr. 10,456-57 (Ramirez). These exceptions were: Item 2.b (Staff Ex. 2, at 7) involving the installation of the process computer; Item 9.a (Staff Ex. 2, at 138) involving the independence of the remote shutdown panel from the control room; and Item 14.c (Staff Ex. 2, at 22-23) involving a backup system display for in-core thermocouple readouts. Tr. 10,546-47 (Ramirez). After lengthy discussion concerning the process computer (Item 2.b) (Tr. 10,510-86), the Staff testified that, upon hearing the Licensee's explanation of its use of the process computer, this particular point seemed to be resolved. Tr. 10,586 (Ramirez). With respect to Item 9.a, the remote shutdown panel, the Licensee intends to comply with the newly issued Appendix R to 10 CFR Part 50 which is also concerned with the remote shutdown panel. Tr. 10,385 (Walsh). Finally, the Licensee has agreed to meet the requirements of Item 14.c, in-core thermocouple readouts. Tr. 21,431-32 (Baxter). So, it appears to the Board, and we require, that all of the NUREG-0752 requirements will be met.¹⁰⁸

915. The Staff Division of Human Factors Safety has made specific arrangements with the Office of Inspection and Enforcement to follow up on the implementation of the changes to the TMI-1 control room. Tr.

¹⁰⁸ There are many references in Staff Exs. 2 and 15 to deficiencies which *will be* addressed in the Licensee's Detailed Control Room Design Review (DCRDR) report. This wording is somewhat confusing in that the DCRDR seems to have been written and submitted about the same time as Staff Ex. 2 (Dec. 1980) and well before the issuance of Staff Ex. 15 (April 1981). See also Staff Ex. 15, at 5. We assume that Staff and Licensee will discuss further the acceptable solutions to these deficiencies and that the solutions in the DCRDR of December 1980 are not necessarily the final word.

10,502 (Ramirez). A further review by the Staff human factors specialists will be necessary prior to restart because some of the changes involve inspection of changes which are simply not within IE's capabilities. Tr. 10,503 (Ramirez). Sholly PF ¶ 144. The Board agrees that these arrangements are appropriate and that the human factors specialists should be called on when needed.

916. With the changes recommended in NUREG-0752 completed, the TMI-1 control room would satisfy all the requirements which an applicant for a new operating license must satisfy with respect to control room design. Ramirez and Price, ff. Tr. 10,452, at 5; Tr. 10,460 (Ramirez).

917. The design of the TMI-1 control room does not violate GDC 13. Ramirez and Price, ff. Tr. 10,452, at 6; Walsh, *et al.*, ff. Tr. 10,234, at 12-13. GDC 13 states:

Instrumentation shall be provided to monitor variables and systems over their anticipated ranges for normal operation, for anticipated operational occurrences, and for accident conditions as appropriate to assure adequate safety, including these variables and systems that can affect the fission process, the integrity of the reactor core, the reactor coolant pressure boundary, and the containment and its associated systems. Appropriate controls shall be provided to maintain these variables and systems within prescribed operating ranges.

10 CFR Part 50, Appendix A. At TMI-1, instrumentation necessary to monitor an accident has been provided in accordance with GDC 13. Ramirez and Price, ff. Tr. 10,452, at 6; Walsh, *et al.*, ff. Tr. 10,234, at 12. The original design process at TMI-1 included a careful review of the instrumentation and controls by both the designers and operators to insure that adequate instrumentation was available for normal and emergency operation. Walsh, *et al.*, ff. Tr. 10,234, at 13. Although there are some human factors deficiencies in the design of the TMI-1 control room (Ramirez and Price, ff. Tr. 10,452, at 5-6), they do not constitute a violation of GDC 13 because the criterion is not concerned with human factors engineering standards and principles. *Id.*, at 6.

918. ANGRY Contention V(C) refers to modifications in the design and layout of the TMI-1 control room as recommended in NUREG-0560. For various reasons, one being that ANGRY did not present testimony on this issue, NUREG-0560 was not admitted into evidence. Nonetheless, we quote here what seems to be the section of NUREG-0560 pertinent to the instant discussion:

More emphasis on human factors engineering should be placed on the design and layout of control rooms. System identification and

location of instruments should be analyzed to improve operator response during an abnormal or emergency operation.

NUREG-0560, May 1979, at 8-12. In view of the discussion in the paragraphs above, we feel that there has been appropriate disposition of the concerns expressed in ANGRY Contention V(C).

919. Both ANGRY Contention V(C) and Sholly Contention 15 were written prior to Licensee's commitment to make changes in the TMI-1 control room. We believe that the extensive changes described above have met most of their concerns which were valid at the time of writing. They have, in general, prevailed with their contentions. We believe that Mr. Sholly will probably agree that he has prevailed. He acknowledges the extensive reviews of the TMI-1 control room by the Licensee and NRC Staff and he identifies the principal remaining issue as being the follow-up by the NRC to assure the full implementation of Licensee's commitments for improvement. Sholly reply finding ¶ 60. We were however puzzled by Mr. Sholly's reply finding ¶ 62 where he has seen the need to reassess without analysis or explanation his original proposed findings ¶¶ 156-60. As to most of the issues raised by these findings, we believe that Licensee has correctly identified the problem, *i.e.*, Mr. Sholly has overlooked additional commitments made by the Licensee. Compare Sholly PF ¶¶ 156-60 with Licensee reply findings ¶¶ 152-54. These commitments meet the major thrust of his proposed findings with respect to "push to test" lamps (PF ¶ 156); alarm and annunciator system (PF ¶ 157) and operations-related communications (PF ¶¶ 158-59).¹⁰⁹

920. Mr. Sholly has not prevailed however, on his proposal that control room activities be video and audio-taped. PF ¶ 160. He has offered nothing more than his own judgment that taping would be useful and not de-

¹⁰⁹ Neither Mr. Sholly, the Board, nor for that matter, the Licensee, is satisfied with the present plant paging system. Sholly PF ¶ 159; Licensee PF ¶ 154. As Mr. Sholly notes (PF ¶ 159), the Board itself observed problems with the page phone system during our site visit. Anonymous whistling, silliness, and inane sounds heard over the page amplifier were, to say the least, incongruous with our expectations of a serious environment for a serious undertaking. We are convinced, however, the Licensee's management is no less annoyed by the problem that were we. Licensee PF ¶ 154. Licensee explains that it expects to begin the in-plant communications study sought by Mr. Sholly in 1981 and to complete it in 1982, which, we believe, satisfies Mr. Sholly's proposed finding ¶ 159. Licensee PF ¶ 154. The underlying problem as we viewed it, however, was not the adequacy of the paging system, or the fact that it can be used anonymously, but that the *whistling, giggling person(s)* who abused it during our visit was loose in a nuclear power plant. We encourage the Licensee to continue to attack the problem by disciplinary action as well as by technology.

trimental. The evidence on the issue did not demonstrate to the Board that the potential advantages outweighed the inhibiting effect that taping would have. Tr. 10,498-99 (Ramirez, Price). Since there is no actual experience on the value and detriments of such a proposal, and because it is a highly human consideration, it is a very subjective issue. Our view is that free and open expression in the control rooms has a greater value than an after-the-fact examination of the operators' words and actions, particularly where it has not been demonstrated that existing recording devices are inadequate.

O. Additional LOCA Analysis

921. UCS Contention 8, which was withdrawn but retained as a Board Question,¹¹⁰ reads as follows:

10 CFR 50.46 requires analysis of ECCS performance "for a number of postulated loss-of-coolant accidents of different sizes, locations, and other properties sufficient to provide assurance that the entire spectrum of postulated loss-of-coolant accidents is covered." For the spectrum of LOCAs, specific parameters are not to be exceeded. At TMI, certain of these were exceeded. For example, the peak cladding temperature exceeded 2200° Fahrenheit (50.46(b)(1)), and more than 1% of the cladding reacted with water or steam to produce hydrogen (50.46(b)(3)). The measures proposed by the Staff address primarily the very specific case of stuck-open power operated relief valve. However, any other small LOCA could lead to the same consequences. Additional analyses to show that there is adequate protection for the entire spectrum of small break locations have not been performed. Therefore, there is no basis for finding compliance with 10 CFR 50.46 and GDC 35. None of the corrective actions to date have fully addressed the demonstrated inadequacy of protection against small LOCAs.

ECNP's similar Contention 1(e) admitted only to extent that ECNP was permitted to adopt UCS Contention 8. First Special Prehearing Conference Order, LBP-79-34, 10 NRC 828, 844 (1979).

922. The Licensee submitted testimony on this issue through Robert C. Jones, Jr. and T. Gary Broughton (ff. Tr. 5038). The Staff's testimony was presented by Walton L. Jensen, Jr. (ff. Tr. 5496 and Tr. 15,808) and by Denwood F. Ross, Jr. and Robert A. Capra (ff. Tr. 15,806). UCS did not

¹¹⁰ Memorandum and Order of Prehearing Conference of August 12-13, 1980, dated August 20, 1980, at 6.

present any direct testimony but did cross-examine both the Staff and the Licensee witnesses extensively. See generally Tr. 5125-88, 5209-75, 5305-39, and 5497-589. The Commonwealth of Pennsylvania also participated in cross-examination. See generally Tr. 5191-99, 5589-99. Although it was notified, ECNP was not present at the hearing on this subject and did not participate in cross-examination. See Tr. 5044. Proposed findings on this issue were submitted by the Staff and the Licensee, reply findings by Licensee only.¹¹¹

923. A LOCA is defined in 10 CFR 50.46 as a coolant loss in excess of the capability of the reactor coolant makeup system. Jensen (LOCA Analysis), ff. Tr. 5496, at 4. A stuck-open PORV which is not isolated by the operator would produce the equivalent of a small-break LOCA (SBLOCA). *Id.*

924. Contrary to the assertions in UCS Contention 8, the Licensee stated that compliance with 10 CFR 50.46 has been demonstrated and adequate protection for SBLOCAs is provided. Jones and Broughton (Additional LOCA Analysis), ff. Tr. 5038, at 2. Extensive small-break analyses have been performed for TMI-1 and these analyses show that small LOCAs can be mitigated within 10 CFR 50.46 criteria. In addition, small-break analyses have been performed to develop improved emergency procedures. *Id.*, at 11.

925. Before the TMI-2 accident, SBLOCA evaluations were performed to verify the conformance of TMI-1 to 10 CFR 50.46. These analyses identified the break location which imposed the most severe requirements on the ECCS. A worst single failure assumption analysis and an analysis of a spectrum of breaks in the reactor coolant pump discharge piping was performed using the B&W ECCS evaluation model which the NRC has approved as meeting Appendix K to 10 CFR Part 50. Conformance to 10 CFR 50.46 was demonstrated for the worst case break since peak cladding temperature was less than 1100°F and no metal-water reaction or cladding rupture was calculated to occur. The pre-TMI-2 analysis assumed use of only safety-grade equipment for mitigation and no mitigating operator actions within 10 minutes of the initiating event, except EFW was assumed to be available and operator action to cross-connect the HPI was determined to be needed in the event of a small break in the RCP discharge piping and postulated HPI train failure. *Id.*, at 2-3.

926. After the TMI-2 accident, additional SBLOCA analyses were performed. Since the TMI-2 accident was aggravated by operator actions, the purpose of these analyses was to provide an improved analytical basis

¹¹¹ Following receipt of testimony on this subject, Licensee submitted a letter to the Board dated June 4, 1981. This letter and attachments contain information relevant to SBLOCA analyses. We discuss the contents of this letter below.

for emergency operating procedures for SBLOCAs but not to demonstrate 10 CFR 50.46 compliance. Tr. 5131 (Jones); Tr. 5572-3 (Jensen). The post-TMI-2 analyses extended the lower end of the break spectrum previously analyzed, assessed the effect of feedwater system failures, and made an assessment of SBLOCAs with delayed RCP trip. Mr. Jones testified that these analyses led to the conclusion that multiple failures must occur before a LOCA scenario can challenge 10 CFR 50.46 limits. Jones and Broughton (Additional LOCA Analysis), ff. Tr. 5038, at 4-5. Mr. Jones also testified that no single failure will wipe out the emergency feedwater system. Tr. 5132 (Jones).

927. As did the pre-TMI-2 analyses, the post-analyses assumed use of only safety-grade equipment for accident mitigation, no mitigating operator actions within 10 minutes of the initiating event (Tr. 5168-70 (Jones)), except EFW was assumed available and operator action to cross-connect the HPI was determined to be required in the above described certain event. Also, manual action of tripping the RCPs following automatic initiation of HPI was assumed. Jones and Broughton (Additional LOCA Analysis), ff. Tr. 5038, at 3, 8.

928. Based upon these analyses and following the TMI-2 accident, B&W developed operator guidelines for managing SBLOCAs. TMI-1 procedures have been subsequently developed to implement these guidelines. *Id.*, at 10.

929. The TMI-1 emergency procedures strongly emphasize maintaining RCS pressure-temperature relationships to assure that a subcooling condition of at least 50°F exists. If the 50°F subcooling cannot be maintained, the procedure requires the HPI to be reactivated. Where HPI is manually initiated, slow reductions are permitted only if certain criteria are met. *Id.*, at 10-11.

930. Among the conditions for terminating HPI is the 50°F subcooling margin. At the time of restart of TMI-1 there will be meter indication of subcooling. The Licensee believes that this is adequate and that a level indicating cooling or inventory is not needed.¹¹² The current guidelines developed to deal with SBLOCAs can be implemented using instrumentation that will be available at restart. Tr. 5206-07 (Jones, Broughton).

¹¹²See also Section B, Detection of Inadequate Core Cooling, above, for further discussion of the subcooling meter and the reactor coolant level indicator.

931. Responding to the Board, Mr. Jones testified that, in the short-term, with respect to SBLOCAs, regardless of the size and with no other failures, Section 50.46 criteria can be met without any operator actions. In the long-term, there are required manual actions of raising the steam generator level and sump switchover. Tr. 5199 (Jones).

932. All analyses have confirmed that the plant can be maintained in a safe condition as defined by 10 CFR 50.46 during a SBLOCA without the RCPs operating during the transient. Moreover, prompt tripping of the pumps upon indication of a LOCA assures adequate core cooling is provided. Jones and Broughton (Additional LOCA Analysis), ff. Tr. 5038, at 9.

933. On June 4, 1981, following receipt of testimony on the subject of SBLOCA analysis, the Licensee served on the parties a letter with attached B&W report discussing an SBLOCA at the RCP suction.¹¹³ The B&W report observes that in post-TMI-2 analyses, including scenarios where EFW was assumed not to be available, the assumed worst case location was the RCP *discharge*. However, as the B&W report states, this may not be as conservative an assumption as a break at the RCP *suction* since under the conditions at the time of coolant blowdown, lower quality fluid is being lost and therefore the inventory depletion rate is higher. In these SBLOCA situations where HPI does not actuate automatically and EFW is not available, operator actuation of one of these systems is required to prevent unacceptable conditions in the reactor core. And, with an RCP *suction* break, the time for operator action is less than with the *discharge* break location, but the difference in time is unknown since it appears that the analysis has not been done.

934. We note that this situation will be considerably improved with the installation of a fully safety-grade EFW system. However, until this is done, one must assume operator action to reinitiate feedwater. So, we have here an unreviewed accident involving potential increased demands on the operating crew, at least until EFW upgrading is complete.

935. The Board must state that the timing of this Licensee submittal is unfortunate. The attached B&W report which is dated March 25, 1981 discusses a subject on which the Board was hearing testimony *the week before*. It would have been much better to have brought up the matter during the hearing. However, that is *fait accompli* at this point, and we don't believe the question of sufficient import to reopen the hearing. But at the same time, we cannot let the matter lie. Therefore, we specify as a condition for restart that this missing analysis be performed, if not already done, and submitted to the Staff for their review. Further, we require that

¹¹³Letter of Baxter to Board dated June 4, 1981 w/attached Metropolitan Edison letter dated May 26, 1981 and B&W report dated March 25, 1981.

the Staff bring this to the Commission's attention for resolution, if in their opinion this unreviewed analysis is shown to yield unacceptable results. The Board would consider unsatisfactory a resolution which assumes that an SBLOCA with delayed feedwater is so unlikely an event that it is outside the design basis and therefore need not be analyzed. This was one option listed by the Licensee.

936. The Staff believes, as does the Licensee, that the ECCS evaluation for TMI-1 is in conformance with 10 CFR 50.46 and that the ECCS will provide adequate protection against the entire spectrum of SBLOCAs. Mr. Jensen testified that the corrective actions when fully completed by the Licensee will fully address the problems of protection against SBLOCA demonstrated by TMI-2 events. Jensen (LOCA Analysis), ff. Tr. 5496, at 6-7.

937. Mr. Jensen confirmed that the B&W small break evaluation model was approved by the NRC Staff. The basis of the approval was compliance with Appendix K to 10 CFR Part 50. The Staff has no reason to change its conclusion concerning the acceptability of the model. *Id.*, at 4.

938. The spectrum of SBLOCA analyses was performed generically for all B&W operating plants with lowered primary coolant loops such as TMI-1. *Id.*, at 4-5.¹¹⁴

939. Cold leg breaks at the RCP discharge between the RCP and the reactor vessel were found to be the most limiting since the analyses predicted approximately 30 percent of the ECCS water might be lost through the break for this location. *Id.*, at 5. In a May 7, 1979 B&W submittal (Licensee Ex. 5), a postulated stuck-open PORV with no operator action to close the block valve was analyzed. It found that more fluid was lost from the reactor vessel for all small cold leg breaks than for a stuck-open PORV case. Under the stuck open PORV case, no core uncover occurred. However, some core uncover was predicted for certain cold leg break cases. Jensen (LOCA Analysis), ff. Tr. 5496, at 5.

940. In the small break analysis, a .07 ft² break at the RCP discharge was identified as the SBLOCA producing the highest peak cladding temperature. Breaks larger or smaller than .07 ft² were found to produce lower peak cladding temperatures. The Staff has approved the spectrum calculations as being applicable to TMI-1. *Id.*, at 5-6.

941. The Staff agrees that the small break analyses results were within 10 CFR 50.46 limits. Specifically, Mr. Jensen testified that the most limiting .07 ft.² break at the pump discharge produced a peak cladding

¹¹⁴ Mr. Jensen had no way of knowing at the time of his testimony that the worst assumed location for the SBLOCA would not have been analyzed.

temperature of 1095°F, well below the 2200°F maximum temperature limit of 10 CFR 50.46 and also well below the metal-water reaction temperature. *Id.*, at 6.

942. The Staff found the extent of these TMI-1 analyses to be sufficient to serve as an analytical basis for developing improved operator guidelines for handling SBLOCAs. *Id.*, at 5.

943. Mr. Jensen discussed the corrective measures that have been or will be taken at TMI-1 to improve protection against SBLOCAs (other than a stuck-open PORV). These measures include: (a) the modification of the small-break emergency procedures to require the ECCS not be terminated unless the temperature of the reactor system water is 50°F less its boiling point as measured by the temperature sensors in the hot legs which will ensure the core is adequately cooled and natural circulation is maintained, (b) the retraining of TMI-1 operators to follow the modified procedures, (c) the modification of the EFW system to improve its reliability,¹¹⁵ and (d) the improvement of the HPI system by adding cavitating venturis and cross-connection lines. With these HPI modifications it will no longer be necessary, in the event of an SBLOCA, for the operator to manually balance flow in the HPI lines using valving. Also, adequate HPI flow will be available for core cooling by preventing extensive HPI loss from a break in the HPI line or at a point near the HPI cold leg nozzle. *Id.*, at 7; Tr. 5605 (Jensen). The system being installed will automatically perform the balancing of HPI flow. Tr. 5605 (Jensen).

944. Mr. Jensen testified that something less than .005 ft.² would be a minimum size SBLOCA at TMI-1, depending on whether the leak is a fluid or steam leak and what makeup flow rate is available. The analysis for this size assumed one HPI pump to be operating and no makeup pumps operating. Tr. 5497-98 (Jensen). Two HPI pumps should not be necessary for any size break, provided EFW is available. Tr. 5501 (Jensen). For an assumed loss of EFW and breaks of .01 ft.² and less, two HPI pumps would be necessary in the feed and bleed mode to assure core cooling, using the usual decay heat rate assumption of 1.2 times the ANS standard. Tr. 5501-02 (Jensen).

945. Responding to the Board, Mr. Jensen testified that the Staff does not consider the HPI system as the safety system to rely on for small breaks but rather considers it a backup system. This is because it is available and could be used for an interim period until EFW or some main FW could be restored. The Staff relies on the EFW system to meet Appendix K small break criteria. Tr. 5503 (Jensen).

¹¹⁵The Board notes that the EFW system will, at time of restart, have been improved to safety grade for these SBLOCAs. Tr. 6200-01 (Wermiel). See also Section Q, below.

946. The pre-TMI-2 accident analyses, to verify conformance with 10 CFR 50.46, did not disclose a situation requiring EFW. Tr. 5590 (Jensen). This is because the preaccident analyses were for large breaks at the pump discharge which would depressurize rapidly causing the primary system temperature to be lower than the secondary system, so that secondary system heat removal would not be required. Tr. 5504 (Jensen).

947. The post TMI-2 analysis, Mr. Jensen explained, did not assume the operator raised the water level of the steam generator. In addition, RCPs were assumed not to be operating. Mr. Jensen testified that the analysis revealed that if the RCPs operated for certain break sizes and were tripped when the reactor system was highly voided, 10 CFR 50.46 limits could be exceeded. Tr. 5573-74 (Jensen).

948. The Staff stated that the feed and bleed mode will provide core cooling for these very small breaks for which EFW is needed. Until EFW is restored, there are certain scenarios where the Staff relies on the feed and bleed mode to meet 10 CFR 50.46, and for those very small breaks without EFW, the Staff depends on the operator to manually operate HPI. For breaks sizes .01 ft² and larger in the cold leg pump discharge, the Staff relies on the ECCS. Tr. 5586-88 (Jensen). Feed and bleed will provide adequate cooling for any break size, if at least two HPI pumps are available. Tr. 5589 (Jensen).

949. The Staff's position is that below break sizes of about .02 ft², the EFW system is required to sufficiently remove decay heat. This then would permit one train of HPI system to adequately cool the core. Simply, the Staff believes that for all small breaks, one HPI train is required and for breaks smaller than .02 ft², EFW (or a second HPI train) is also required to prevent the core from being overheated. Responding to Board queries, Mr. Jensen commented that for very small breaks the core would be cooled for some time even without EFW but with one HPI train operating. The safety valves would open in this scenario and water would be lost from the system. Then, unless either another HPI train or EFW were actuated the core might become uncovered. The conditions under which EFW is required to prevent uncover is for breaks smaller than .02 ft². Tr. 5601-03 (Jensen). The analyses involved assumed EFW system was operable to meet the core damage limits of 10 CFR 50.46. The EFW is needed to meet those limits and, for certain break sizes, RCP trip is also needed. Tr. 5603-04 (Jensen).

950. According to Mr. Jensen one of the main lessons learned from the TMI-2 accident was to not turn off the HPI water when it turned on automatically. The B&W analysis assumed the HPI came on and was operating until the reactor coolant system is shown to be refilled. Tr. 5595 (Jensen).

951. The B&W LOCA analyses cover the full spectrum of sizes and breaks. The Licensee will also perform, in the long-term, additional studies and analyses in accordance with Staff requirements. Tr. 5582-5584 (Jensen).

952. The Board finds, based on the facts presented on the record and with the exception of the new analyses specified above, that compliance with 10 CFR 50.46 has now been demonstrated. The Staff explained that the corrective actions set out above, when completed, will address the problems of protection against SBLOCAs demonstrated by the TMI-2 accident. The analyses were adequate and are supported by corrective measures that have or will be taken at TMI-1 to improve the protection against SBLOCAs.

953. When it adopted UCS Contention 8, the Board also directed

the staff and the licensee to present experts and the fundamental documents involved in the small break LOCA analysis, and to have very complete testimony on this subject. The recommendations of NUREG-0565 and NUREG-0623 should be addressed.

It appears from the small break LOCA analysis that there is a large amount of reliance upon operator action and on nonsafety-grade equipment. The Board wants that issue explored by testimony, including why such reliance is proper.¹¹⁶

Memorandum and Order, September 8, 1980, at A-10. The Staff and the Licensee discussed the applicable recommendations contained in NUREG-0565 (Board Ex. 4) and in NUREG-0623 and why the reliance placed by the SBLOCA analyses on operator action and on nonsafety-grade equipment is proper. Ross and Capra, ff. Tr. 15,806; Jensen (Board Question on UCS 8), ff. Tr. 15,808; Jones and Broughton (Board Question on UCS 8), ff. Tr. 5038.

954. In early May 1979, the Bulletins and Orders Task Force (B&OTF) was formed within the Office of Nuclear Reactor Regulation under the direction of Dr. Denwood F. Ross. The B&OTF was responsible for reviewing and directing the TMI-2 related staff activities on loss of feedwater transients and SBLOCAs for all operating reactors to assure their continued safe operation. It was the responsibility of Mr. Capra and

¹¹⁶This is yet another example demonstrating why the Board found it necessary to reopen the record on the implications of cheating on operator examinations.

Mr. Jensen to evaluate the information requested from B&W related to SBLOCAs and to publish the results in NUREG-0565 (Board Ex. 4). Ross and Capra, ff. Tr. 15,806, at 4.

955. Concurrently with work of the B&OTF, many investigations into the accident at TMI-2 were conducted. Each investigation and special task force developed its own independent set of recommendations. As one would expect, many of the recommendations overlapped and intertwined with the recommendations of other groups. Therefore, in order to develop a complete and orderly set of TMI-2 related recommendations, the TMI Action Plan (NUREG-0660) was developed. The recommendations spawned by the investigative bodies and special task force reports, including NUREG-0565, was thus incorporated into NUREG-0660. Where individual recommendations overlapped with others, the intent of the individual recommendations was incorporated into items of the Action Plan that had a larger and broader scope. All 22 of the recommendations contained in NUREG-0565 were incorporated into the Action Plan as subitems of II.K.2 or II.K.3. *Id.*, at 5-6.

956. Of the 22 recommendations originally contained in NUREG-0565, 20 apply to TMI-1. Of the 20 remaining recommendations:

- (1) Five of the original NUREG-0565 recommendations have been extracted directly from the Action Plan and will be implemented on TMI-1 in accordance with the schedule shown in NUREG-0737:

- 2.1.2.a Auto Block Valve Closure System
- 2.1.2.d Evaluation of Safety Valve Reliability
- 2.2.2.a Analysis Methods for SBLOCA-Appendix K
- 2.2.2.b Plant Specific Analysis-10 CFR 50.46
- 2.3.2.a Auto Trip of RCPs during SBLOCA

- (2) Eight of the original NUREG-0565 recommendations have been incorporated into other items of the Action Plan. As such, they do not have an individual implementation. They will be implemented on TMI-1 in accordance with the scope and schedule of the recommendation into which they have been incorporated. These items also appear in NUREG-0737:

- 2.2.2.c Effect of CFT [Core Flooding Tank] Injection
- 2.6.2.a Verify Two-Phase Natural Circulation Models
- 2.6.2.b Instrumentation for Natural Circulation
- 2.6.2.c Analysis-SBLOCA in Pressurizer Spray Line
- 2.6.2.e Effects of CFT & HPI Slugging

- 2.6.2.g Predictions of LOFT Test L3-6
- 2.6.2.h Information of Noncondensable Gases

(3) Five of the original NUREG-0565 recommendations have been extracted as part of the fuel load and full power requirements stated in NUREG-0694 and as such, they will be required to be implemented on TMI-1 prior to restart:

- 2.1.2.b Evaluation of PORV Opening
- 2.1.2.c PORV Reporting Requirements
- 2.1.2.e Safety Valve Reporting Requirements
- 2.6.2.f Evaluation of RCP Seal Damage
- 2.6.2.i Effects of Slug Flow on OTSG Tubes

(4) The two remaining original NUREG-0565 recommendations have been incorporated into other items of the Action Plan for which plant specific requirements have not yet been developed. Therefore, until further guidance is issued by the Staff, no licensee action is required:

- 2.3.2.b Reliability of Nonsafety-Grade Equipment
- 2.3.2.c Simulator Improvements

957. In their written testimony Dr. Ross and Mr. Capra discuss each of the 20 NUREG-0565 recommendations. They set forth each of the recommendations, the Licensee's and the Staff's positions on the recommendations, and the method through which the recommendations will be implemented. Ross and Capra, ff. Tr. 15,806, at 9-10. The Licensee also discussed its response to each of the recommendations in NUREG-0565. Jones and Broughton (Board Question on UCS 8), ff. Tr. 5038, at 2.

958. Mr. Jensen in his written testimony dealt specifically with the seven recommendations of NUREG-0565 which relate to SBLOCA analyses. These are items 2.2.2.a, 2.2.2.c, 2.6.2.a, and 2.6.2.g (concerning computer models) and items 2.2.2.b, 2.6.2.c, and 2.6.2.d (concerning additional analyses). Jensen (Board Question on UCS 8), ff. Tr. 15,808, at 2.

959. Items 2.2.2.a, 2.2.2.c, 2.6.2.a, and 2.6.2.g involve the need to confirm specific model features against applicable experimental test data. The recent tests against which present small-break LOCA models can be both qualitatively and quantitatively assessed include the entire Semiscale small-break test series and LOFT test L3-1 and L3-2. Other separate effects tests (e.g., ORNL core uncover tests) and future tests, as appropriate, should also be factored into this assessment. The NRC Staff believes that further refinement of the small break LOCA models is

desirable in understanding the sequence of events during the accident but that the current model and calculations are in conformance with 10 CFR 50.46. *Id.*, at 2-3.

960. With respect to items 2.2.2.b, 2.6.2.c, and 2.6.2.d, Mr. Jensen stated that if model deficiencies are discovered as a result of the above data comparisons, the NRC will require that the ECS models be revised and the small-break spectrum analyses for TMI-1 be repeated (item 2.2.2.b). The additional analyses recommended in items 2.6.2.c and 2.6.2.d involve multiple system failures which would fall within the range of the break spectrum already analyzed. Operator action in dealing with these events will be included in Task I.C.1 of the TMI-1 Action Plan.

961. Based on the testimony presented and with reservation in regard to the new analysis specified above, the Board finds that the Staff and Licensee have adequately addressed the recommendations of NUREG-0565.

962. NUREG-0623¹¹⁷ was also issued in response to the TMI-2 accident. Shortly after the accident at TMI-2, the NRC issued IE Bulletins to all pressurized water reactor (PWR) licensees that instructed them in the event of HPI initiation to maintain forced flow in the reactor coolant system. At that time, forced circulation with the RCPs was thought not only to be acceptable but preferred. More extensive analyses were performed by all PWR vendors and the Staff in the months that followed the accident. In some cases, vendor analyses concluded that either delayed trip or continuous operation of the RCPs during a small break LOCA could possibly lead to inadequate core cooling and excessive clad temperatures. Ross and Capra, ff. Tr. 15,806, at 51.

963. The B&W analyses, however, showed that if the RCPs remained running during the accident, the core would remain acceptably cool. However, the continuous operation of RCPs resulted in the generation of a high system void fraction in the coolant early in the accident. This void fraction was shown to remain relatively high until the system depressurized enough to actuate the low pressure injection system and recover the system liquid inventory. Because the system voided to such a high value, B&W examined what would happen if the pumps were tripped at some time into the accident when the system void fraction was high. These calculations

¹¹⁷ NUREG-0623, Generic Assessment of Delayed Reactor Coolant Pump Trip During Small Break Loss-of-Coolant Accidents in Pressurized Water Reactors.

showed that at the time of the pump trip, the liquid that was previously dispersed around the primary system, through pumping action, now collapsed down to the low points of the primary system, such as the bottom of the vessel and steam generators. For small breaks between 0.2 and 0.025 ft², this resulted in a significant uncover of the reactor core. Since the HPI system could not refill the reactor vessel in time, an insufficient amount of liquid was available to provide acceptable core cooling. *Id.*, at 51-2.

964. Based upon their review of these analyses and similar analyses performed by the other vendors, the Staff issued IE bulletin 79-05C/06C on July 26, 1979. In addition to follow up analyses required by the Bulletin, each Licensee was instructed to immediately trip all operating RCPs upon reactor trip and initiation of HPI caused by low reactor coolant system pressure. All licensees were further required to provide two licensed operators in the control room at all times during operation to accomplish this action and other follow-up actions required during such an occurrence. As part of the long-term action required by the Bulletin, each licensee was required to propose and submit a design which would assure automatic tripping of the operating RCPs under all circumstances in which this action may be needed. *Id.*, at 52.

965. The purpose of publishing NUREG-0623 was to present the results of the Staff review of the vendor analyses submitted in response to IE Bulletin 79-05C/06C and to present the Staff's conclusions based upon that review. Based upon these conclusions, presented in Section 6.0 of the report, it was quite clear that additional research and analyses would have to be done by both industry and the Staff in order to completely answer questions associated with the pump trip issue. *Id.*,

966. The Licensee also addressed the NUREG-0623 conclusions in its testimony by Mr. Jones and Mr. Broughton. Jones and Broughton (Board Question on UCS 8), ff. Tr. 5038. The Board finds that the Staff and the Licensee have adequately addressed the conclusions reached in NUREG-0623 as discussed by the Staff. See Ross and Capra, ff. Tr. 15,806 at 51.

967. With respect to reliance on operator action and on nonsafety-grade equipment, the Staff testified that the assumption that the operator manually trips the reactor coolant pumps immediately following a small break LOCA is the only reliance on nonsafety-grade equipment and the only operator action assumed in the analyses of small break LOCAs. Tr. 15,813 (Jensen).¹¹⁸ An additional operator will be available in the TMI-1 control

¹¹⁸ The Board does not believe this statement of Jensen to be complete by itself. Earlier, he testified that either 2 HPI trains or one HPI train plus EFW would be required. So, until EFW is fully upgraded, this additional operator action would be needed. However, our conclusions remain unchanged.

room to trip the reactor coolant pumps. The operators will be trained to perform this action. Staff Ex. 1, at C1-16. Four operational transients in PWRs (North Anna Unit 1, Prairie Island, Arkansas Nuclear One, Unit 2 and Crystal River 3) which occurred in 1979 and 1980 have indicated that operators have acted promptly in tripping the reactor coolant pumps when safety injection signals were received at those facilities. The Staff believes that the manual trip requirement at TMI-1 is adequate in the interim period while the need for an automatic trip is evaluated under the Action Plan. Jensen (Board Question on UCS 8), ff. Tr. 15,808, at 4.

968. The Licensee's witnesses testified that both the pre-and post-TMI-2 accident LOCA analyses assumed the use of only safety-grade equipment for accident mitigation and assumed no mitigating operator actions within 10 minutes of the initiating event, except (1) EFW was assumed to be available and (2) operator action to cross-connect the HPI was determined to be required in the event of a small break in the RCP discharge piping and the postulated failure of the HPI train which discharges into the unbroken coolant loop. Modifications of the HPI lines have been made to add cross connections and flow limiting devices to ensure sufficient flow without operator action. Jones and Broughton (Additional LOCA Analysis), ff. Tr. 5038, at 3, 4, 8.

969. The Board finds, based on the testimony presented by the Staff and the Licensee that, while the SBLOCA analyses rely to a limited extent on operator action and on nonsafety-grade equipment, such reliance is not excessive and should not endanger the health and safety of the public.

970. The Board further finds that the additional SBLOCA analysis required by us and discussed above should be completed and reviewed by the Staff prior to restart.

P. Systems Classification and Interaction

971. UCS Contention 14 states as follows:

The accident demonstrated that there are systems and components presently classified as nonsafety-related which can have an adverse effect on the integrity of the core because they can directly or indirectly affect temperature, pressure, flow and/or reactivity. This issue is discussed at length in Section 3.2, "System Design Requirements", of NUREG-0578, the TMI-2 Lessons Learned Task Force Report (Short Term). The following quote from page 18 of the report describes the problem:

There is another perspective on this question provided by the TMI-2 accident. At TMI-2, operational problems with the conden-

sate purification system led to a loss of feedwater and initiated the sequence of events that eventually resulted in damage to the core. Several nonsafety systems were used at various times in the mitigation of the accident in ways not considered in the safety analysis; for example, long-term maintenance of core flow and cooling with the steam generators and the reactor coolant pumps. The present classification system does not adequately recognize either of these kinds of effects that nonsafety system can have on the safety of the plant. Thus, requirements for nonsafety systems may be needed to reduce the frequency of occurrence of events that initiate or adversely affect transients and accidents, and other requirements may be needed to improve the current capability for use of nonsafety systems during transient or accident situations. In its work in this area, the Task Force will include a more realistic assessment of the interaction between operators and systems.

The Staff proposes to study the problem further. This is not a sufficient answer. All systems and components which can either cause or aggravate an accident or can be called upon to mitigate an accident must be identified and classified as components important to safety and required to meet all safety-grade design criteria.¹¹⁹

972. Direct testimony was presented by UCS (Pollard, ff. Tr. 8091), the Licensee (Keaten, ff. Tr. 7558), and the Staff (Conran, ff. Tr. 8372). Proposed findings were submitted by UCS, Licensee, Staff, and the Commonwealth; reply findings by Licensee and Staff.

973. In the paragraphs below we discuss the extensive record developed on this subject. We organize the discussion as follows:

1. Safety Classification of Reactor Systems
2. Effects of Nonsafety-Related Systems on the Reactor Core
3. Mitigation of Accidents by Nonsafety Systems
4. System Interactions Studies

¹¹⁹ In its First Special Prehearing Conference Order, dated December 18, 1979, the Board limited UCS Contention 14 to the "core cooling system". LBP-79-34, 10 NRC 828, 837 (1979).

5. Commonwealth Proposed Findings
6. Qualifications of Staff Witness
7. Findings on Systems Classification and Interaction
8. Concluding Remarks

1. Safety Classification of Reactor Systems¹²⁰

974. The classification system used by the Staff to categorize systems important to safety and the regulatory requirements for these systems were explained by Staff witness Conran. NRC Staff Testimony of James H. Conran Relative to Classification of Systems and Components as Important to Safety, ff. Tr. 8372; also, Tr. 8374, *et seq.* He testified that the term “. . . structures, systems, and components *important to safety* . . .” is defined in the introductory paragraph to the General Design Criteria (Appendix A to 10 CFR Part 50) as those “. . . structures, systems, and components that provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public”. From this context, it is clear that the expression “. . . important to safety . . .” is meant to apply generally to all structures, systems, and components addressed in the General Design Criteria (GDC). The term is used consistently in that sense throughout the GDC, and in other parts of the regulations as well. Conran, ff. Tr. 8372, at 4.

975. Conran also explained the use of the term “safety-grade” in the NRC regulatory process. He stated that though

that term is not defined explicitly in the regulations, the term is widely used in the context of the safety review process. The meaning of the term, as most commonly used by the Staff in that context, is inferred from the language of the regulations, as follows:

¹²⁰ Some of the terms in the record of this proceeding used to classify reactor systems are “important to safety”, “safety-related”, “safety-grade”, “having critical safety functions”, “nonsafety systems”, and “nonsafety-grade systems”. We will not attempt to explain the meaning of each of these terms but include them here only to illustrate the reason for some of the confusion and disagreements we heard. We will discuss and explain those terms which we consider important in the regulatory process.

- (a) General Design Criterion 1 introduces the notion of different quality levels for plant features with differing safety roles and varying degrees of importance to safety. Specifically, GDC-1 requires application of “. . . quality standards commensurate with the importance of the safety function to be performed . . .” for structures, systems, and components important to safety.
- (b) Appendix A to 10 CFR Part 100 implements the concept established in GDC-1 (*i.e.*, gradations in quality levels corresponding to relative safety importance) by identifying explicitly a select sub-class of structures, systems, and components (out of the board class “important to safety”) that are required for the performance of specific, critical safety functions (*e.g.*, safe shutdown, accident prevention and consequence mitigation, etc.). Specifically, Sec. III.(c) of Appendix A to 10 CFR Part 100 defines the Safe Shutdown Earthquake (the most severe seismic event analyzed for a nuclear power plant), and requires that “. . . certain structures, systems, and components [important to safety] . . .” be designed to remain functional for that event. Those “certain” plant features, and the critical safety functions they must perform, are further identified in Sec. III.c as: “. . . those necessary to assure:
- (1) The integrity of the reactor coolant pressure boundary,
 - (2) The capability to shut down the reactor and maintain it in a safe shutdown condition, or
 - (3) The capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of this part.”

Such considerations are the origin of the term “safety-grade”; and the Staff applies that term *only* to the structures, systems, and components *required* to perform the specific critical safety functions identified above.

Conran, ff. Tr. 8372, at 4-5.

976. Mr. Conran then summarized these definitions as follows:¹²¹

- (1) The term “important to safety” applies generally to the broad class of structures, systems, and components addressed in the General Design Criteria.

¹²¹ In a memorandum for all NRR personnel dated November 20, 1981 the Director of NRR, noting problems of consistency in the use of safety classification terms in this proceeding, has directed NRR personnel to employ interim standardized definitions of “Important to Safety”, “Safety-Related”, and “Safety-Grade”. The Director’s standardized definitions are consistent with Mr. Conran’s testimony.

- (2) "Safety-grade" structures, systems, and components are a sub-class of all those "important to safety".
- (3) All structures, systems, and components encompassed by the term "important to safety" (including the "safety-grade" sub-class) are necessary to meet the broad safety goal articulated in Appendix A to 10 CFR Part 50 of the regulations (*i.e.*, provide reasonable assurance that a facility can be operated without undue risk to the health and safety of the public).
- (4) Only "safety-grade" structures, systems and components are *required* for the critical accident prevention, safe shutdown, and accident consequence mitigation safety functions identified in Sec. III.c of Appendix A to 10 CFR Part 100.

Id., at 6.

977. The Licensee summarized the general design approach at TMI-1 as follows:

The general design approach to assure the safety of the public is to provide multiple levels of control or protection features for expected operational events, expected transient conditions, or severe equipment failures or natural phenomena. The equipment used to provide the greatest assurances of protection for the most severe plant accidents, or to assure safe shutdown despite severe natural phenomena, is designed and constructed to the highest standards. Systems designed to less stringent but still rigorous standards are used to control less severe transients and normal operations. The acceptability of the less stringent standard lies in the reduced consequence if these systems fail during a transient or normal operation, and the fact that the resulting event is less severe than (*i.e.*, bounded by) the design bases events for the systems relied upon to protect the public. In the event that these normal control systems fail to perform their function, they are backed up by fully safety-grade equipment capable of mitigating the resulting event.

Keaten and Brazill, ff. Tr. 7558, at 14. The Board notes that this approach agrees with the GDC concept of “. . . quality standards commensurate with the importance of the safety function being performed . . .”. Part 50, Appendix A, Criterion 1.

978. However, Licensee's position on the definition of “safety-grade” is not quite so clear. For example, Licensee's witness, Mr. Keaten, stated that:

In fact, the requirements for safety-grade equipment are really imposed upon those systems which are required — and I emphasize the word “required” — to mitigate the consequences of accident and protect the health and safety of the public.

Tr. 7573 (Keaten). We do not know if Mr. Keaten intended to leave out the critical accident prevention and safe shutdown functions of safety-grade equipment as discussed in Staff testimony. We think not because Licensee quotes the Staff testimony that “. . . the nuclear plants in operation today generally have been licensed in accordance with the classification scheme described by the Staff”. Licensee proposed finding ¶ 368.

979. We turn now to UCS views on this subject. UCS witness Pollard stated that Commission policy has been to apply the requirements of the GDC to systems variously referred to as safety-related, safety-grade, or important to safety. UCS proposed finding ¶ 477. Pollard, ff. Tr. 8091, at 14-3 and 14-4. Mr. Pollard also stated in his prepared testimony that there was an error in applying the Commission's classification scheme in that some systems that had been classified as important to safety “did not meet all the requirements applicable to safety-grade systems”. *Id.*, at 14-4. As further support of this description of the licensing process, UCS cited the following language from the NRC's Advance Notice of Proposed Rulemaking, Consideration of Degraded or Melted Cores in Safety Regulation, September 26, 1980:

Furthermore, in reviewing reactor plant designs using the design basis accident approach, the NRC does not review all structures, systems, and components but rather reviews, in varying levels of detail, only those considered “safety grade” by the applicant submitting a Safety Analysis Report. Items considered by the applicant to be outside the scope of design basis accident analyses are generally not considered to be “safety grade” and are not reviewed by the NRC to see whether they will perform as intended or meet various dependability criteria. *This method of classification is based on the notion*

that things credited in the analysis of a design basis event or specified in the regulations are important to safety and thus are "safety grade" where all else is "nonsafety-grade". Nonsafety-grade items do not receive continuing regulatory supervision or surveillance to see that they are properly maintained or that their design is not damaged in some way that it might interact negatively with other systems. Instead, these items simply receive what attention may be dictated by routine industrial codes and by desires to enhance plant availability. [Emphasis added by UCS]

UCS proposed finding ¶ 478.¹²²

980. Thus, it appears to this Board that the UCS interpretation of the NRC's classification system is that there are safety-related systems which meet all applicable "safety-grade" requirements and there are nonsafety systems which need not meet any of the "safety-grade" requirements, but there is nothing in between such as that described by Staff and Licensee namely, different quality levels for plant features with differing safety roles and varying degrees of importance to safety.

981. The Board is of the opinion after hearing arguments and testimony on all sides for the question that the Staff's interpretation, especially that of Mr. Conran, is the one closest to the system actually used by the Staff. It is also the system which the Board feels should be employed. To argue otherwise would in one aspect of the question argue against making improvements in safety which would result in a safer system, without upgrading to a fully "safety-grade" system. In other words such a viewpoint might discourage safety improvements to existing systems. We agree with Mr. Conran when he states that: "The language of regulations typically is broadly drawn so as not to be too prescriptive — to permit flexibility in the implementation of those requirements". Tr. 8432.

2. Effects of Nonsafety-Related Systems on the Reactor Core

982. UCS Contention 14 states that,

The accident demonstrated that there are systems and components presently classified as nonsafety-related which can have an

¹²² The Staff objected to this proposed finding since the document from which the above is quoted is not in evidence or in the record. However, the document is a public one and we officially notice the reference here to help point out the lack of uniformity within NRC on this subject.

adverse effect on the integrity of the core because they can directly or indirectly affect temperature, pressure, flow and/or reactivity.

and that,

All systems and components which can either cause or aggravate an accident . . . must be identified and classified as components important to safety and required to meet safety-grade design criteria.

983. There is no question that there are systems and components classified as "nonsafety" which can affect temperature, pressure, flow, and reactivity of the core coolant or the reactor core. The main feedwater system is one of the more obvious of these systems; the ICS is another. The question then becomes — do these or can these changes of temperature, pressure, flow, and reactivity "have an adverse effect on the integrity of the core"?

984. Staff admits that nonsafety systems and components can directly or indirectly affect core reactivity and primary coolant temperature, pressure, and flow. They further state that (at least in general) failure or off-normal operation of nonsafety systems and components can cause or aggravate an accident, but that does not establish that such failure or off-normal operation *alone* can have an adverse effect on the integrity of the core. Staff points out that in the TMI-2 accident improper operation of installed "safety-systems" (in addition to the initiating event) led to core damage. Conran, ff. Tr. 8372 at 7.

985. The Board does not disagree with the Staff statements in the preceding paragraph. It is clear to us that just because a change has been effected in the parameters being discussed, this does not necessarily create an unsafe condition which could adversely affect the core integrity. The purpose of safety-grade systems is, indeed, to prevent these adverse effects and, as we discuss later, to mitigate the consequences of accidents. We see no convincing evidence in the record presented by UCS or any other party that there are specific nonsafety systems at TMI-1 lurking and poised to cause, by themselves, core damage. This does not mean, of course, that this very situation does not exist. It is possible, though we believe improbable, that there are some potential serious systems interactions which are not so obvious and that they might be unidentified for corrective action. This is one of the purposes of the systems interactions studies described in the paragraphs below, to assure that such booby traps are ferreted out. But even if they are not, the safety-grade systems are still there to "prevent and mitigate" as described by the Staff.

986. Despite this reasoning we are not of the opinion that simply because the safety-grade systems are there, the Staff or Licensee should turn their backs on possible improvements in nonsafety systems and com-

ponents which will reduce the rate of challenge to safety-grade systems. Improvements in the EFW system (see Section Q, below) and in the power supplies to the PORV and its block valve (see Section G, above) are examples of the types of improvements which can help to reduce the rate of challenge. UCS appears to agree with this aim when they say that: "Repeated challenges to emergency systems are unacceptable". Pollard, ff. Tr. 9027, at 5-6.

987. We conclude then that nonsafety systems which can directly or indirectly affect core reactivity and primary coolant temperature, pressure, and flow need *not* be upgraded to meet safety-grade criteria except if the failure or off-normal operation of the nonsafety system by itself without failures of safety-grade systems will cause core degradation. Clearly, in this example, the system would need to be improved to safety-grade or some other equivalent improvement made.

988. We further conclude that improvements should be made in nonsafety systems if significant reduction in rate of challenge of safety-grade systems would be the result. However, these improvements need not result in a fully safety-grade system as UCS seems to suggest in its Contention No. 14.

3. Mitigation of Accidents by Nonsafety Systems

989. In Contention No. 14, UCS quotes the Staff Lessons Learned Task Force as follows:

Several nonsafety systems were used at various times in the mitigation of the accident in ways not considered in the safety analysis; for example, long-term maintenance of core flow and cooling with the steam generators and the reactor coolant pumps. The present classification system does not adequately recognize either of these kinds of effects that nonsafety systems can have on the safety of the plant. Thus, requirements for nonsafety systems may be needed to reduce the frequency of occurrence of events that initiate or adversely affect transients and accidents, and other requirements may be needed to improve the current capability for use of nonsafety systems during transient or accident situations. In its work in this area, the Task Force will include a more realistic assessment of the interaction between operators and systems.

NUREG-0578, at 18. The contention concludes that:

All systems or components which . . . can be called upon to

mitigate an accident must be identified and classified as components important to safety and required to meet all safety-grade criteria.

990. Examples of nonsafety systems used to mitigate the TMI-2 accident are the reactor coolant pumps, pressurizer level instruments, the PORV, the PORV block valve and the EFW system. Pollard, ff. Tr. 8091, at 14-4 and 14-5. UCS states that at TMI-1 the classification remains unchanged (since the TMI-2 accident). *Id.*, at 14-5.

991. The Staff and Licensee are uniform in their opinions that had safety systems not be used improperly at TMI-2, there would have been no need for the use of nonsafety systems and, consequently, nonsafety systems need not be upgraded to safety-grade. Keaten, ff. Tr. 7558, at 15; Conran, ff. Tr. 8372, at 11. Upgrading cannot take the place of operator training. Licensee's and Staff's dependence upon operator training, however, emphasizes the importance of the reopened hearing on the ramifications of cheating on operator examinations.

992. Despite the fact that such upgrading to meet safety-grade criteria may not be required, there may be some instances in which the Staff may decide as a prudent measure to require upgrading of the system or component in question, but not to full safety-grade. Conran, ff. Tr. 8372, at 10. In fact, this is precisely the approach being taken at TMI-1 with systems such as EFW (see Section Q, below) and with components such as the PORV (see Section G, above). The Board observes that EFW will, for example, be upgraded to nearly safety-grade at the time of restart with even further improvements to complete safety-grade to be made later. We are in full accord with this approach. As with nonsafety systems which can affect reactivity, temperature, pressure, or flow, we do not believe that a nonsafety system or component which might be used for accident mitigation need be upgraded all the way to safety-grade (if, indeed, upgrading is needed at all), but that incremental improvements can be made depending on the varying degrees of importance to safety.

993. There are no definitive criteria as to which systems that are important to safety must be upgraded to safety-grade. Staff judgment is an important factor. We strongly support the decision to make EFW safety-grade. We recommend further consideration of installing a safety-grade system for achieving cold shutdown. The systems interaction studies, discussed below, may result in further changes. But we do not have a record that would support substituting our judgment for the Staff judgment with regard to the systems recommended by Mr. Pollard of UCS.

4. Systems Interaction Studies¹²³

994. UCS suggested that the Staff has no program or plan for a comprehensive study to identify potential nonsafety-grade system/safety-grade system interactions at TMI-1 (UCS proposed finding ¶ 542), that no systematic effort has been made to identify and correct this problem of adverse systems interactions (UCS proposed finding ¶ 474), that there are no plans to do any systems interaction review for TMI-1 and TMI-1 is not included in the IREP program (UCS proposed findings ¶¶ 487 and 525), that there is no existing requirement for any systems interaction study for TMI-1 (UCS proposed finding ¶ 525), and that the systems interactions studies specifically called for by the ACRS will not be performed at all (UCS proposed finding ¶ 490).

995. We feel that UCS is reasonably but not totally correct in its characterization of the status of systems interaction studies as indicated by the references to their proposed finding in the preceding paragraph. Rather than respond to each of these statements, the Board has summarized the status of the record on this matter as we currently understand it in Section U, *infra*, in the discussion of Board Question No. 3, and also here.

996. We note that there has been considerable effort at TMI-1 in correcting problems of systems interactions. That is, to pick an obvious example, what the EFW upgrading is all about. Section Q, *infra*. Another example would be the efforts involved in evaluation of the ICS. Section H, *supra*. Both of these items are TMI-2 Action Plan Items as we explained in Sections H and Q.

997. Other Action Plan Items regarding systems interactions were identified by the Staff. Of particular interest are the following:

- II.C.1 Interim Reliability Program (IREP)
- II.C.2 Continuation of IREP
- II.C.3 Systems Interaction¹²⁴

Conran, ff. Tr. 8372, at 15. See also, Ross, ff. Tr. 15,555, at 1-1 and 3-2; and Rowsome, ff. Tr. 16,907.

¹²³ On October 29, 1981, Mr. Sholly forwarded his response to the Board's order of October 13, 1981 on the subject of the IE or Martin Report. This response contains information regarding systems interactions studies. Our tentative conclusion regarding the information in Sholly's response is that the result found in this Decision regarding systems interactions studies is unaffected.

¹²⁴ Staff seems to have incorrectly identified this as item II.C.5 in the Conran testimony.

998. For the reasons discussed in Section U, *infra*, the current IREP studies do not include TMI-1. In Section U the Board urges the Staff to continue the development of IREP as expeditiously as possible since the Board believes “. . . that the application of the IREP or follow-on studies could lead to an enhancement of safety at TMI-1 . . .”. The Board adds there that it would be premature to require the Licensee to begin those studies prior to restart.

999. We turn now to other efforts in the systems interactions area. Action Plan Task II.C.3, referenced by the Staff as noted above, is to coordinate and expand ongoing Staff work on systems interaction (Unresolved Safety Issue USI A-17) so as to incorporate it into an integrated plan for addressing the broader question of system reliability in conjunction with IREP and other efforts. NUREG-0660, Vol. 1, at II.C-6. But Task II.C.3 does not apply to TMI-1 because this item is “plant specific”. Ross, ff. Tr. 15,555, at 7 and 1-1.

1000. Since the Board has found the record to be less than clear regarding Ross' term “plant specific”, we turned for possible clarification to Unresolved Safety Issue USI A-17 which is referenced in the preceding paragraph. We find that the current status as publicized by the Staff is:

Work originally planned under TAP A-17 will now be performed under TMI Action Plan Item II-C.3, Systems Interaction.

NUREG-0606, Vol. 3, No. 3, Aqua Book, at 26. The Board can only conclude at this juncture that UCS is correct in stating that there are no plans to do any systems interaction review at TMI-1, since:

1. Action Plan Item II.C.3 does not apply to TMI-1.
2. TAP A-17 will now be performed under Action Plan Item II.C.3.
3. IREP studies do not include TMI-1.

The Board tends to side with UCS on this matter. We specify that TMI-1 shall be included by the Staff in generic reviews of systems interactions and that, as we state in Section U, *infra*, application of IREP or IREP follow-on studies could lead to an enhancement of safety at TMI-1.

5. Commonwealth Proposed Findings

1001. In their proposed finding ¶ 223 the Commonwealth points out that there is no Staff requirement for redundant on-site power supplies for the pressurizer level instrumentation. They state that this is a Category A requirement (Table B-1) of NUREG-0578 and is therefore encompassed by short-term order item 8 of the Commission's August 9, 1979 Order and

Notice of Hearing. 10 NRC at 145. Commonwealth proposed finding ¶ 219. They recommend that the Board direct that, prior to escalation above 5% power, the pressurizer level instrumentation shall be upgraded such that power can be supplied from redundant vital power supplies. Commonwealth proposed finding ¶ 234. Inasmuch as the Licensee does not object to the relief requested by the Commonwealth (Licensee reply finding ¶ 181) we adopt Commonwealth proposed finding ¶ 234 as our own. In its entirety, it reads as follows:

The Board therefore directs that, prior to escalation above 5% power, the pressurizer level instrumentation shall be upgraded such that power can be supplied from redundant vital power supplies. The design should also assure that failure of the ICS/NNI power supply would not cause a loss of all pressurizer level instruments.

6. Qualifications of Staff Witness

1002. UCS has stated that Conran was not qualified to present the Staff testimony on this subject. UCS proposed finding ¶ 493. We have reviewed Mr. Conran's experience and find that he is a graduate physicist with post-graduate courses in electronic engineering and physics and with professional courses in fault-tree analysis. He has done planning, engineering support, test equipment design, and trouble-shooting in the telephone communications field. His hands-on nuclear reactor experience includes direction of acceptance testing operations of naval nuclear propulsion systems and refueling operations for these systems. He has had extensive and diverse regulatory experience in AEC/NRC. Despite UCS's misstatement of the record regarding his experience (see Staff reply finding ¶ 13), we find Conran qualified to present the testimony on this subject. See Technical Qualifications Information attached to Mr. Conran's Testimony, ff. Tr. 8372.

7. Finding on Systems Classification and Interactions

1003. The Board made the following findings on system classification and interventions:

a. The Staff's definitions of "safety-grade" and "important to safety" are accepted by the Board.

b. Limited improvements to systems which are not safety-grade are acceptable to provide improved plant safety. These improvements need not necessarily be of such extent that the affected system becomes upgraded to safety-grade.

c. Nonsafety-grade systems and components can directly or indirectly affect core reactivity and primary coolant temperature, pressure, and flow. However, we are unaware of any such systems at TMI-1 which can adversely affect the integrity of the core.

d. Improvements in nonsafety-grade systems which will significantly reduce the rate of challenge of safety-grade systems should, in general, be made.

e. All nonsafety-grade systems which might conceivably be called on to mitigate the consequences of an accident need not necessarily be required to meet all safety-grade criteria.

f. TMI-1 shall be included by the Staff in generic reviews of systems interactions. Application of IREP or IREP follow-on studies could reasonably lead to an enhancement of safety at TMI-1.

g. The Commonwealth proposed finding ¶ 234 which suggests upgrading of the power supplies to the pressurizer level instrumentation before reactor power operation above 5% is adopted as our own.

h. Staff witness Conran is qualified to present testimony on this subject.

8. Concluding Remarks

1004. The Board would like to comment that the discussion on this subject, which was prompted by UCS' contentions, was useful in better defining the expressions "important to safety" and "safety-grade" as these expressions are used in the regulatory process. In the Board's view the exercise prompted by UCS Contention No. 14 yielded results which should be helpful to the Commission and Staff in current and future safety reviews.

Q. Emergency Feedwater Reliability

1005. Board Question No. 6 reads:

- a. Is a loss of emergency feedwater following a main feedwater transient an accident which must be protected against with safety-

grade equipment? Would such an accident be caused or aggravated by a loss of non-nuclear instrumentation, such as occurred at Oconee?

- b. In what respect is the emergency feedwater system vulnerable to non-safety-grade system failures and to operator errors?
- c. What has been the experience in other power plants with failures of safety-grade emergency feedwater systems, if they have such systems in other power plants?
- d. What operator action is required to operate in a feed-and-bleed mode following a loss of emergency feedwater?
- e. If the emergency feedwater system were to fail, what assurance do we have that the system can be cooled by the feed-and-bleed mode? This is of particular concern if the PORV's and safety valves have not been tested under two-phase mixtures.
- f. Can the system be taken to cold shutdown with the feed-and-bleed cooling only? Are both high pressure injection (HPI) pumps required to dissipate the decay heat in the feed-and-bleed mode? The board would like an evaluation of the reliability of the feed-and-bleed system. Has there been any experience using that system?
- g. If there is a loss of steam in the secondary system which results in failure of the turbine-driven feedwater pumps, will both motor-driven pumps be required to supply the requisite amount of feed-water? Does this meet the usual single-failure criteria since it appears that a redundant system requires multiple components to operate?
- h. Can the turbine driven pumps and valves be operated on Direct Current, or are they dependent upon the Alternating Current safety buses?
- i. Will the reliability of the emergency feedwater system be greatly improved upon conversion to safety-grade, and is it the licensee's and staff's position that the improvement is enough such that the feed-and-bleed back-up is not required?

- j. Will the short-term actions proposed improve the reliability of the emergency feedwater system to the point where restart can be permitted?
- k. Question 6 should be addressed with reference to *Florida Power & Light Co.* (St. Lucie, Unit 2), ALAB-603, (July 30, 1980); *i.e.*, whether loss of emergency feedwater is a design basis event notwithstanding whether design criteria are met.

Background of Board Question 6

1006. Board Question 6 was first identified by the Board during the prehearing conference of August 12 and 13, 1980. *See* Tr. 2394-96. The Board reduced the question to writing in its Memorandum and Order of September 8, 1980 (at A-31 to A-33), and its Memorandum on Board Questions, dated September 12, 1980.

1007. The NRC Staff's early evaluation of the TMI-2 accident led it to the view that B&W designed reactors appear to be unusually sensitive to certain off-normal transient conditions originating in the secondary system and that, because of features of the B&W design that contribute to this sensitivity, B&W designed reactors place more reliance on the reliability and performance characteristics of, among other systems, the emergency feedwater (EFW) system, than do other PWR designs. *See* Commission Order and Notice of Hearing, CLI-79-8, 10 NRC 141, 142-143 (1979). Consequently, several of the short- and long-term actions recommended by the Director of Nuclear Reactor Regulation go to improvements to the TMI-1 EFW system. Short-term action 1(a) calls for the performance of specified items to upgrade the timeliness and reliability of the EFW system. Short-term action 1(b) recommends the development and implementation of operating procedures for initiating and controlling EFW independent of integrated control system (ICS) control. Short-term action 2 would require, among other things, IE Bulletin 79-05A items on EFW valve positioning procedures and EFW train operability. *See* Wermiel and Curry, ff. Tr. 16,718 at 2, 3. Short-term action 8 and long-term action 3, which incorporate the NUREG-0578 recommendations, include NUREG-0578 item 2.1.7.a on automatic initiation of the EFW system, and item 2.1.7.b on EFW flow indication to the steam generators. *See, generally*, Commission Order and Notice of Hearing, CLI-79-8, 10 NRC 141, 144-145 (1979), and Staff Ex. 1.

1008. The TMI-2 accident highlighted the importance of the EFW system. The EFW pump discharge valves were closed prior to the accident thereby disabling the EFW system. Unavailability on demand of the EFW system was a potential contribution to the severity of the accident. Wer-

miel and Curry, ff. Tr. 16,718, at 2. The NRC Staff (IE) considered that improvements in plant procedures and technical specifications were an immediate need in order to limit the possibility of a similar occurrence from happening again and hence promulgated the bulletins cited above, 79-05A. *Id.* The TMI-2 Lessons Learned Task Force noted that "the need for an emergency feedwater system of high reliability is a clear lesson learned from the TMI-2 accident." NUREG-0578, p. 10. The resulting task force recommendation, 2.1.7.a and b, are included in the August 9, 1979 Commission order; the Staff position is further "clarified" in Item II.E.1.2 of NUREG-0737 and in the Staff SER, NUREG-0680, C1-1 to C1-16.

1009. The EFW system as installed and operated at TMI-1 prior to the TMI-2 accident was not safety grade and was not relied upon to protect the core following a loss of main feedwater or other feedwater transients. Although the design included three EFW pumps feeding two steam generators, the overall system was not designed to meet the single failure criterion, and a high degree of reliability could not be anticipated. No testimony was offered or requested concerning the system reliability as originally designed, although Licensee's witness Mr. Keaten said there had been no failures on demand at TMI-1. Keaten, ff. Tr. 16,612, at 11. He did not say that there had been no failures at TMI-1. The lack of failures *on demand* tells us very little about the reliability of the EFW system, the ability to respond if a demand should occur. We make no judgments concerning the adequacy of the original design. Our task is to decide whether the requirements of the Commission's orders have been met and whether the improved EFW reliability is adequate to protect the health and safety of the public. The meeting of the requirements of the order have not been challenged by any party; the adequacy of the design and procedural changes was challenged by UCS and is the thrust of Board Question 6.

1010. Following the TMI-2 accident, the NRC Staff made a study of feedwater transients in B&W reactors.¹²⁵ In reviewing the operating experience, the staff reported that feedwater transients occurred at a rate of three per year per plant. NUREG-0560, at 3-1. It was this figure that led to the initial Board concern; if the TMI-1 EFW system were to be

¹²⁵ NUREG-0560, Staff Report on the Generic Assessment of Feedwater Transients in Pressurized Water Reactors Designed by the Babcock and Wilcox Company, May 9, 1979. This NUREG is not in evidence. We refer to it solely to explain the background of the Board's initial concern and the genesis of Board Question 6.

challenged at such a rate, the reliability of the system would have to be extremely high. Consequently, when the Staff presented witnesses who had reviewed the licensee event reports (LERs) on failure of safety-grade emergency feedwater systems, we asked for the failure rate. Tr. 6093 (Jordan, Lantz). The witness responded that there had been eight failures in 200 reactor years. Tr. 6093 (Lantz). A failure rate of 1 in 25 reactor years was not to us indicative of high reliability.

1011. In *Florida Power & Light Company* (St. Lucie, Unit 2), ALAB-603, 12 NRC 30 (1980), the Appeal Board found that the likelihood of the loss of all AC power at St. Lucie was the product of two factors: (1) the probability of an off-site power failure (found to be between 0.1 and 1.0 per year) and (2) the probability of a simultaneous failure of both diesel generators to start on demand (found to be 10^{-4} , at best, assuming true independence of the two diesel generator systems). This yielded a combined probability in the range of 10^{-4} to 10^{-5} per year. *Id.*, at 45.

1012. Rejecting arguments that the assumed simultaneous failure of both diesel generators challenges the "single failure criterion," the Appeal Board found, on the basis of its evidentiary record, including WASH-1400, that diesel generators are relatively unreliable pieces of equipment, compared to other equipment to which the single failure criterion is commonly applied, and that "[b]lind reliance on the single failure criterion (that is, simple redundancy) does not provide an adequate degree of plant safety and public protection in this state of affairs." *Id.*, at 48-52.¹²⁶

1013. The Appeal Board then ruled that station blackout at St. Lucie must be considered a design basis event and conditioned the plant with two protective requirements. *Id.*, at 57, 64.

1014. Because of the high rate of challenge to EFW systems, our concern was that these systems, even though they meet safety-grade criteria, may not be reliable enough. *See, e.g.*, Board Question 6.c. We viewed the *St. Lucie* Appeal Board rejection of "blind reliance upon the single failure criterion" as guidance, so we directed that Board Question 6 be addressed with reference to ALAB-603 ". . . i.e., whether loss of emergency feedwater is a design basis event notwithstanding whether design criteria are met." Board Question 6.k.

¹²⁶ The Appeal Board had compared the St. Lucie station blackout probability values with Section 2.2.3 of the Staff's Standard Review Plan (SRP) which provides that off-site events must be considered in the design basis where there is a conservatively calculated probability of occurrence of 10^{-6} or a realistic calculated value of at least 10^{-7} . But, as two of its members point out in a December 22, 1980 Memorandum to the Commission, the finding that station blackout must be considered a design basis event did not depend upon the use of the threshold probabilities of the SRP. Rather it depended upon the entire record before them.

1015. Upon review of ALAB-603, the Commission in CLI-81-12 (June 15, 1981), determined that ALAB-603 does not establish generic guidelines for determining the design basis events to be used for plant design and operation. *Id.*; *Slip opinion*, at 2 and 7. However, the Commission let stand the licensee amendment imposed by the Appeal Board and went on to note:

The Commission has adopted a plan for the development and articulation of safety objectives for nuclear power. "Plan for Developing a Safety Goal," 45 Fed. Reg. 71023 (October 27, 1980). This effort should provide the context for resolving the generic issue of a numerical threshold for the analysis of accident sequences. However, the pendency of the safety goal matter should not inhibit the boards from examining closely any accident sequence which in their judgment poses an unacceptable risk to the public health and safety. Probabilistic or numerical calculations may be used in such an examination and boards have a responsibility to mandate whatever mitigative actions they deem necessary to protect adequately the public health and safety when such actions are supported by the record.

1016. We are not sure in view of the Commission's comments in CLI-81-12 that we correctly relied upon the Appeal Board's decision ALAB-603, but our actions in addressing the reliability of an asserted safety grade EFW system were endorsed after the fact by the reasoning of CLI-81-12. It was precisely such considerations that led us to pose Board Question 6. We knew that the Licensee proposed upgrading the EFW system to safety-grade, but in view of the past record with "safety-grade" EFW systems at other plants, we felt compelled to examine the reliability of the system. For that reason our Question 6.a asked whether the loss of emergency feedwater following a main feedwater transient is an accident which must be protected against with safety-grade equipment, and whether such an accident could be caused or aggravated by a loss of non-nuclear instrumentation.

1017. The Staff's position is that the loss of emergency feedwater following a main feedwater transient is not an accident which must be protected against with safety-grade equipment. Wermiel, *et al.*, ff. Tr. 6035, at 1. Because the TMI-1 emergency feedwater system will be safety-grade for a loss on main feedwater transient at the time of restart, the loss of both feedwater systems is an accident which is beyond the design basis. Tr. 6082, 6200-01 (Wermiel). However, the Staff did not rest with that answer; they offered a number of expert witnesses who gave their reasons for believing the EFW system would be adequately reliable and,

late in the hearing, provided numerical estimates as to the reliability of the system. Wermiel and Curry, ff. Tr. 16,718. The details of that testimony will be discussed later.

1018. The focus of our concern was generally misunderstood by the parties and was not addressed in the first round of testimony by Staff and Licensee. The Board explained in some detail the deficiencies in the testimony. Tr. 6170-87 (Jordan). Later testimony was directed more precisely to our concerns. Wermiel and Curry for the Staff, ff. Tr. 16,718; Keaten for Licensee, ff. Tr. 16,612.

1019. The thrusts of most of the other subparts of Board Question 6 are obvious and need no explanation. We add only that Questions 6.d, e, and f on high pressure injection (HPI) and feed-and-bleed core cooling were asked in order that we might judge the usefulness and reliability of a mitigative action in case the EFW system should fail. We view the HPI as an important safety feature for preventing core damage.

1020. Although both Licensee and Staff provided testimony addressing each subpart of Board Question 6, we will not attempt in this decision to address each one. However, the answers were most helpful in providing information necessary to our overall findings on the adequacy of the modifications.

Discussion

1021. We proceed, now, to address in a general way the role of the EFW system in plant operation and the design of the system. The primary system reactor coolant normally removes heat from the fuel and transports it through two piping loops (hot legs) to the top of the two steam generators. The cooler fluid then goes out the steam generator cold legs, through four reactor coolant pumps, and back into the reactor vessel and the lower portion of the core. Keaten, *et al.*, ff. Tr. 16,552, at 2. *See also, id.*, at Figure 2 (which is also Licensee Exhibit 17) for an illustration of the major plant systems at TMI-1.

1022. The two steam generators are large, vertical, tube-in-shell heat exchangers that transfer the primary system heat through tubing walls into the secondary system. The primary coolant passes through the inside of the steam generator tubes. Heat is transferred through the tube surface to the outer, or secondary, side of the tubes where the cooler, secondary fluid is heated. The secondary coolant boils in the steam generators. Keaten, *et al.*, ff. Tr. 16,552, at 3.

1023. Secondary side makeup water (feedwater) is normally provided by the main feedwater system. The feedwater system contains two main feedwater pumps, three condensate pumps and three condensate booster

pumps, all located in the turbine building, which supply the two steam generators. After the reactor has tripped, this system can supply enough feedwater to remove residual heat with only one main feedwater pump, one condensate pump and one condensate booster pump supplying one steam generator. The steam produced in the steam generators after reactor trip is normally piped through the containment structure and through the turbine bypass valves to the shell side of a condenser where it is condensed to liquid water. From there the water is returned to the steam generator by the main feedwater system. Keaten, *et al.*, ff. Tr. 16,552, at 3.

1024. The emergency feedwater system at TMI-1 is an alternate source of steam generator secondary side water supply. In the event main feedwater is not available, the EFW system would supply water from either or both of the condensate storage tanks¹²⁷ to the secondary side of the steam generators. The steam produced would be removed through the turbine bypass valves to the main condenser, if available, or through the main steam relief valves or the atmospheric dump valves to the atmosphere. Keaten, *et al.*, ff. Tr. 16,552, at 3, 4.

1025. The TMI-1 EFW system consists of two feed trains supplied by one turbine-driven pump and two electric motor-driven pumps with common suction sources. Prior to the modifications to the system, it could feed emergency feedwater to either or both steam generators under automatic initiation of the turbine-driven pump or manual initiation of the motor-driven pumps. The turbine-driven pump is started automatically either on loss of both main feedwater pumps or on loss of all four reactor coolant pumps. In the case where the turbine-driven EFW pump is not available, prior to the modifications the two motor-driven pumps would be started manually by an operator. Licensee Ex. 15, at 1, 4-5. The two motor-driven EFW pumps can be powered from either on-site or off-site AC power sources. The steam-driven EFW pump requires neither off-site nor on-site AC power sources to operate.

1026. Two motor-driven pumps or the turbine pump has enough capacity to remove the full 7% decay heat immediately following shutdown. Within 2½ minutes after shutdown, a single motor-driven pump will remove decay heat. Even if only one motor-driven pump were available initially, adequate heat removal would be provided. In this situation, RCS temperature and pressure would initially increase, possibly resulting in lifting a relief valve. As decay heat drops, the EFW pump would supply enough water to

¹²⁷ Each of the two interconnected condensate storage tanks has a capacity of 250,000 gallons; and, by Technical Specifications, each is required to contain a minimum of 150,000 gallons of water for EFW use. Another water source is the 165,000-gallon condenser hotwell. A backup source of river water is also available via the Reactor Building emergency cooling pumps. Licensee Ex. 15, at 1, 4.

overcome the temperature/pressure rise and restore normal conditions. Keaten, *et al.*, ff. Tr. 16,552, at 7. With this design, common-mode failures of both motor-driven pumps can be accommodated. Although there could be a brief lifting of a relief valve in the unlikely event of failure of two of the three pumps, the overall improvements discussed above will greatly reduce challenges to the relief valves and thereby satisfy the concerns of the Lessons Learned Task Force as stated on page A-30 of NUREG-0578. We cannot agree with UCS proposed findings ¶¶ 390-92.

1027. The flow of emergency feedwater to each steam generator is controlled by air-operated modulating flow control valves. Positioning of these valves is via electric-to-pneumatic converters that receive control signals from the ICS. The valves are modulated to maintain the desired steam generator water levels. The valves are also interlocked with pressure switches so that emergency feedwater (and main feedwater) is cut off to a given steam generator if a low pressure (less than 600 psig) is detected within that generator. Licensee Ex. 15, at 2.

1028. A number of modifications will be made to the TMI-1 emergency feedwater system prior to plant restart. *See, generally*, Staff Ex. 1, at C1-1 to C1-12, C2-6 and 7, C8-34 to C8-40; Staff Ex. 14, at 13-14, 38-39; Tr. 5672-81 (Capodanno). An important modification is the installation of a safety-grade auto-start for the EFW pumps. Recommendation 2.1.7.a of NUREG-0578. The EFW system, as modified for restart, will automatically start the turbine-driven pump and both motor-driven pumps upon:

- (a) loss of both main feedwater pumps, or
- (b) loss of four reactor coolant pumps.

This auto-start capability will exist with a loss of off-site power. Licensee Ex. 15, at 6; Tr. 5823-26 (Capodanno, Lanese). The EFW pump automatic initiation signals are independent of the ICS. Staff Ex. 1, at C8-35. Licensee has committed to modify the EFW system to provide, prior to restart, control room annunciation for all automatic start conditions of the EFW system. Staff Ex. 1, at C1-7, 8. Prior to restart, Licensee will perform a functional test to verify that all EFW pumps automatically start on loss of feedwater or loss of four reactor coolant pumps. Staff Ex. 1, at C1-1. In addition, all EFW pumps can be started manually from the control room. With these modifications, a single failure in the automatic initiation system will not result in the inability to actuate the emergency feedwater pumps on a loss of main feedwater or loss of off-site power. Staff Ex. 1, at C8-35.

1029. The original EFW system design did not have any provision for indication in the control room of emergency feedwater flow. Safety-grade, redundant indication of EFW flow to each steam generator will be provided in the control room prior to restart. Licensee Ex. 15, at 6; Staff Ex. 1, at C8-39. Licensee has committed to perform a functional test of the new EFW flow instrumentation prior to restart. Staff Ex. 1, at C1-5. Based upon the Staff's review of Licensee's design for providing safety-grade EFW flow indication in the control room and on the information that the flow transducers are qualified for operation in the assumed environment from a postulated main steam line break in the Intermediate Building, the Staff has concluded that Licensee is in compliance with the NUREG-0578 recommendation, in item 2.1.7.b, for emergency feedwater flow indication to the steam generators. Staff Ex. 1, at C8-40; Staff Ex. 14, at 39. The Staff will verify that the flow devices are installed and suitably qualified prior to restart. Staff Ex. 14, at 39.

1030. Prior to restart, the failure mode of the EFW flow control valves will be changed in order to assure that emergency feedwater can be delivered when required. In the original system design, these valves failed half open on loss of control power, and failed "as is" on loss of instrument air. As a result of the modification, the valve will fail in the open position on loss of instrument air, and will remain in that position. Licensee Ex. 15, at 6; Staff Ex. 1 at C1-1, 2. The modification we discuss next will enable the operator to switch to manual control in the event of a loss of control power.

1031. Short-term Commission order item 1(b) requires that Licensee develop and implement operating procedures for initiating and controlling EFW independent of ICS control. In addition to providing automatic initiation of the EFW pumps independent of the ICS, Licensee will provide, in the control room, a separate manual EFW control station independent of ICS for each control valve. When this manual control is selected, all active components of the ICS are bypassed. Power for each control valve from the backup control station will be derived from the redundant emergency power supplies. Licensee Ex. 15, at 6, 7; Staff Ex. 1, at C1-11. The staff has reviewed Licensee's conceptual design for this modification, as well as the revised emergency procedures which include operating instructions on the use of the new EFW manual control station. The Staff has concluded, and we agree, that Licensee is in compliance with this part of the Commission order. Staff Ex. 1, at C1-11, 12.

1032. A support system which affects EFW system reliability is the air supply for certain air-operated valves. The TMI-1 air supply system consists of two 60-hp compressors. Licensee Ex. 15, at 3. One of the restart modifications for the EFW system will be the provision of a redundant, two-hour air supply system that will supply instrument quality

air to the pressure control valve that regulates steam supply to the turbine, and to the two EFW flow control valves, for a two-hour period in the event of loss of all AC power. Licensee Ex. 15, at 7. The Staff has verified that EFW system initiation and operation is assured independent of any AC power source for at least two hours. Staff Ex. 1, at C1-9, 10.

1033. Prior to restart, the low-low level condition at each of the two condensate storage tanks will be annunciated in the control room. The alarm setpoint will be such that the operator will have a minimum of 20 minutes before either of the tanks is pumped dry. This will provide ample time for the operator to realign the EFW pumps' suction to an alternate water source. Licensee Ex. 15, at 7; Staff Ex. 1, at C1-8. Separate power supplies for each level transmitter loop will be provided as a longer term modification. Licensee Ex. 15, at 7; Staff Ex. 14, at 13.

1034. Another restart modification is the provision of redundant, single-failure-proof indication in the control room, independent of the ICS, of the level in each steam generator. All hardware used in this modification will be safety grade. This level indication will assure that the operator can properly control steam generator level, using the new manual loaders added for the EFW control valves, in the event of an ICS/NNI malfunction. Licensee Ex. 15, at 7; Staff Ex. 14, at 38.

1035. The modifications to the EFW system described above have been reviewed by Staff and they state that all of the short-term recommendations in the Commission's order will be in place at restart and that the Licensee has made reasonable progress in meeting the long-term requirements. Staff Ex. 14, at 36-38. We agree. Indeed it appears to us that the situation is even better; that at restart the Licensee will be in compliance not only with the short-term requirements of 2.1.7.a and b, but also the long-term requirements of 2.1.7.a. There are no long-term requirements in 2.1.7.b. Tr. 17,097-101 (Wermiel). We explain.

1036. NUREG-0578 recommendation 2.1.7.a calls for *control-grade* automatic initiation of EFW at restart (short-term). The long-term recommendation is the upgrading of the automatic initiation circuits to *safety grade*. All of these modifications, though not yet in place, will be completed by restart and are safety grade. Tr. 17,097-101 (Wermiel). What will not be completed by restart is safety-grade automatic *control* of the EFW flow to the steam generator and environmental qualification of some components for non-LOCA events. This highly desirable improvement in the EFW system is not a part of NUREG-0578 or of the corresponding sections of NUREG-0737, namely II.E.1.2, Parts 1 and 2, and is not part of the Commission order.

1037. In addition to the safety-grade automatic EFW flow control system, the Licensee has committed to a number of other long-term modifications that will contribute to the reliability of the system. Included in the scope of that effort will be:

- a. Addition of cavitating venturi in each EFW line;
- b. Safety-grade condensate storage tank low-low level alarm;
- c. Safety-grade steam generator high level alarm;
- d. Safety-grade isolation of main feedwater on overflow of an affected steam generator;
- e. Upgrade Main Steam Rupture Detection System to safety-grade.

Licensee Ex. 15, at 10, 11.

1038. A number of the long-term modifications to the EFW system are associated with Item II.E.1.1 of NUREG-0737 and are scheduled for implementation prior to January 1, 1982. However, it is likely that the Licensee will be unable to implement certain aspects of this upgrade before the cycle 6 refueling outage. Ross, ff. Tr. 15,555, at Table 2. This may be as long as one year after restart. Tr. 16,726 (Wermiel). As noted above, this delay does not involve any "stretching" of Commission orders; the matter of safety during the interim and beyond will be a part of our EFW reliability considerations discussed below.

1039. We turn now to our considerations regarding the safety of TMI-1 at restart and after the long-term modifications have been completed. Our discussion will be directed to the reliability of the EFW system — our conclusion is with the probability of core damage following a transient, particularly a loss of main feedwater transient. We recognize that no nuclear plant (or other enterprise) can be made completely safe, *i.e.*, zero probability of an accident. We have no particular pass-fail probability in mind; we note that some serious accident scenarios in WASH-1400 had calculated probabilities of occurrence as high as 10^{-5} /yr. The Commission has adopted a plan (NUREG-0735) to develop a safety goal. Plants having a probability of severe core damage less than 10^{-5} /yr would require no action. Plants having a probability of core damage in the range of 10^{-3} to 10^{-4} would require corrective action in a matter of years. Rosenthal and Check, ff. Tr. 11,158, at 27. Staff estimates of EFW reliability are not inconsistent with these numerical goals. Tr. 17,092 (Curry). See reference to *St. Lucie*, CLI-81-12, *supra*.

1040. We first turn our attention to the frequency of feedwater transients; we noted above that NUREG-0560 reported three transients per year. However, Licensee's witness Keaten has pointed out that a transient

in the main feedwater system (MFW) is not the same as a loss of feedwater and a challenge to the EFW system. Keaten, ff. Tr. 16,612, at 7, 8. An independent study by the Licensee found that feedwater losses in five B&W plants occurred at a rate of 0.3/yr. *Id.*, at 9. This figure was not challenged and we adopt it even though there have been no failures in five years of operation at TMI-1. Koppe, ff. Tr. 13,335, at 41.¹²⁸ Upon cross-examination by UCS, the figure was shown to be based on only 10 plant years of operation, but even so it has statistical significance to within a factor of two which is adequate for our purposes. Tr. 16,619-27; Tr. 16,671 (Keaten). However, in our opinion, a plant protection system that is challenged at a rate of 0.3 per year must have high reliability.

1041. As noted above, our concern with EFW reliability was triggered in part by the frequency with which the MFW system was lost and the unimpressive EFW reliability figures noted by Mr. Lantz, namely eight failures in 200 reactor years. Tr. 6093. However, as pointed out by Mr. Keaten, this figure is not an entirely accurate figure on system availability; it was based partly on testing experience, and it "tells us nothing" about failure rate on demand. Keaten, ff. Tr. 16,612, at 10. We agree in part — there is no basis for concluding that the failure rate on demand is 1 in 25 as was perhaps implied in the Board question. Nevertheless, as Keaten also pointed out, "data on EFW success on demand is not available." *Id.* Therefore, one must turn to the data on EFW availability in order to estimate the probability of failure on demand. We make such an estimate in the following paragraph.

1042. If, for example, EFW systems were tested every day, eight failures per 200 reactor years would be acceptable assuming that repairs were made immediately. If, however, EFW systems were tested monthly and one assumes that the failure occurred at the middle of the test period, the demand failure rate would be

$$\frac{1}{2} \times \frac{1}{12} \text{ month/yr} \times \frac{8 \text{ failures}}{200 \text{ years}} = 1.6 \times 10^{-3}$$

We do not know how often the EFW system is to be tested at TMI-1 but believe that a monthly test frequency is more likely than a daily test. The figure we derive above, 1.6×10^{-3} per demand, corresponds very closely with the Staff witness Curry's figure, 2×10^{-3} as shown on the Wermiel-Curry Chart described below. The agreement is more than fortuitous. We believe that this close agreement adds strong support for our position that the reliability of the EFW system should be subject to careful scrutiny in this proceeding.

¹²⁸This figure, 0.3/yr, is within the range of challenge rates to diesel generators at St. Lucie.

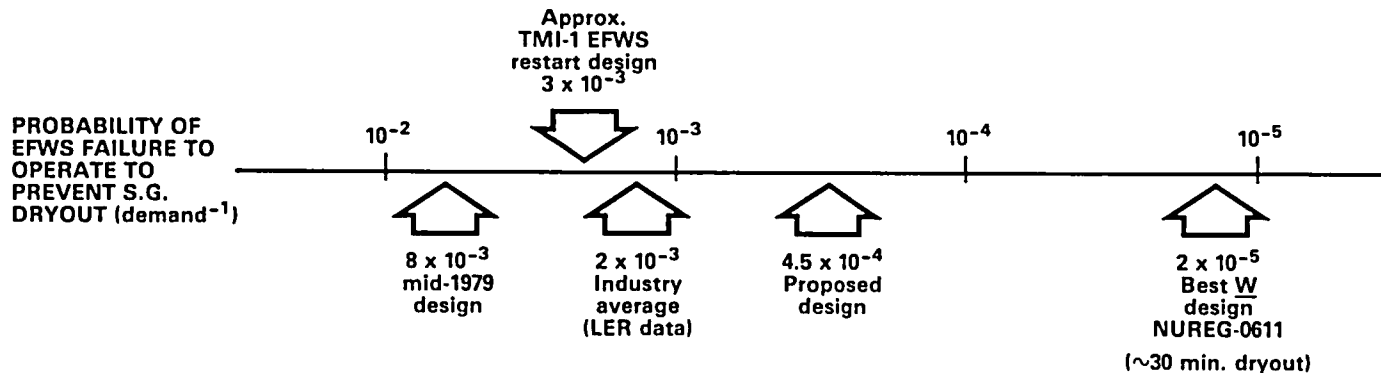
1043. It is Licensee's position that the Board has no basis for pursuing the issue of EFW reliability either under *St. Lucie, supra*, or otherwise. Licensee PF ¶¶ 447-50. Mr. Keaten points to a statement by a Staff witness that data on EFW success on demand are not available; that EFW systems vary from plant to plant and are, therefore, plant specific and that the industry-wide data by Mr. Lantz is not applicable to TMI-1. Keaten, ff. Tr. 16,612, at 10. The Licensee urges us to find that the effort to establish EFW system reliability would be a "futile exercise" in view of the large spread in estimates and point to a figure by Mr. Keaten of 10^{-3} and by Mr. Koppe of 10^{-5} Licensee PF ¶ 449, n. 142. Mr. Keaten mentioned the number of 10^{-3} /demand in answer to a Board question; he was referring to some preliminary B&W analyses which he was not in a position to defend. Tr. 16,676.

1044. We have already expressed our reservation concerning Mr. Koppe's testimony. PID ¶¶ 453-54. Licensee proposed finding ¶ 446 summarizes the Koppe testimony as follows "From January 1979 through August 1980, there were no instances where the emergency (or auxiliary) feedwater system at any pressurized water reactor was incapable of performing its essential function. Koppe, ff. Tr. 13,335, at 40." The data are much too limited (50 plants, 20 months) to support a figure of 10^{-5} since he also claims the demand rate (0.3 per reactor year) was small. Keaten, ff. Tr. 16,612, at 9. We are also aware of no failure on demand: TMI-2. We reject the implication of Licensee's argument that the lack of reliable data on the failure probability on demand of a safety system is adequate reason for refusing to inquire into the safety of that system.

1045. We are convinced that the reliability record of EFW systems prior to TMI-2 was not good. We must now address the issue as to whether the reliability of the TMI-1 EFW system, after the modifications are complete, will be adequate. Since the amount of operational experience with *modified* EFW systems is very limited, and has not become a part of the record of this proceeding, we turn to other types of evidence. In response to Board Question 6, the Staff has made a fault tree-event tree reliability analysis of the EFW system at TMI-1. Estimated failure probabilities were provided by the Staff for the TMI-1 EFW system as it existed in mid-1979, as it would exist at the time of restart, and as it would exist after full modifications are completed. *See, generally*, Wermiel and Curry, ff. Tr. 16,718, at 31-42. The numerical results are summarized in a chart as attachment 3 to the Wermiel and Curry testimony (hereafter Wermiel-Curry Chart); the chart can be found on p. 1368. The fault tree analysis was similar to that used in WASH-1400 and indeed some of the component reliability data were derived from WASH-1400. *Id.*, at 33. In cases where the data were limited, conservative assumptions were made. *Id.*, at 34. We recognize, just as is the case with WASH-1400, that it is difficult

to assign error bands to the derived numbers; however, we would expect the bands would be narrower than those for WASH-1400 because the system under study is much more limited and has fewer branches. The fact that the estimated probability of failure of EFW at restart is higher than LER data on unmodified systems leads us to believe the estimates are not grossly low — a problem we had with the Koppe data, *supra*. The staff did not attempt to estimate the uncertainty. *Id.*, at 39.

CHART: WERMIEL AND CURRY TESTIMONY*
TMI-1 EFWS UNAVAILABILITY AT 5 MINUTES; LMFW TRANSIENT



*Source: Wermiel and Curry, ff. Tr. 16,718, Attachment 3.
 See also Tr. 16,739.

1046. Before going into the implications of the Wermiel-Curry Chart, we will describe what the chart says. The scale of probability runs from 10^{-2} on the left, a high probability of failure, namely one chance in 100, to a low probability on the right, *i.e.*, 10^{-5} or one chance in 100,000. Arrows are located along the probability scale; the numerical value at the point of the arrow is given at the base of each arrow. The number is the probability that the EFW system will fail to operate within 5 minutes after the time that a loss of main feedwater occurs. For example, the Staff estimates that the probability that the TMI-1 system, as it existed in mid-1979, would fail to perform when challenged, would be 8×10^{-3} or one chance in 125.¹²⁹

1047. Following a loss of main feedwater, the EFW system is designed to start promptly to supply water to the steam generators to remove decay heat. B&W steam generators have been estimated to have a dry-out time of 5 minutes compared to 30 minutes for Westinghouse PWRs. Wermiel and Curry, *ff. Tr.* 16,718, at 41. This was the basis for the 5-minute start time for EFW. This shows up in the event tree analysis in that essentially no credit was given for possible operator actions to correct a fault that prevents the EFW system from starting. This is an important factor in predicting the much lower probability of failure for Westinghouse EFW systems. Westinghouse systems also have three or four steam generators which provide additional redundancy. *Id.*, at 41. Licensee testified that although the steam generators dry out in 5 minutes, no damage would result if the EFW system were delayed as much as 20 minutes. Therefore, according to Licensee, there is time for operator action. *Tr.* 16,614 (Keaten). The improvement in reliability that would be realized in the analysis by extending the time for operator action from five minutes to twenty minutes has not been included in the Staff's analysis; however, the Staff believes that operator recovery actions would certainly improve the reliability. *Tr.* 16,940 (Curry). They further stated that had a 20 or 30 minute criterion for the start of EFW been assumed, TMI-1 would compare favorably with other plants. *Tr.* 17,080 (Wermiel).

1048. We conclude therefore that the estimates on the Wermiel-Curry Chart for TMI design are conservative; at least a factor of 2 or 4 would not be an unreasonable estimate.

1049. As shown on the Wermiel-Curry Chart, the Staff estimates that the reliability of the EFW system at TMI-1 will be improved by about a factor of 3 as a consequence of the restart improvements. A further factor of 6 will result from the long-term modification, chiefly as a consequence of providing safety-grade flow control independent of either operator or

¹²⁹ The EFW system was not safety grade and was not relied upon to protect the core; that task fell to the HPI system which was safety grade. Capodanno, *et al.*, *ff. Tr.* 5642, at 2.

ICS control. Tr. 16,742-43 (Curry); Wermiel and Curry, ff. Tr. 6035, at 8, 9. Thus it appears that the changes made in response to the Commission orders have produced a smaller improvement in the reliability of the EFW system than the long-term changes included under item II.E.1.1 of NUREG-0737. Nevertheless the Staff considers the short-term changes under the Commission order to be significant. Tr. 16,743 (Curry). UCS argues that the short-term changes are insufficient; the long-term changes are being made too late. UCS PF ¶¶ 462, 464, 468, 469. The long-term changes are committed for the first refueling after restart. Staff Ex. 14, at 38. Refueling will probably occur about one year after restart. Tr. 16,727 (Wermiel).

1050. Following completion of the long-term modification, the Staff estimate for the reliability of the EFW system is 4.5×10^{-4} per demand. Wermiel-Curry Chart, *supra*. If this is coupled with a demand frequency of 0.3 per year from loss of main feedwater, the failure probability of the EFW system is about 1.5×10^{-4} year. These numbers are very similar to the ones cited by the Appeal Board in *St. Lucie*, ALAB-603, *supra*, 12 NRC at 49 and 52.¹³⁰ The estimated demand frequency, loss of all AC power, was between 0.1 and 1 per year. The diesel generator failure rate was estimated at between 10^{-3} and 10^{-4} per demand. The Appeal Board decided that measures were required to mitigate such an event should it occur. We believe that similar measures are necessary at TMI-1; that the reliability of the EFW system has not been demonstrated to be adequate by itself. However, the EFW system is backed up by the high pressure injection system, so that in the event of failure of the EFW system the core can be cooled by feed and bleed while repairs are being made to the EFW system. Capodanno, *et al.*, ff. Tr. 5642, at 11; Jones, ff. Tr. 5488, at 12.

1051. We have not established the reliability of the feed-and-bleed system. However, it depends only on safety-grade equipment, *i.e.*, code safety valves and the safety-grade HPI system.¹³¹ Since only safety-grade equipment is involved and procedures and training have been directed to

¹³⁰ In *St. Lucie*, CLI-81-12, the Commission also stressed that "... the probability values for that particular event [station blackout] should not be interpreted as establishing a generic numerical threshold to be used for future consideration of accident sequences." *Slip op.*, at 6. Just as the Appeal Board in *St. Lucie* used the Standard Review Plan threshold values for perspective only, we do not rely upon *St. Lucie* station blackout probability values as a generic numerical threshold in this case. It is perspective which we consider only in the full context of the record of this proceeding.

¹³¹ It was the HPI system at TMI-2 that was turned off and led to the consequent core damage. As the Commission has pointed out in CLI-80-16, the operators have been instructed not to turn it off. 11 NRC at 676. We note that the operators may turn off the HPI provided certain conditions have been met.

the TMI-2 accident, a high degree of reliability is expected. Keaten and Jones, ff. Tr. 4588, at 12. We here note again the importance of operator training and testing, and the significance of the reopened proceeding on matters related to cheating on operator examinations.

1052. Licensee states that initiation of feed and bleed is a very simple operation and can be continued indefinitely. Keaten, ff. Tr. 16,552, at 10. There is enough water in the borated water storage tank for at least 19 hours of feed and bleed operation. The feed and bleed operation can then be switched to a recirculation mode taking water from the containment sump. Wermiel, *et al.*, ff. Tr. 6035, at 6 (Jensen). Thus the core can be kept cool until feedwater is restored.

1053. Although it is Licensee's position that the reactor can safely be kept in a hot shutdown condition, with cooling by either the EFW system or feed and bleed, the Board inquired about the possibility of attaining cold shutdown using feed and bleed only. The Staff did not know of any procedures for cooldown by feed and bleed nor whether cold shutdown could be thereby achieved. Licensee's witness Ross said that the system could be depressurized and cooled by use of the PORV. Tr. 16,575 (Ross). He was not asked, nor did he claim that such a transition could be made soon after a shutdown.¹³² When Mr. Keaten was asked by UCS's Mr. Pollard about achieving cold shutdown without feedwater, he referred to the use of the vent valve or the PORV. He did not claim it could be done promptly. Tr. 16,583-84. We believe that the testimony on small break LOCAs shows that the rate of bleed from the PORV is not sufficient to cool the core soon after a shutdown; hence, the pressure will rise and at least one safety valve will lift. Keaten, *et al.*, ff. Tr. 16,552, at 8. It may be that after a few hours the reactor coolant could be depressurized by the PORV. We do not know how long would be required after shutdown to perform this, and we therefore do not consider feed and bleed as a backup mode of achieving cold shutdown.

1054. Neither Licensee nor Staff witness brought to our attention the inability to achieve rapid cold shutdown using feed-and-bleed cooling, an oversight of some concern to us. Subpart f of Board Question 6 asked "Can the system be taken to cold shutdown with the feed and bleed cooling only?" The answer should have been "No, not immediately." Nevertheless, feed and bleed using the PORV and safety valves is a

¹³² When Mr. Ross was pointedly asked "If the only mode of core cooling available was feed and bleed using the safety valves and the PORV as the relieving device, is it possible to reduce the pressure and temperature in the primary system to a range at which the RHR system could be brought into play?" he replied "No". Tr. 16,036 (Ross, Baxter)

backup to the EFW system in that it provides a means for cooling the core following the loss of all feedwater. It provides time to activate the EFW system.

1055. UCS proposed finding ¶ 400 faults the TMI system because there is no path from hot shutdown to cold shutdown using only safety-grade equipment. While that may well be a matter of some concern it was not central to our questioning. The safety implications of this circumstance were not addressed during the hearing, and no prepared testimony was offered. Our greater concern, as noted above, is the inability to achieve rapid cold shutdown *by any path* if all feedwater is lost.

1056. We now address the central question, is the EFW system as backed up by the HPI adequately reliable? We believe the evidence supports an affirmative answer. As we noted above, the staff estimate of EFW failure probability, combined with LER data on frequency of loss of MFW, results in an overall failure rate of $\sim 1.5 \times 10^{-4}$ year. Since the EFW system is backed up by a safety-grade HPI, designed to protect the core in the event of a small break LOCA, we believe we can conservatively assume an additional safety factor of 100, or an overall probability of failure to protect the core of about 10^{-6} /yr. Lacking any demonstration that the above failure probabilities are grossly in error, we conclude that the EFW system, as modified, will, with the HPI backup, adequately protect the health and safety of the public.

1057. The reliability figures and conclusions stated in the previous paragraph address the situation following the long-term modifications. We now address the sufficiency of the restart modifications to protect the public during the limited time period from restart to the first fuel loading, which may be as long as one year. The EFW system will be safety grade at restart for small break LOCA and MFW transients, the ones of concern to this Board. Tr. 6200-01 (Wermiel). Our chief concern and a major concern of UCS (proposed finding ¶ 456) lies in the fact that the EFW system will not be completely divorced from the ICS.¹³³ However, as required by the restart modifications, the operator will have safety-grade EFW flow information and the ability to control the system from the control room. Staff witness Mr. Curry testified that in his opinion TMI-1 EFW system reliability at restart will be comparable with some other operating plants, and about equal to industry average based on the LER survey. Tr. 16,722 (Curry). *See also* Wermiel-Curry Chart, *supra*. In addition, at restart, the EFW system will be backed up by the safety-grade HPI system. Not all plants have the feed and bleed capability of a full pressure HPI as does TMI-1. Tr. 17,064 (Wermiel). Although the reliabil-

¹³³ We note that only 4 of the 8 B&W plants, *i.e.*, TMI-1 plus 3 others, have committed to safety-grade flow control. Staff Ex. 14, at 38.

ity of the EFW system at restart will not be as high as it will be in the long term, for the reasons stated above, we find that the modified EFW system will provide adequate protection for the limited period contemplated.

1058. The Commonwealth of Pennsylvania played an important role in developing an adequate record on EFW reliability. In their proposed findings, §§ 171-189, they note the lack of safety-grade control at restart with final modifications to come in the long term. They urge us to find such an approach as acceptable for restart. However, they focus on two other deficiencies and propose two conditions for restart. One relates to a perceived deficiency in the condensate storage tank alarms; the other, to simultaneous steam generator isolation. We next address the Commonwealth's concerns.

1059. Safety-grade condensate tank level indication and alarm is one of the long-term modifications to which the Licensee is committed, although it is not a part of the August 9, 1979 Order. Staff Ex. 14, at 13 and 27. At present, the power for the alarms is from the NNI supply; failure of that power supply led to the Crystal River (a nuclear power plant owned and operated by the Florida Power Corp.) incident. Pending the installation of safety-grade alarms, the low level alarms will be powered from separate power supplies and will alarm on loss of power. *Id.*, at 13. This item was considered by the Staff in estimating the improvement of EFW reliability upon making all long-term modifications, but they did not believe that this would be a major contributor to the unreliability of the EFW system. Tr. 17,005-06 (Curry). The Commonwealth proposes that, as a condition of restart, the level transmitters and alarms be powered from independent, vital power supplies. Commonwealth PF ¶ 206. We are not convinced that such a finding is necessary, since as noted above, the lack of a safety-grade power supply is not a major contributor to system unreliability.

1060. The second item raised by the Commonwealth is of greater concern to this Board. Commonwealth PF §§ 207-215. Cross-examination by Mr. Dornsife of Licensee's witness Lanese brought out that actuation of the main steam rupture detection system could isolate all feedwater flow to both steam generators. Tr. 5924.

1061. Moreover, a Staff witness testified that a similar problem occurred during an overcooling event at Crystal River which caused a depressurization of both steam generators. This depressurization caused both steam generators to be isolated from all feedwater by the main steam rupture logic. On further cross-examination, this witness believed that there are plans to address this problem at TMI-1 by the first refueling after restart. Tr. 16,922 (Rowsome).

1062. The Licensee's witness stated that the rupture detection isolation signal can be bypassed in the control room to allow unisolation of the steam generator but that this contingency needs to be included in an emergency procedure. Tr. 5926 (Lanese).

1063. We agree with the Commonwealth that this is a significant concern which was not adequately resolved on the record. This item is not included in the EFW items required for restart. Staff witnesses have pointed out that most of the long-term modifications to the EFW system are included in NUREG-0737, item II.E.1.1. Position (1) reads as follows:

- (1) Perform a simplified AFW system reliability analysis that uses event-tree and fault-tree logic techniques to determine the potential for AFW system failure under various loss-of-main-feedwater-transient conditions. Particular emphasis is given to determining potential failures that could result from human errors, common causes, single-point vulnerabilities, and test and maintenance outages;

Id., at 3-77.

1064. It would seem that the single failure isolation of feedwater by the steam generator rupture detection system should be included in II.E.1.1, but we have no evidence that it is. We do not agree that Licensee's proposal to include it in the emergency plans is an adequate answer. Therefore, we require that prior to restart, the Licensee propose for Staff approval, a long-term solution to the steam generator bypass logic problem for implementation as soon as possible after restart. Prior to restart, the Staff shall certify to the Commission that the Licensee has made reasonable progress in initiating its program for the long-term solution.

1065. We have considered all of the UCS-proposed findings and acknowledge their contribution to the record in asking many good questions of Licensee and Staff witnesses. We essentially agree with UCS that the Licensee failed to provide convincing evidence of the reliability of the EFW system. To claim that the Staff's evidence was conclusive beyond any doubt would be an exaggerated claim. However, the Staff used the best available data combined with an event tree-fault tree analysis to estimate system reliability — the analysis that the intervenors said was lacking in the failure modes and effects analysis of the integrated control system. UCS has not pointed to any gross deficiencies in the Staff analysis nor have they shown that the results were incorrect. We have relied on the Staff figures on reliability of the EFW system and our own estimates of the adequacy of the feed-and-bleed backup to arrive at our conclusion that the core is adequately protected from a loss of main feedwater transient, the dominant challenge to the EFW system.

1066. The Board finds that the short-term actions recommended in the Commission's Order and Notice of Hearing to improve the timeliness and reliability of the TMI-1 emergency feedwater system are necessary and sufficient to provide reasonable assurance that the facility can be operated without endangering the health and safety of the public, and should be required before resumption of operation should be permitted.

1067. We also find that implementation of the condition noted above plus the recommended long-term actions with respect to the EFW system are necessary and sufficient to provide reasonable assurance that the facility can be operated for the long term without endangering the health and safety of the public, and should be required of Licensee as soon as practicable.

R. Valve Testing

1068. Board Question/UCS Contention 6 was:

Reactor coolant system relief and safety valves form part of the reactor coolant system pressure boundary. Appropriate qualification testing has not been done to verify the capability of these valves to function during normal, transient, and accident conditions. In the absence of such testing and verification, compliance with GDC 1, 14, 15, and 30 cannot be found and public health and safety is endangered.

Board Question Regarding UCS Contention 6:

The Board wants more than just a schedule for testing of reactor coolant system safety and relief valves, as is required pursuant to NUREG-0578. Is there reasonable assurance that the tests will be successful, *e.g.*, that there is good evidence that the valves will indeed perform in an accident environment?

1069. Both the Staff and the Licensee presented direct evidence on this issue. The Licensee's testimony was sponsored by James H. Correa, Gary T. Urquhart, and Robert C. Jones, Jr. (ff. Tr. 8746). The Staff's testimony was sponsored by John J. Zudans (UCS Contention 6, ff. Tr. 8824). No other direct evidence was presented. Only the Licensee and the Staff filed proposed findings. On this issue, however, we recognize that UCS proposed findings ¶¶ 209-214, submitted in connection with UCS Contention 5, are directed toward valve testing.

1070. In its Contention 6, UCS had alleged that appropriate qualification testing had not been performed to verify the capability of reactor coolant system relief and safety valves. UCS withdrew its sponsorship of

Contention 6 on July 31, 1980. Subsequently, the Board not only retained the contention as a Board question, but also posed its own question, quoted above, regarding the former UCS Contention 6.

1071. We have already noted that the pressurizer safety valves are part of the reactor coolant pressure boundary and functionally provide overpressure protection for the reactor coolant system. The valves were designed for, and protect the integrity of, the reactor coolant system at the design conditions of the primary system — 2500 psig and 670°F. The reactor coolant system is adequately protected by either of the two safety valves, since each is capable of relieving the required capacity. Correa, *et al.*, ff. Tr. 8746, at 5 (Urquhart).

1072. The pressure relieving capacity of the safety valves was established consistent with the applicable edition and addenda of Section 9 of Section III of the ASME Boiler and Pressure Vessel Code. This included certification by the valve manufacturer of the capacity of the valves utilizing prototypical testing to establish discharge factors and analytical verification of the ability of the valves to withstand design and operating pressures. *Id.*

1073. The safety valves were also designed in accordance with the requirements of Section III of the ASME Code to assure reactor coolant pressure boundary integrity. Testing and examination of the valves during and following manufacturing and testing included the following:

- (a) Chemical and mechanical testing of the materials.
- (b) Volumetric examination of the materials.
- (c) Surface examination of the materials.
- (d) Hydrostatic pressure testing of the completed valves at the manufacturer and after installation.
- (e) Verification of set pressure.
- (f) Seat leakage testing following opening and closing.

Id., at 5, 6 (Urquhart). *See also*, Zudans, ff. Tr. 8824, at 4, 5.

1074. Also of significance with regard to the capability of the pressurizer safety valves is the transient which occurred February 26, 1980, at the Crystal River nuclear unit, a plant with a B&W nuclear steam supply system and components similar to TMI-1. During the transient, one of the two safety valves lifted at approximately 2400 psig and flowed saturated steam, two-phase fluid and liquid water. The water flow rate was up to 700 gpm and the valve reseated at approximately 2300 psig, a blowdown to a pressure about 4% below the opening pressure. Correa, *et al.*, ff. Tr. 8746, at 6 (Urquhart).

1075. Subsequent to the transient, the affected valve was subjected to detailed laboratory inspection and testing to determine if any damage had been sustained. No damage detrimental to the proper operation of the

valve was discovered even though it had experienced flow conditions other than saturated steam. *Id.*, at 6, 7 (Urquhart); Tr. 8787-88, 8806, 8809 (Urquhart); Zudans, ff. Tr. 8824, at 7.

1076. The pressurizer PORV was designed for the same system conditions as the safety valves — 2500 psig and 670° F. The valve design was governed by the same ASME Code requirements as the safety valves as it related to pressure boundary integrity, and the valve was tested and examined in a manner similar to the safety valves. Because the PORV is power operated in response to an independent pressure signal, verification of set pressure was not applicable. Verification of valve opening and closing was performed, however, both prior to shipment and following installation. Correa, *et al.*, ff. Tr. 8746, at 7 (Urquhart); Zudans, ff. Tr. 8824, at 5. The PORV is seismically qualified, and its solenoid operator is qualified for up to 300° F and 2×10^8 R. The PORV block valve is environmentally and seismically qualified, as is its control circuitry. The control circuitry for the PORV itself is environmentally qualified. Tr. 8768 (Correa); Tr. 8800-01, 8997 (Urquhart).

1077. The PORV which will be installed in TMI-1 prior to restart is the TMI-1 spare PORV. This valve was ordered per the original PORV requirements, was manufactured in 1978, was "N" stamped per Code Case 1581, and in general satisfies the 1977 Edition with the Winter 1979 Addendum of Section III of the ASME Code for fabrication requirements. Correa, *et al.*, ff. Tr. 8746, at 8.

1078. The valve is being modified per the manufacturer's latest design features to improve seat tightness. The modification is being performed per the latest ASME Section III requirements. As part of the modification effort, the valve will be disassembled and all critical dimensions will be recorded and checked against drawing requirements. In addition, all moving parts will be inspected for surface finish and signs of wear caused by the original testing of the valve prior to its shipment in 1978. This inspection of the valve internals will ensure that the valve parts meet all requirements. After reassembly of the valve, it will be seat leak tested and opened at its setpoint. This will ensure that the valve will function properly. *Id.*; Tr. 8809-10 (Correa).

1079. Prior to being installed in TMI-1 the valve will again be seat leak tested. During hot functional testing the valve also will be actuated to ensure its functional ability and to test all downstream instrumentation. *Id.*, at 9.

1080. A valve testing program is also in progress in response to recommendation 2.1.2 of NUREG-0578. The performance testing of PWR relief and safety valves is being conducted by the Electric Power Research Institute (EPRI). The objectives of these tests are to evaluate the performance of each of the various types of reactor coolant system safety and

relief valves in PWR plant service for the range of fluid conditions under which they may be required to operate, and to obtain piping thermal hydraulic and support reaction load data. Licensee has submitted its plant specific data to EPRI for inclusion in the test program, and B&W-supplied operational transient and postulated accident sequence data is being used in defining test parameters for the EPRI test matrix. One of the relief valve types chosen to be tested is the same model as the TMI-1 relief valve, and one of the safety valve types chosen to be tested is the same model as the TMI-1 safety valve. Therefore, the EPRI test results can be directly applied to TMI-1. *Id.*, at 9-12. *See also* Zudans, ff. Tr. 8824, at 5; Tr. 8922 (Zudans).

1081. The NRC Staff has concluded that the PORV and safety valve test program was scheduled to have been completed on the schedule required by NUREG-0737 (July 1, 1981), and that the NUREG-0737 technical requirements for safety and relief valves, associated piping and supports, can be met, subject to completion of their review of additional information which has been submitted. The Staff has found that Licensee has committed to the requirements of this item (NUREG-0578, 2.1.2) consistent with other operating reactors, noting that Licensee is participating in the EPRI program and is monitoring the program to assure that the test results apply to TMI-1 plant specific valves and associated piping and supports.¹³⁴ Staff Ex. 14, at 25, 26.

1082. The Staff is sufficiently confident in the outcome of the EPRI tests that it believes restart of TMI-1 should be permitted before the tests are completed. Tr. 8838 (Zudans). Should the testing demonstrate that the safety and relief valves are not qualified for two-phase and solid flow, the Staff will require the Licensee to take corrective actions. Zudans (UCS 6), ff. Tr. 8824, at 5. In addition to the fact that analysis of a stuck-open PORV shows that no fuel damage is predicted to occur, the Staff relies on the following: improved PORV position indication; TMI-1 procedures which require closure of the block valve early in a LOCA; the emergency power supplies for the PORV and block valve; and the generally upgraded TMI-1 emergency procedures for small-break LOCAs. Further, the set-point changes and installation of anticipatory reactor trips will considerably lower the PORV challenge rate. This has been verified by operating experience. *Id.*, at 6, 7; Tr. 8838-39 (Zudans).

1083. The Board is satisfied that the valve testing program described by the Staff and Licensee is adequate to reveal any potential design deficiencies in the safety and relief valves at TMI-1. The testing program was not

¹³⁴ Block valve qualification is a new recommended requirement added by NUREG-0737, which was not in NUREG-0578. EPRI and the Staff are still discussing a formulation for such a test program. Staff Ex. 14, at 25, 26; Tr. 21,223-24 (Jacobs).

completed prior to the close of the record, nor do we feel it necessary for the results of the tests to be reported to us. We denied a motion by UCS to reopen the record to receive further evidence on PORV block valve testing. Board Memorandum and Order, June 9, 1981. On August 25, 1981 we issued an order asking the Staff to comment on the relevance of some early test results to TMI-1. The Staff reply of September 14 assured us that the results were not significant with respect to the issues in the TMI-1 proceeding. We have been reassured that the Staff is closely following the test program and that any impact on the adequacy of the TMI-1 PORV and safety valves to function properly would be brought to the attention of the Commission. Our concerns in adopting UCS Contention 6 have been satisfied. The requirements of Section 2.1.2 of NUREG-0578 are being satisfied.

S. Accident Design Bases: Board Question/UCS Contention 13 and Board Question 2

1084. In this section we address Board Question/UCS Contention 13 which requires an explanation of the Staff's method of determining which of the possible accidents fall within the design basis (the Class 9 question), and the related Board Question 2 which inquires into how the Licensee and the Staff have determined that the long- and short-term "fixes" at TMI-1 have, in their totality, provided reasonable assurance that the public health and safety is protected.

1. Board Question/UCS Contention 13

1085. UCS Contention 13 states:

The design of TMI does not provide protection against so-called "Class 9" accidents. There is no basis for concluding that such accidents are not credible. Indeed, the staff has conceded that the accident at Unit 2 falls within that classification. Of the realm of possible accidents, the Staff's method of determining which fall within the design basis accidents and those for which no protection is required is faulty in that the design basis accidents for TMI do not bound the credible accidents which can occur. Therefore, there is not reasonable assurance that TMI-1 can be operated without endangering the health and safety of the public and resumption of operation should not be permitted.

Background of the Class 9 Issue

1086. The Union of Concerned Scientists proposed Contention 13 alleges that the Staff's methodology for determining which among the realm of possible accident sequences are "credible" for the purposes of determining the plant's design basis is fundamentally faulty.¹³⁵ The contention was admitted by the Board subject to further specification, with the caveat that the showing of the Licensee and the Staff would depend upon the specificity provided by UCS. The Board noted in its First Special Prehearing Conference Order, *supra*, 10 NRC at 837, that: "(r)egardless of the final specificity of this contention, the Board itself expects the Staff to provide evidence addressing the general method by which the Staff has determined whether accidents within the scope of this proceeding fall within or outside the design basis." UCS subsequently filed a timely motion for summary disposition with respect to UCS Contention 13, asserting, *inter alia*, that the NRC Staff had conceded under oath that it has not and cannot determine the probability of any particular accident sequence. UCS argued that it was entitled to judgment as a matter of law since its motion demonstrated that the Staff's methodology for identifying "credible" accidents had no rational basis. By leave of the Board, the Staff filed no response to the UCS motion. The motion was denied by the Board, not as a judgment on its merits, but because the Board considered the issue so important as to call for its treatment on the evidentiary record. Tr. 2229-31. The Board accepted the facts and arguments stated in the motion as providing sufficient specificity to permit litigation of the contention, while noting again that the nature of the Licensee's and Staff's responses

¹³⁵ In addition to UCS Contention 13, the Board admitted "Class 9" accident contentions advanced by ECNP (ECNP-4(b) and -4(c)) and by Mr. Sholly (Sholly-17), which identified particular accident sequences with a nexus to the TMI-2 accident. For reasons discussed in our general Introductory Findings, ¶ 25 PID, we rejected other "Class 9" contentions advanced by UCS, ECNP, ANGRY and CEA. *See also*, our First Special Prehearing Conference Order, 10 NRC 828, 832-35, 837 (1979). However, we permitted ECNP, ANGRY, and CEA each to adopt UCS Contention 13 in place of their rejected contentions. ECNP and CEA subsequently lost their rights to adopt UCS Contention 13, upon default on Board orders. Mr. Sholly withdrew his Contention 17 by memorandum dated December 23, 1980, and, as we discuss in the body, UCS, lead intervenor on its contention, withdrew its sponsorship of UCS Contention 13 by letter dated January 5, 1981. The Board did not adopt Sholly Contention 17, or ECNP Contentions 4(b) and 4(c) on which ECNP had defaulted (Tr. 11,025-26) but retained UCS Contention 13. ANGRY, the sole remaining intervenor with an interest in UCS Contention 13, conducted limited cross-examination of Licensee's witness and departed, and did not attend the evidentiary session at which the Staff presented its testimony on the issue. *Compare* Tr. 11,088 and Tr. 11,103. Only the Licensee, Staff, and UCS filed proposed findings on the substantive aspects of this issue. Only Licensee addressed the issue in reply findings.

would of necessity be framed in response to the generality of the contention. Tr. 2337; *See also* Tr. 2198-99, 2208-12, and 2221. During the hearing, UCS informed the Board that, due to a lack of resources compounded by the length of the proceeding, it would be unable to participate directly in the litigation of UCS Contention 13. However, consistent with its earlier rulings, the Board required the Staff to come forward with evidence on its methodology for classifying accidents as credible or incredible.

1087. In response to UCS Contention 13, the Staff presented testimony by Jack Rosenthal and Paul Check. Rosenthal and Check, ff. Tr. 11,158. These witnesses sponsored Staff Exhibit 13, Potential Core Damage Accident Sequences and Preventive and Mitigative Measures. The Licensee presented the testimony of Solomon Levy. Levy, ff. Tr. 11,049. No other party presented a direct case. Because the contention here in question has more to do with the Staff than the Licensee, the Licensing Board gave greater attention to the Rosenthal-Check testimony. The contention is primarily directed toward the adequacy of Staff methodologies for determining design-basis events and their significance to plant safety. Hence, the Staff is in the better position to address the contention.

Discussion on Class 9 Considerations

1088. A resolution of UCS Contention 13 will, in a large measure, depend upon an interpretation of the terms used in the contention. We rely on UCS PF ¶¶ 315 through 320 for assistance in defining the terms. *See also* our discussion in First Special Prehearing Conference Orders, 10 NRC at 832-35.

1089. The term "Class 9 accidents" is derived from a proposed rule published by the Atomic Energy Commission in 1971. The proposed rule, which has now been withdrawn by the Nuclear Regulatory Commission, set forth a system of classification of potential accidents for use in NRC Staff assessments performed pursuant to the National Environmental Policy Act of 1969. The proposed rule set forth a spectrum of accidents divided into nine classes ranging from trivial in nature to the most severe for the purposes of evaluating environmental risk.

1090. Class 9 accidents were characterized in the proposed rule as "involv(ing) sequences of postulated successive failures more severe than those postulated for the design basis for protective systems and engineered safety features." These events, characterized as beyond the design basis, were not explicitly assessed in determining the adequacy of the facility design. For the purposes of analysis pursuant to 10 CFR Part 100, Class 9 accidents were considered as "not credible". Rosenthal and Check, ff. Tr. 11,158, at 6-7.

1091. The design basis is the set of prescribed anticipated operational occurrences and accidents used to assess the way specific systems respond to upset conditions. Design-basis events (DBEs) are events or sequences of events which fall within the design basis. DBEs provide a set of analytic tests of the plant design, consisting of sample challenges to the plant safety systems. These tests are used by the Staff to determine if installed or proposed safety features can cope adequately with the DBEs. Rosenthal and Check, ff. Tr. 11,158, at 4.

1092. An explicit list of DBEs is not provided in the Commission's regulations, but must be found on a system-by-system basis for each plant in the Final Safety Analysis Report (FSAR), the Technical Specifications, applicable reference or topical reports, and related design documents. *Id.*, at 3. The set of DBEs now used by the Staff to test the overall adequacy of the plant design was not developed until the mid-1970's. *Id.*, at 17-18. A listing of events to be considered is included in Regulatory Guide 1.70, Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (Revision 2), issued in 1975. Levy, ff. Tr. 11,049, at 2.

1093. The response of each plant to the DBEs is assessed using the requirements stated in the General Design Criteria (10 CFR Part 50, Appendix A) and other standards set forth in the Standard Review Plan and Regulatory Guides. The consequences of DBEs are assessed against the requirements of 10 CFR Part 100; for the purposes of this analysis, DBEs are considered to be "credible" events. Rosenthal and Check, ff. Tr. 11,158, at 5.

1094. Since the withdrawal of the AEC's proposed rule by the Commission, the term "Class 9" accident has no formal meaning, but it is in common usage. The Staff uses the phrase "events beyond the design basis" as equivalent to the term "Class 9." Tr. 11,245-46 (Rosenthal). As so defined, the TMI-2 accident was a Class 9 event even though the containment was not breached and most of the fission products were not released from the containment. Rosenthal and Check, ff. Tr. 11,158, at 8.

1095. In its proposed finding, ¶ 314, UCS made it clear that the essence of its contention is that the Staff has no technically supportable method for classifying particular accident sequences as either credible or not credible.

1096. The chief concern of the Board lies in the adequacy of the mandated modifications to protect the core from severe damage in the event of a loss of main feedwater or a small break LOCA. Both issues will be addressed in our findings on Board Question/UCS 13 and Board Question 2 on the adequacy of the long- and short-term recommendation at issue in this proceeding, below in this section.

1097. It is clear from the above definitions that the Staff uses the terms "credible" and "not credible" to describe whether or not a particular accident is, or is not, a design basis event. Whether this is a "scrutable

method" (UCS's wording) does therefore hinge on what accident scenarios are included in the class of DBEs and which are excluded and the basis for making such a classification. Ideally, the Staff should look at all scenarios that lead to core melt and assess the probability of each. If the probability is less than, say, 10^{-6} /yr, it might be classed as beyond the design basis and there would be no requirement for a safety system to protect against it.¹³⁶ Attention could then be focused on high consequence, higher probability events.¹³⁷ We note that this was the approach taken by the authors of WASH-1400.

1098. It is clear from Staff testimony in this proceeding that the Staff's method for classifying events is not ideal, involves a considerable amount of engineering judgment, and is, in a sense, not "scrutable." UCS PF ¶ 321. However, as Licensee points out, UCS's proposed findings — taken as a whole — constitute a generic indictment of the design and licensing process employed in the review of *all* commercial nuclear power plants. Licensee reply finding ¶ 231. We agree. However, we nevertheless will consider the implications for TMI-1. We will describe the methods used by the Staff for deciding which events are design basis; though they do depart from ideal, they are by no means irrational, and do not force a conclusion that TMI-1 is unsafe.

1099. Staff witnesses Rosenthal and Check testified that the basis for deciding which accidents are "credible", *i.e.*, design basis events, has been an evolving one.

1100. Over the course of years the Staff has used several approaches. Reactor regulation has been a developing process, with new information and new techniques being incorporated as they have become available and verified. But fundamentally, the staff uses engineering judgment informed by engineering assessment of the performance characteristics of the various system and components in a nuclear power reactor and of the kinds of system or component failures that may occur. This is often called a mechanistic or deterministic approach. It relies upon the composite of engineering experience and expertise of the Staff, supplemented by the engineering experience and expertise of the ACRS, and with substantial contribution from the engineering experience and expertise of designers, builders, and operators of nuclear power reactors. Rosenthal and Check, ff. Tr. 11,158, at 17.

¹³⁶ *But see* our discussion of the use of probabilistic numbers in our findings on emergency feedwater reliability and Board Question 6 in Section Q, *supra*.

¹³⁷ The only consequence that we will address in connection with this contention is severe core damage including core melt. We therefore agree with UCS that we should focus on reducing the likelihood of core melt to a very low value. Hence, we disregard Licensee's complaints about UCS proposed findings that fail to include consequences. Licensee RF ¶ 237.

1101. In the early days of reactor safety assessments, determining the kinds of accidents that a plant should be designed to cope with was a matter of group assessment of what kinds of things can go wrong. Effort was made to bound those events that might reasonably be expected to happen. This was accomplished principally by postulating the failure of each major plant system in turn, and requiring that the plant manage the consequences, *i.e.*, to ensure that predicted off-site doses remain within Part 100 guidelines. *Id.*

1102. Consideration was given to loss of coolant flow, control rod withdrawal malfunction, the failure of control rods to insert, and pipe breaks. Efforts were made to identify the conditions that provided a reasonable upper bound to these various kinds of events. This identification process frequently took the form of extended discussion, and debates — both oral and written — among the Staff, industry experts, and the ACRS. In this fashion, for example, the practice developed to design for the instantaneous guillotine failure of the largest primary system coolant pipe as the reasonable upper bound of pipe break events. *Id.*

1103. Early assessments also included several reactivity-related events such as ejected control rod and moderator dilution. The inclusion of feedwater events as DBEs is more recent. Rosenthal and Check, *ff. Tr.* 11,158, at 18.¹³⁸

1104. With progressively more sophisticated safety assessments being performed during the 1960's and early 1970's, this process finally led, by the mid-1970's, to the set of design basis events (anticipated operational occurrences and accidents) now used by the Staff in all case reviews to test the overall adequacy of design. These events were believed to represent a sound composite engineering judgment regarding the reasonable upper bounds for events which might occur. Also, they were thought to define a reasonable envelope of all credible events. Thus, plants were required to be designed to mitigate the consequences of those events which were considered "credible". Conversely, mitigative measures were not required for those events which were considered "incredible". *Id.*

1105. However, more recently, with the increasing use of risk assessment and with current perception of event sequences as a continuum of probabilities of occurrence and a continuum of consequences, the Staff is extending its consideration of failure sequences. *Id.*

1106. The Staff now considers a spectrum of event sequences and employs a variety of "fixes." It is Staff practice to address those event sequences designated as design basis events primarily by requiring installation of emergency safety features (*i.e.*, hardware), although the Staff has

¹³⁸ The Board notes that as a product of this method and the consequences of the TMI-2 accident, the EFW system at TMI-1 will be upgraded to "safety grade".

also employed procedural measures to mitigate DBEs. Event sequences not designated as "design basis events" have been "fixed" by a variety of means including the use of increased surveillance and testing of existing equipment or improving plant procedures and operator training, as well as some hardware requirements. The goal of these "fixes" is to reduce the probability and/or the consequence of an event sequence. Selection of the means to implement one or more "fixes" is based in part on risk assessment, but still predominately on engineering judgment. *Id.*

1107. However, the Staff now explicitly considers a much wider range of event sequences, some involving multiple failures and some involving systems not traditionally considered safety systems. In this connection, the Staff considers plant or system modifications which can eliminate the initiating event, or can improve the capability of some other systems to compensate for or cope with the initial malfunction, as well as improvements in mitigating system characteristics. These are all intended to assure that the likelihood of the candidate sequence is diminished to a low level relative to other potential reactor safety system malfunctions or that the potential consequences of such an event is less severe than analyzed design basis events. For example, operating experience has shown that significant plant upsets could occur for B&W plants because of deficiencies in the integrated control system (ICS). The Staff has concluded that the ICS power supplies should be made more reliable and has required that the emergency feedwater system be isolated from the ICS. Rosenthal and Check, ff. Tr. 11,158, at 19.

1108. In connection with the TMI-1 restart, the Staff considered all sequences having nexus to the TMI-2 accident. The methods used to assess this wider range of sequences remains principally a deterministic assessment. Although the Staff now sometimes uses fault trees and event trees to help understand the sequence step-by-step, the assessment of the adequacy of systems to safely terminate the event is still based primarily on the experience and judgment of the review staff involved. *Id.* The Staff has used quantitative probability assessment in arriving at judgments, but only in a limited way. Rosenthal and Check, ff. Tr. 11,158, at 20-27.

1109. The Staff states several reasons why quantitative probabilistic analysis is not the only procedure used: (1) because there is a lack of sufficient failure-rate data and because of difficulties in establishing complete system models, sound assessments which have been adequately tested are rare; (2) the Staff does not have a numerical probability goal against which to assess compliance; and (3) the Staff believes its approach — which utilizes composite engineering experience and judgment — provides a sound, comprehensive basis for decisions. *Id.*, at 20.

1110. Nonetheless, even when the Staff has emphasized detailed analysis of postulated events, the probability element has not been totally absent. The probability associated with calculated consequences was given limited (generally quantitative) consideration, and some element of probability was reflected, primarily in the selection of events or event sequences to be analyzed. For example, the probability of two or more random equipment failures initiating an event was considered to be low enough to eliminate this situation from consideration as a design basis event. *Id.*, at 20. UCS, in PF ¶ 339, criticizes the Staff action but points to no evidence that two more random equipment failures occur so frequently that this situation must be included as a DBE.

1111. The following comments summarize Staff practice and experience with quantitative probability assessment and safety goals:

- (1) Where calculated values of the probability of occurrence are vanishingly small (as shown for BWR rod drop), probabilistic analysis can be readily used to exclude trivial issues (such as vanishingly small contribution to total risk) and to focus Staff resources.
- (2) The numerical value of the probability that a specific external hazard will occur (Section 2.2.3 of the SRP) is a useful screening tool; however, in most cases, the probability of external hazards has been shown to be large or small in relation to the values given in the SRP.
- (3) When the calculated probability of an occurrence is within one or two orders of magnitude of an *ad hoc* goal, it has been difficult to make final decisions. For example, the issue of ATWS has not been resolved by the Commission.
- (4) The change in ATWS goals (the goals set forth in WASH-1270 vs. those set forth in NUREG-0460, Volume 1) illustrates that, at least conceptually, the Staff believes (a) that the contribution of individual issues to total risk should be compared to the overall perceived risk, and (b) that attention should be focused on those sequences in which the risk potential is significantly above the general level of risk associated with other sequences.
- (5) Numerical goals are difficult to apply, particularly in view of the range of uncertainty in calculating probabilities.

Rosenthal and Check, ff. Tr. 11,158, at 26.

1112. Turning now to the UCS "clarification" of their contention "that the Staff has no technically supportable method for classifying accident sequences as either credible or not credible", much depends on the definition of "technically supportable". The Staff does rely largely on engineering judgment backed up in part by probabilistic risk assessment techniques. Is that "technically supportable"? Would it be better if the Staff made greater use of risk assessment? We think it would and we encourage the Staff to continue to incorporate such techniques whenever appropriate. Should there be a goal, a dividing point between credible and incredible? The Commission has decided that there should be, as we have indicated in our discussion of the *St. Lucie* case and NUREG-0735 in Section Q on Emergency Feedwater Reliability, *supra*. However, we are unable to find direction in, nor are we bound by the Commission's plan for developing a safety goal as set forth in NUREG-0735. Until a safety goal is established we do not believe the Staff approach of using a combination of deterministic and probabilistic methods is unreasonable.

1113. As noted above the TMI-2 accident was not a design basis accident. It is apparent that the sequence of events that occurred at TMI-2 was not anticipated or adequately protected against. A major concern of the Board has been whether the proposed and mandated modifications are sufficient. In our Memorandum and Order to the NRC Staff Regarding Class 9 Accidents, dated March 31, 1980, we stated, "We need to be informed by the Staff what critical accident sequences the staff will analyze in order to assure that the proposed short- and long-term actions necessary to provide adequate protection to public health and safety have been taken." In our Memorandum on Board Question, dated September 12, 1980, the Board stated with reference to Board Question 2 ". . . its concern with having an adequate record on the sufficiency of the proposed short-term and long-term actions to protect the health and safety of the public."

1114. In response to our March 31, 1980 order, the Staff supplied an 86-page document entitled TMI-1 Potential Core Damage Accident Sequences and Preventive and Mitigative Measures. The document was tendered on June 2, 1980 and was sponsored into evidence as Staff Ex. 3 by Rosenthal and Check, ff. Tr. 11,158, at 11. Accident sequences having a close nexus to the TMI-2 accident were diagrammed as event trees. *Id.*, at 13, 14. Sequences leading to core melt involved multiple failures of engineered safety systems such as emergency feedwater (EFW), high pressure injection (HPI) and primary pressure relief valves. It is the Staff's position that, as a consequence of the design modification and the improved operational procedures, the scenarios leading to core melt are no longer "credible". *Id.*, at 16. Although as noted earlier, the Staff uses both probabilistic and deterministic methods in deciding which sequences are

“credible”, the basis for excluding the core melt sequences from design basis was primarily deterministic which “obviated the need for probabilistic assessment”. *Id.*, at 16. In Staff Ex. 3, the improvements in procedures and design were listed as they apply to each step in the event tree. However, the resulting reduction in failure probability at each step could not be quantified. Tr. 11,251 (Rosenthal). Nevertheless, it was claimed that an understanding of the underlying probabilities was involved in making a deterministic judgment of which fixes were needed. Tr. 11,253 (Check).

1115. As noted above, the Staff listed the mitigative measures that could reduce the failure probability at each step in the event tree. See Tables 7 through 15 in Exhibit 3 and p. 12 of the Rosenthal-Check testimony, ff. Tr. 11,158. For example, Table 7 lists the measures to reduce the potential for loss of main feedwater. It includes changes in the ICS resulting from the failure modes and effects analysis. Table 8 lists measures to reduce potential for failure of the EFW system and includes a large number of the order items that we discuss in connection with Board Question 6 on EFW reliability. Section Q, *supra*. The remaining tables address other modes in the event tree — the mitigating actions are classified as “software” requirements and “hardware” requirements. Included in the software are such items as requirements for review of operating experience, improved training of operators, shift manning requirements, the requirement for a shift technical advisor, and operating procedure review. Rosenthal and Check, ff. Tr. 11,158, at 13. Hardware changes include changes in the PORV setpoint and the high-pressure reactor trip setpoint. *Id.*, at 14. The total list of changes is large, many of which may be of marginal value, but the total impact will surely make TMI-1 a much safer plant. However, many of the items included in Tables 8 through 15 of Staff Ex. 3 will not be implemented at restart — some of them many never be. UCS argues that

. . . the Staff has done little more than compile a list of items which were at some point being considered for implementation on operating reactors, without distinguishing the important from the less important recommendations, without indicating what degree of improvement is associated with each and even without deleting those items not adopted for implementation. The Staff then claims that these measures, in their undifferentiated entirety, will reduce the probability of TMI-2-related accident sequences to the realm of being “not credible”. For the Board to come to such a conclusion would require a considerable leap of faith.

UCS PF ¶ 369.

1116. UCS points out that many of the items in the tables of Staff Ex. 3 are taken from the TMI Action Plan, NUREG-0660, but have not been included in NUREG-0737. UCS PF ¶ 371. Other items have little relevance (UCS PF ¶ 372) and others have no short-term benefit. UCS PF ¶ 373. Among the omitted items of concern to this Board is the IREP (Interim Reliability Evaluation Program) study and the systems interaction program. Action Plans II.C.1 and II.C.3. The IREP program has been broadened into a National Reliability Evaluation Program (NREIP). No date has been set for implementation at TMI-1. Rosenthal and Check, ff. Tr. 11,158, at 27. We agree with UCS that the Staff list of improvements in Exhibit 3 is inflated and so we asked the Staff to address the sufficiency of those actions that *will be* implemented at TMI-1 in Board Question 2. Since Board Question 2 is so intimately related to UCS Contention 13, we will proceed to discuss it at this point.

2. Board Question 2

1117. The Board stated its concern with having an adequate record on the sufficiency of the proposed short- and long-term actions to protect the health and safety of the public. Tr. 2392. The Board asked for testimony on:

[H]ow the staff or licensee has determined that all of the necessary TMI-2 related recommendations have been identified and that all the appropriate accident sequences have been addressed. The board wants testimony or other evidence which explains, if such be the case, how the licensee and the staff have concluded that the NUREG-0578 short- and long-term recommendations, other subsequent safety recommendations, and the identified accident sequences (with their respective preventative or mitigative measures) are *in their totality* sufficient to provide reasonable assurance that TMI-1 can be operated without endangering the health and safety of the public. The question is not intended to enlarge the scope of the hearing. The response may be limited to consideration of accidents following a loss-of-feedwater transient.

[Board] Memorandum on Board Questions, September 12, 1980, at 3-4.

1118. The Staff filed testimony on Board Question 2 through Denwood F. Ross, Jr. (ff. Tr. 15,555). This testimony was also adopted by Robert A. Capra. Tr. 15,554. The Licensee did not file testimony on this issue. Proposed findings were filed by Licensee, Staff, and UCS. Reply findings

were filed by Licensee and UCS, but not by the Staff. Although UCS has taken a strong position on this question in its proposed findings, it did not participate in the related evidentiary hearings.

1119. In responding to Board Question 2, the Staff also addressed Board Questions 1 and 5 which respectively inquired about the applicability of NUREG-0694 and NUREG-0660 items to TMI-1.¹³⁹ Table 3 of the Ross-Capra testimony listed, by short title and alphanumeric designation, all of the Action Plan items. Table 2 gave a breakdown of the applicability of the 279 items listed in Table 1. Most of the items were not judged by the Staff as being applicable to TMI-1 at this time either because they needed further consideration, were not directed at B&W plants, or were plant specific. Of the 84 items that were applicable to TMI-1, 54 were included in the Commission Order; 18 additional items are being required because they were included in NUREG-0694,¹⁴⁰ and 11 are NUREG-0737 items that will apply to TMI-1. (One is listed as already completed.) Table 3 gives a breakdown of the 84 items applicable to TMI-1.

1120. In addressing the question of sufficiency of the requirements, the Staff pointed out that the Action Plan items resulted from the recommendations of a number of task forces and review groups following the TMI-2 accident. The TMI Action Plan Steering Group considered all of the recommendations and consulted with ACRS and other experts. To quote Dr. Ross,

Such a collective and comprehensive assessment by persons, both inside and outside the NRC having expert knowledge over a broad range of technical disciplines provides reasonable assurance that the probable causes of the accident at TMI-2 and their associated corrective measures have been completely and adequately identified.

Ross, ff. Tr. 15,555, at 5.

1121. As we noted above, only 84 of the 279 Action Plan items are applicable to TMI-1. One hundred twenty-six items do not apply or the items may ultimately lead to new requirements, but in a manner not yet determined (*i.e.*, items require further definition of scope, need, and criteria). *Id.*, at 7. As pointed out in UCS PF ¶¶ 567-583, many of the omitted items are items in which the Board was particularly interested. II.C.1 is the IREP study, II.C.2 is the application of IREP to other

¹³⁹ NUREG-0694, TMI-Related Requirements for New Operating Licenses. NUREG-0660, Action Plans for Implementing Recommendations of the President's Commission and Other Studies of the TMI-2 Accident.

¹⁴⁰ NUREG-0694 contains a total of 48 requirements — 30 of those were included in the Commission's Order. Ross, ff. 15,555, at 9.

operating plants, and II.C.3 is the systems interaction study. In fact Board Question 3 was specifically aimed at the IREP study. We note that the ACRS has emphasized the importance of the systems interaction studies. Staff Ex. 14, Appendix C. Dr. Ross stated that a new branch is being organized in the NRC, the Risk and Reliability Assessment Branch, which will include such studies. Tr. 15,627 (Ross). The Staff agrees with ACRS that such studies are important but should not be a requirement for restart; that such studies will be under way in under two years. Tr. 15,623 (Ross). The Board agrees with this Staff and ACRS conclusion.

1122. In its proposed findings on Board Question 2, UCS makes many criticisms of the Staff's presentation on this issue and urges the Board to find that the plant should not be permitted to restart because the record does not establish that the short- and long-term items collectively are sufficient. UCS PF ¶¶ 550-630, *particularly* ¶ 630.

1123. UCS' criticisms fall into several broad categories which attack the Staff's position in not requiring certain Action Plan items in the short term. For example UCS faults the Staff reasoning that the IREP study will not be required prior to restart because the Staff has yet to determine the best approach to that action. UCS PF ¶ 582.

1124. The Staff is criticized for not having a detailed engineering explanation for the exclusion of that particular Action Plan item observing that the "Staff could only reiterate the process by which the Action Plan was developed and their future plans which may eventually lead to a requirement to such studies." UCS PF ¶ 583. Similarly, UCS simply disagrees with the Staff judgment that Action Plan items II.E.3.2-5 relating to reliability and capability of heat removal systems need not be implemented or resolved prior to restart. UCS PF ¶ 596. UCS will not accept the Staff explanation that the approach has not yet been determined. UCS PF ¶ 597.

1125. Another major theme which pervades UCS' position appears to be that where a particular Action Plan item has been identified as desirable for the short or long term, there is then a presumption that it is "necessary" within the meaning of the Commission hearing order of August 9, 1979. UCS PF ¶¶ 550-630, *passim*; particularly ¶ 622. We do not agree with UCS that the ruling of the Appeal Board in *Virginia Electric and Power Company* (North Anna Units 1 and 2), ALAB-491, 8 NRC 245 (1978), applies to this consideration. In *North Anna*, licensing boards were directed to require a justification why a plant could be operated safely in the presence of an unresolved generic safety issue. We do not view the Commission order in this proceeding to equate all of the 84 Action Plans identified as being relevant to TMI-1 as having the same significance as the unresolved generic safety issue considered in *North Anna*. The Commission's order raised no presumption that any of the

NRR short- and long-term recommendations were either "necessary" on the one hand or "sufficient" on the other. 10 NRC 141, at 148. We were directed to decide those issues upon a clean slate without an evidentiary impetus in either direction.

1126. We believe that UCS misstates the issue and the record when it suggests that the NRC Staff, contrary to the teachings of *North Anna*, disregards Action Plan items relevant to TMI-1 simply because they have generic applicability. UCS PF ¶ 622, n. referencing PF ¶¶ 544-546. We have not seen the Staff evade its responsibility in this proceeding by depending upon an asserted reliance on the generic scope of a safety item. UCS has not pointed to any examples. This is not to say that the Staff has not pointed to generic technical problems as a reason why certain schedules in the Action Plan items may not be met, which raises another UCS concern about the Staff's treatment of Board Question 2.

1127. UCS points to a priority ranking system in NUREG-0660, at Table B-1, which assigned a maximum of only 100 points for the assessment of safety significance out of a possible 210 points. The remaining priority points were based upon such non-safety factors as cost and time required for implementation and the nature of the proposed improvement. UCS PF ¶¶ 599-600. UCS also points to Staff testimony to the effect that delivery problems could affect the Staff's "requirements" as to a particular Action Plan (PF ¶ 615 citing Tr. 15,676 (Ross) and ¶ 619) and to other testimony indicating that the Staff has in its concept of "necessity" the subconcept of "feasibility". Citing Tr. 16,681-82 (Ross).

1128. In sum UCS would have us find that the Staff has not provided a reliable basis for measuring, in safety terms, which items should be required before restart because its judgment has been tainted by considerations of costs, feasibility, delivery schedules and other practical considerations. UCS PF ¶ 621. The Board itself has labored over this seeming paradox. We discuss this in greater detail in our ruling on the meaning of "necessary" in the Commission's August 9, 1979 hearing order (10 NRC, at 148) under Section B, Detection of Inadequate Core Cooling (ICC) *supra*. There we noted, *inter alia*, that the Commission itself in its Policy Statement on Further Guidance for Power Reactor Operating Reactors (45 Fed. Reg. 85236, December 24, 1980) recognized that the scheduling of TMI-2 accident-related improvements would depend upon the availability of both NRC and industry resources as well as the safety significance of the actions, and that the actions will result in gradually increasing improvements in safety. *Id.*, also at PS-54.

1129. We agree with the Licensee that there is an element of unfairness in UCS's approach to Board Question 2. It did not participate in the

hearing on this issue.¹⁴¹ It did not avail itself of the contention process to address what it perceives to be the shortcomings in the Staff's approach to this issue. UCS raises the issue for the first time in its proposed findings. We are not, however, shocked by UCS's approach. Any party may file proposed findings notwithstanding its participation on a respective issue. The point made by the Licensee, however, is valid, that if the evidentiary record is now inadequate in areas of concern to UCS, UCS must suffer some loss in the persuasive force of its complaints. Licensee reply PF ¶ 260.

1130. The root of the problem is the fact that UCS misperceives the scope of Board Question 2. The Board did not intend to have specific litigations as to the necessity and sufficiency of each of the Action Plan items set out in NUREGs -0694, -0660, and -0737. Nor was the evidence on Board Question 2 presented in that light. Our purpose was to review the Staff's approach in identifying the necessary "fixes", to learn how the Staff and the Licensee satisfied themselves that all needed fixes have been identified, and to determine whether the approach was reasonable. As we stated in Board Question 2, "The question is not intended to enlarge the scope of the hearing." The record produced in response to Board Question 2 is therefore inadequate to support Board findings on the need for or sufficiency of many of the Action Plan items where those items were not otherwise specifically litigated as contentions, mandated hearing order items, or specific Board questions. On the other hand we have referred to evidence presented under the framework of Board Question 2 in our findings on particular issues where it has been appropriate in context.

1131. The Licensee specifically objects to the Staff's position as expressed in ¶ 424 of Staff's proposed findings:

The Staff has taken the position with respect to TMI-1 that the requirements in NUREG-0694 that must be implemented by applicants prior to issuance of a license must be completed by Met Ed prior to restart. Dated requirements whose completion date falls before restart shall be a condition of restart; those whose completion date falls after restart should not be a condition of restart.

Ross (Board Question 2), ff. Tr. 15,555, at 8-9.

¹⁴¹ UCS did not examine the principal Staff witnesses, D. Ross and R. Capra, but did examine Staff witnesses Jensen, Jacobs and Silver (ff. Tr. 21,037) in a late clean-up session on open items remaining in the Staff's SERs. This examination produced testimony also related to Board Question 2, and has been cited in UCS reply findings ¶ 115, *et seq.*

1132. Licensee believes that the Staff has overlooked later testimony that only 5 of the 18 NUREG-0694 items which were not incorporated in the hearing order should be completed before restart. See Part Two of Licensee's reply findings ¶ 262 and Part Two of Licensee's proposed findings ¶¶ 519-520. The later testimony modified the earlier Staff position that all 48 NTOL items in NUREG-0694 (including the subset not incorporated in the hearing order) were Staff restart requirements. This modification was the result of the Commission's Order in CLI-81-3 (March 23, 1981) grouping TMI-1 with other operating licensees except where the record requires a finding to the contrary. 13 NRC 291, 295-96. The Board has reviewed the testimony and the exhibit cited by the Licensees and we find that the Licensee has correctly stated the record. Tr. 21,325-29 (Jacobs, Silver); Staff Ex. 11. The 5 surviving items in question are:

- I.B.1.2 Evaluation of Organization and Management Improvements
- I.C.7 NSSS Vendor Review of Procedures
- I.D.1 Control-Room Design Reviews
- I.G.1 Training During Low-Power Testing
- I.C.8 Pilot Monitoring of Selected Emergency Procedures for NTOLs.

Staff Ex. 11. As to these items, the Board regards Licensee's position as a restart commitment.

1133. Licensee also objects to the Staff position on NUREG-0737 items II.K.2.14/II.K.3.7. Licensee PF ¶¶ 526-27. These items would require all B&W licensees to provide analyses documenting that the PORV will open in less than 5 percent of all anticipated overpressure transients. Licensee submitted the requested analysis (performed generically by B&W for all B&W licensees); however, as documented in Staff Exhibit 12, the Staff has requested that Licensee provide, prior to restart, additional information in order to respond to Staff concerns regarding the data base utilized in the analysis. Staff witnesses Jacobs and Silver testified that no other B&W operating reactors have been reviewed for compliance with this item, nor has the Staff communicated its concerns about the analysis to any other B&W licensees, nor has any enforcement action been taken against any other B&W licensee with respect to this item. Tr. 21,436-37 (Jacobs, Silver); Staff Ex. 12, at II.K.2.14-1 through 3.

1134. Licensee's objection rests upon the grounds that the Staff has discriminated against TMI-1 contrary to the provisions of CLI-81-3, that the submission of the additional information will not affect the safe operation of the plant, and that reasonable progress has been made. Licensee PF ¶ 527.

1135. Contrary to the implications of Licensee's argument, the Commission's order in CLI-81-3 does not charge this Board with assuring that there is parity among TMI-1 and other commercial reactors. We view CLI-81-3 as permitting or requiring the Board to accept, where appropriate, Commission guidance and direction on other operating licensees as being reasonable for TMI-1 unless our evidentiary record indicates a different result. This is not to say that the Staff's treatment of other reactors is irrelevant. If, under comparable circumstances and, despite CLI-81-3, the Staff takes differing positions on TMI-1 *vis-a-vis* other operating reactors there is at least an inference that the Staff may be wrong either with respect to TMI-1 or with respect to the other operating reactors. But, we are not relieved of considering on the merits the validity of the Staff's position on any given TMI-1 recommendation solely because the Staff has treated other operating reactors more leniently.

1136. As to the merits of the Staff's recommendation on Items II.K.2.14/II.K.3.7, the Staff witnesses testified that the submission of this additional information will not affect the safe operation of the plant and that, if the same criteria were being used to evaluate TMI-1 as were being applied to other plants, the submission of the initial analysis would constitute reasonable progress toward completion of this item. Tr. 21,438 (Silver), 21,441 (Jacobs). For these reasons, the Board finds that completion of this item is not required in order to provide reasonable assurance that TMI-1 can be restarted without endangering the public health and safety, and that therefore Licensee need not be required to complete this item prior to restart.

1137. In arriving at this conclusion, the Board has accepted Licensee's proposed finding to rule on the merits on a particular Action Plan item under Board Question 2 where we would not do so (albeit on a generalized basis) for UCS. The testimony of Messrs. Silver and Jacobs (*id.*) on the need for and reasonable progress toward the implementation of Items II.K.2.14/II.K.3.7 has been considered in the context of UCS Contention 5, Section G, Valves, *supra*, where there has been a very substantial litigation on the issue. There the Board has relied in part upon the reasonable progress and the Licensee's commitment on these items in our conclusions on UCS Contention 5.

1138. With respect to the board issues raised by Board Question/UCS Contention 13 and Board Question 2 we find that the Staff has demonstrated that its methods for determining which accidents fall within the category of "design basis" accidents is reasonable. They depend upon a combination of deterministic and probabilistic assessments. Staff judgment plays an important role — infallibility cannot be guaranteed. Nevertheless it is on that basis that we find that the Staff's method of determining that all of the necessary TMI-2 accident-related recommendations have been

identified is sufficient to provide reasonable assurance that TMI-1 can be operated in the short and long term without endangering the health and safety of the public.

T. Equipment Qualification

1139. Board Question/UCS Contention 12 was:

The accident demonstrated that the severity of the environment in which equipment important to safety must operate was underestimated and that equipment previously deemed to be environmentally qualified failed. One example was the pressurizer level instruments. The environmental qualification of safety-related equipment at TMI is deficient in three respects: (1) the parameters of the relevant accident environmental have not been identified; (2) the length of time the equipment must operate in the environment has been underestimated; and (3) the methods used to qualify the equipment are not adequate to give reasonable assurances that the equipment will remain operable. TMI-1 should not be permitted to resume operation until all safety-related equipment has been demonstrated to be qualified to operate as required by GDC 4. The criteria for determining qualification should be those set forth in Regulatory Guide 1.89 or equivalent.

Board Questions Regarding UCS Contention 12:

- 1. The TMI-2 accident demonstrated that some safety-related equipment may have been exposed or was in imminent danger of being exposed to environmental stresses beyond that for which it was qualified. The board's concern is primarily with such equipment qualification. In addition, environmental stresses to safety-related equipment will be of concern to the extent that such equipment is not included in existing staff requirements.**
- 2. Which items of Regulatory Guide 1.89 have been grandfathered with respect to TMI-1? Explain any justification for allowing restart without compliance with the grandfathered items.**
- 3. What are the environmental qualification criteria which equipment inside of containment must meet with respect to radiation levels and length of time of exposure? (Address the Interim Staff Position on Environmental Qualification of Electrical Equipment, NUREG-0588).**

1140. The Board limited this contention to "equipment important to safety in the containment building and auxiliary building", and accepted it as limited. First Special Prehearing Conference Order, dated December 18, 1979, at 21. UCS subsequently withdrew its sponsorship of UCS Contention 12, and it was adopted as a Board Question. See Memorandum and Order of Prehearing Conference of August 12-13, 1980, dated August 20, 1980, at 6.

1141. Only the Licensee and Staff presented affirmative cases. Proposed findings were submitted by Licensee, Staff, UCS and the Commonwealth of Pennsylvania; reply findings, only by Licensee and Staff.

1. Radiation Intensity

1142. Following the TMI-2 accident a large fraction of the noble gases krypton and xenon, plus other volatile fission products, escaped from the core and the reactor system thereby producing an intense radiation field both inside and outside the containment vessel. Our concern was whether the safety-related electrical equipment at TMI-1 would be able to perform its function when exposed to radiation doses of millions of rads. We recognized that Regulatory Guide 1.89, included in Board Question/UCS Contention 12 (BQ/UCS 12), addressed the problem of high radiation fields. Indeed it requires that Class 1E electrical equipment must be environmentally qualified to withstand radiation doses resulting from the escape of 100 percent of the noble gases and 50 percent of the halogens. If TMI-1 equipment were qualified to Regulatory Guide 1.89 criteria it would withstand the radiation from a TMI-2 accident. However, Licensee's witness Braulke pointed out that the implementation section of Regulatory Guide 1.89 states that the guide will apply only to those construction permit applicants for which the Staff had issued its Safety Evaluation Report on or after July 1, 1974. Since TMI-1 received its operating license in April 1974, Licensee is not required to meet the criteria of this regulatory guide. Braulke (BQ/UCS-12), ff. Tr. 6802, at 2. Since compliance with the harsh environmental criteria of Regulatory Guide 1.89 was not a condition for licensing, our attention shifted to our third question regarding UCS-12, namely, what criteria must be met at TMI-1?

1143. Before we explore the testimony directed at BQ/UCS-12, we believe it would be helpful to summarize our discussion below of the positions of the various parties. UCS contends that all safety-related electrical equipment must be qualified to the equivalent of Regulatory Guide 1.89 prior to restart. Licensee and Staff point to a Commission requirement that all operating reactors must conform to Division of Operating Reactor (DOR) guidelines by June 30, 1982 and that these

guidelines are equivalent to Regulatory Guide 1.89. (This is not in dispute although one question of interpretation will be addressed later.) The Licensee argues that it is making good progress in meeting the DOR guidelines and that this Board need not, and the Staff should not, address restart requirements since the Commission has made a generic decision that applies to TMI-1. The Staff would require that at restart the equipment be qualified only to meet the environment of a design basis small-break LOCA; that the harsh environment that might result from a TMI-2 type small-break LOCA would not occur. Staff proposed finding ¶ 20. The Commonwealth of Pennsylvania is concerned about the Licensee's calculations of maximum flood level in the TMI-1 containment building and the possible immersion of safety instrumentation.

1144. Licensee is now reviewing the environmental qualification of all safety-related electrical equipment. This is being done in response to IE Bulletin 79-01B which is intended to obtain information needed to evaluate the adequacy of equipment. Braulke, *et al.* (UCS 12, 14, and 3), ff. Tr. 6802, at 4, 6. The Bulletin requires all operating reactor owners to:

- a. Provide a master list by system of all electrical equipment exposed to a harsh environment and required to function under postulated accident conditions.
- b. Provide evidence of environmental qualification for each equipment item listed.
- c. Provide service condition profiles (*ie.*, temperature, pressure, etc., as a function of time) and equipment operating time requirements for each equipment item listed.
- d. Evaluate the qualification of the equipment items listed against the NRC Division of Operating Reactors "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical Equipment in Operating Reactors" (the "DOR Guidelines"), and provide a plan to resolve any deficiencies.
- e. Identify the maximum expected flood level inside primary containment resulting from postulated accidents.

Id., at 7.

1145. Subsequent to the issuance of IE Bulletin 79-01B the Commission issued a Memorandum and Order relative to a request for reconsideration by UCS of a UCS Petition for Emergency and Remedial Action, CLI-80-21, May 27, 1980, 11 NRC 707, which adopted the DOR Guidelines and NUREG-0588 as the criteria documents for establishing environmental qualification of safety-related electrical equipment. Rosztoczy-1, ff. Tr.

6927-A at 3.¹⁴² Although the Commission reaffirmed the decision not to shut down any plants, it commended UCS for highlighting areas not adequately addressed by the regulations. The Commission further required that all operating plants conform to the DOR or NUREG-0588 guidelines by June 30, 1982. 11 NRC at 715. The order also states:

We believe the current Commission requirements in the fire protection and environmental qualification areas and those actions we order today provide reasonable assurance that the public health and safety is being adequately protected during the time necessary for corrective action.

Id., at 709.

1146. The Commission also stated that:

The Commission endorses the staff's actions to use the DOR Guidelines to review operating plants and NUREG-0588 to review plants under licensing review as well as those pieces of equipment in operating plants which do not meet the DOR Guidelines. Furthermore, pursuant to Section 161(b) of the Atomic Energy Act and based upon the record in this proceeding, the Commission is ordering today that these two documents form the requirements which licensees and applicants must meet in order to satisfy those aspects of 10 CFR 50, Appendix A, General Design Criteria (GDC)-4 which relate to environmental qualification of safety-related electrical equipment. [Footnote omitted]

Id., at 711.

1147. The Commission went on to note, however: "In this order we have not attempted to apply the lessons of Three Mile Island to environmental qualification. This issue is addressed in the NRC Action Plan under review by the Commission." *Id.*, at 716.

1148. We also note that on October 24, 1980, the NRC Staff issued, in this docket, an immediately effective Order for Modification of License, amending the TMI-1 operating license to add the following Commission-approved technical specifications:

- a. By no later than June 30, 1982, all safety-related electrical equipment in the facility shall be qualified in accordance with the provisions of: Division of Operating Reactors "Guidelines for Evaluating Environmental Qualification of Class 1E Electrical

¹⁴²This order was issued in response to a UCS petition for review of an earlier order denying the request to shut down all plants pending review of fire protection and environmental qualification of electrical components.

Equipment in Operating Reactors" (DOR Guidelines); or NUREG-0588, "Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment," December 1979. Copies of these documents are attached to Order for Modification of License DPR-50 dated October 24, 1980.

- b. By no later than December 1, 1980, complete and auditable records must be available and maintained at a central location which describe the environmental qualification method used for all safety-related electrical equipment in sufficient detail to document the degree of compliance with the DOR Guidelines or NUREG-0588. Thereafter, such records should be updated and maintained current as equipment is replaced, further tested, or otherwise further qualified.

45 Fed. Reg. 75812 (November 17, 1980). The order also provided that Licensee or any person whose interest may be affected by the order might request a hearing. *Id.*, at 75,812-13.

1149. Licensee's witness Braulke testified that the master list of equipment called for by Bulletin 79-01B was submitted on November 1, 1980. Tr. 6839. He stated also that the criteria were those of the DOR guidelines. Tr. 6840.¹⁴³ He pointed out that the DOR guidelines are significantly more detailed and require more than IEEE-279 referenced in Regulatory Guide 1.89. Tr. 6827. The information available from equipment suppliers was not adequate to document complete compliance with the guidelines. Mr. Braulke estimated that 95 percent of the items were documented (Tr. 6841) and that the remaining open items would be resolved by February 1, 1981. Tr. 6853. Exceptions may be sought for some items. Tr. 6863. It appeared that the Licensee was making good progress in complying with IE Bulletin 79-01B and Commission Order, CLI-80-21. We turned to the Staff witnesses for verification.

1150. Staff witness Rosztoczy stated on November 24, 1980 that the list of safety-related equipment submitted by the Licensee will be reviewed by the Staff by February 1, 1981 in order to assure qualification to DOR guidelines. All equipment must be so qualified by June 30, 1982; any deficiencies must be resolved. Rosztoczy-1, ff. Tr. 6927-A, at 4. Deficient equipment must be requalified or replaced. The Staff may decide that some pieces of equipment need not meet Regulatory Guide 1.89 criteria; if so, justification will be articulated in depth in the SER. Completion of the

¹⁴³ Mr. Braulke's estimate of 2×10^7 rads for the 30-day equipment dose (Tr. 6913) is a factor of 2 less than the Staff's value of 4×10^7 rads. Tr. 22,144. We did not feel it was necessary to attempt to resolve the difference.

SER was expected by February 1, 1981. Rosztoczy-2, ff. Tr. 6927-A, at 2. Since the Staff had not had time to complete its review of the Licensee's submittal at the time of the foregoing testimony (November 26, 1980), we asked that the witness return at a later date. We agree with Staff proposed finding ¶ 5 on this issue that:

Cross-examination of Dr. Rosztoczy at the time of his initial appearance was limited to determining the status of the Staff's review of environmental qualification of safety-related equipment at TMI-1 and to seeking assurance that he would be available for further examination after the Staff had reviewed the Licensee's responses to IE Bulletin 79-01B.

Tr. 6928-37.

1151. Subsequent to Dr. Rosztoczy's initial appearance, Staff counsel advised the Board that for purposes of addressing the environmental qualification issue in this restart proceeding, the Staff would limit its analysis and testimony to accidents that are clear and close analogs to the TMI-2 event. Tr. 19,487 (Tourtellotte). The Board agreed that such a limitation would be appropriate. Tr. 19,487-88 (Smith). The limitation was no more than a repetition of the jurisdictional limits the Board has observed throughout the proceeding. PID ¶ 24. Since it was the harsh environment at TMI-2, *i.e.*, intense radiation fields and high water level in containment, that was reflected in BQ/UCS-12, we saw no problem with Staff's statement.

1152. However, when Staff witnesses, Rosztoczy and LaGrange, returned on June 29, 1981, their prepared testimony was limited to the qualification of equipment needed following a *design basis* small-break LOCA. Rosztoczy, ff. Tr. 21,867. The radiation levels evaluated were a small fraction of that experienced at TMI-2, *i.e.*, one percent failed fuel rather than 30 to 50 percent as in the TMI-2 accident. These was no reference to the Staff's evaluation of Licensee's submittal in response to IE Bulletin 79-01B. The SER prepared by the Staff as required by CLI-80-21 was not offered in evidence by the Staff; indeed when offered by UCS it was objected to by the Staff counsel as being outside the scope of the hearing. Tr. 21,875 (Cutchin). It was admitted by the Board as UCS Exhibit 40 but, because it lacked a sponsoring witness, it was received only to establish the existence of the document, not for the evidence of compliance or noncompliance with CLI-80-21. Tr. 22,078 (Smith).

1153. Although the original testimony was directed at broad compliance with the UCS contention, when UCS abandoned the contention, it was the Staff's view that the Board's question was more limited in scope. Tr. 21,882-83, 21,885 (Cutchin).

1154. We have not been able to discern why the Staff approached BQ/UCS-12 with an analysis of a design basis small-break LOCA with its assumption of one percent failed fuel. When this very narrow testimony was presented, we questioned counsel about the Staff's rationale for its change of position since the earlier testimony, but our efforts were not productive. Tr. 21,885-92. The Staff's proposed findings are no more helpful. Nowhere has the Staff explained how it uses the Board's superfluous agreement that the Staff may limit its analysis and testimony to accidents that are clear and close analogs to the TMI-2 accident (Staff proposed finding ¶ 6) to justify an analysis of a design basis LOCA with an assumption of only one percent failed fuel.¹⁴⁴

1155. The analysis by the Staff's witness of a design basis small-break LOCA with its assumption of one percent failed fuel is not one of the "clear and close analogs to the TMI-2 event . . ." promised by the Staff (Tr. 19,487). The Staff's claim that it presented such an analysis (proposed findings ¶¶ 6 and 7) is unfounded. The design basis small-break LOCA does not envelope the TMI-2 accident.¹⁴⁵ The Staff's analysis has been useless to the Board in deciding our questions on UCS Contention 12. It added nothing to our understanding of the ability of the safety equipment in TMI-1 at restart to withstand the harsh environment of a TMI-2 type accident¹⁴⁶ or in accord with the criteria of Regulatory Guide 1.89.

1156. In our view the Staff has defaulted and the decision must rely chiefly on Licensee's testimony and argument.

¹⁴⁴ An argument (albeit a losing one) could have been mounted that the Staff should not be required to go beyond the assumptions of 10 CFR 50.46 in its assumption of fuel failure for analysis of the radiation environment. Counsel suggested that, absent some special showing, Section 50.46 would justify the Staff's one percent failed fuel assumption and that the Commission hydrogen ruling in this proceeding, CLI-80-16, May 16, 1980 (11 NRC 674) would justify such an approach. Tr. 21,888 (Cutchin). Counsel eschewed reliance upon this theory, however (*id.*), and the argument does not appear in the Staff's proposed or reply findings.

¹⁴⁵ We recognize also that the Staff could have argued that BQ/UCS-12 goes *beyond* an accident which is a close analog to the TMI-2 accident because of the references to Regulatory Guide 1.89 and NUREG-0588 in our second and third questions, respectively, on UCS Contention 12. We would have listened and probably have agreed. But this argument was never made, nor did we see it as an evidentiary problem.

¹⁴⁶ The Staff's point that, with the appropriate implementation of the TMI-2 lessons learned and improved training of the TMI-1 operators, radiation releases greater than those resulting from one percent failed fuel would not occur, has not escaped our attention. Staff proposed finding ¶ 20. Such an approach to this issue, however, deprives the Board of the opportunity to measure in total context all of the aspects of the issue, *i.e.*, adequacy of lessons learned, operator training, and the specific subissue, adequacy of the environmental qualification of equipment.

1157. We have the Licensee's testimony by Mr. Braulke that it is making good progress and that it will be in compliance with CLI-80-21 by June 30, 1982. Some of the equipment will not have been so qualified at restart. We had hoped to find out which items will not be completely qualified at restart and to make at least a qualitative judgment of the risk of allowing interim operation prior to June 1, 1982. We have no basis for such a judgment. We do, however, agree with the Licensee that the question posed in this proceeding has been addressed generically by the Commission in CLI-80-21.

1158. UCS, however, would require compliance with the requirements of CLI-80-21 and IE Bulletin 79-01B before restart. The Licensee argues in proposed finding ¶ 568 that the Commission twice has denied requests by UCS for emergency relief in the form of a shutdown of operating reactors pending the completion of the new environmental qualification program citing UCS' original *Petition for Emergency and Remedial Action*, denied in CLI-78-6, 7 NRC 400 (1978) and in *petition for reconsideration* which was denied in CLI-80-21.

1159. It appears to us, however, that the essence of BQ/UCS-12 was taken to the Commission and that UCS won a major point, namely, that environmental qualification of safety-related electrical equipment according to DOR guidelines must be completed by June 30, 1982, even including power plants, such as TMI-1, that were exempted from Regulatory Guide 1.89. UCS did not convince the Commission that operating plants should be shut down pending qualification.

1160. Moreover, in its memorandum and order in this proceeding, CLI-81-3, March 23, 1981 (13 NRC 291), the Commission directs us to group TMI-1 with operating reactors rather than with those with pending applications unless the record dictates a contrary finding. 13 NRC at 295-96.

1161. With this in mind that Commission's guidance in CLI-80-21 and the DOR guidelines are very appropriate and convenient. They subsume a TMI-2 type accident. We see no basis upon which to treat TMI-1 differently than other operating reactors on the issue of radiation environmental qualification of electrical equipment. By virtue of CLI-80-21, June 30, 1982 is a reasonable time for compliance, and we have the testimony of Mr. Braulke cited above, that the Licensee has made reasonable progress toward meeting this date.

1162. However, we believe that it was unfortunate that the Staff objected to the receipt into evidence of the substance of its SER on Licensee's progress under CLI-80-21 (UCS Exhibit 40). Upon reflection, we wish that we had required an equitable arrangement for its admission into evidence for the information contained in it. Having failed to accomplish this, the Board instead now directs the Staff to certify to the Commission,

for review in immediate effectiveness, a report on Licensee's compliance with CLI-80-21 as it relates to safety equipment functioning in a radiological environment in a TMI-2 type accident.

1163. The Staff in its testimony of Dr. Rosztoczy (ff. Tr. 21,867, at 6, 7) proposed that restart be subject to six specific conditions:

1. Replace materials with a qualified life of 1.5 years prior to restart.
2. Prior to criticality, put into place a maintenance and replacement program that will assure all materials with a qualified life of less than 40 years will be replaced when needed.
3. Consider aging of the materials during the periods prior to installation, during plant operation, and during the periods the plant is not operating in establishing the material replacement schedules.
4. Complete the aging evaluations for the equipment still to be evaluated prior to exceeding 5% power operation and factor the results into the replacement program, if required.
5. For the Foxboro pressure transmitters, reevaluate the referenced test report to justify the acceptance of the test results for demonstrating Foxboro pressure transmitters are qualified for the specified radiation levels. The failures occurred during a test to radiation levels several thousand times greater than the radiation levels expected as a result of a loss of feedwater/SBLOCA event. Also, provide justification for applying the test results to the transmitter model installed in TMI-1 and provide the results of the above evaluation and justification to the NRC for review prior to exceeding 5% power operation.
6. Evaluate the information made available to them prior to criticality, concerning the recent testing on Limitorque motor operators, and determine whether the results of that testing are applicable to the operators in TMI-1 for the event being analyzed. Prior to exceeding 5% power operation, provide the results of this evaluation to the NRC for review.

1164. In its proposed finding ¶ 557 Licensee assents to, because of a disinclination to oppose, the first five conditions.

1165. However the Licensee objected to the schedule for condition 6 in that the required evaluation could not commence until the test results were received and that 90 days would be required for the evaluation. We believe that the required information was enclosed with a July 27, 1981, letter from Richard H. Jacobs to Henry D. Hukill. Thus the Licensee's proposed

modification of schedule is not necessary. The Staff in its proposed findings materially changed the Rosztoczy conditions without explaining why the original conditions are inadequate. Staff proposed finding ¶ 32. In fact, the Staff does not point to any evidentiary basis whatever for its modified proposed conditions. *Id.*

1166. In its reply finding on the matter (¶ 320), Licensee objects to the Staff's unsupported changes. In particular, where Dr. Rosztoczy recommended the submission of evaluations prior to exceeding 5 percent power, the Staff now proposes the replacement of equipment prior to exceeding 5 percent power — not if the equipment is shown by the evaluation to be unqualified — but if there is not yet an adequate (to the Staff) demonstration of qualification after the evaluation is performed.

1167. Moreover, the Staff does not explain why this particular licensee compared to all others is subject to an advance from the June 30, 1982 deadline set by the Commission under CLI-80-21. Licensee reply finding ¶ 320.

1168. In view of the total void of support for the Staff post-hearing position, the Board is left with no choice but to rule in favor of the Licensee's position. Although we understand Licensee to grumble that the original condition contained in Dr. Rosztoczy's testimony also is not being applied to other operating licenses before June 30, 1982, the Licensee does not now object to those conditions; only the post-hearing proposed amendments. *Id.* Accordingly, the Board will require as a condition of restart the conditions set out in Dr. Rosztoczy's testimony and quoted above.

2. Submergence

1169. Among the harsh conditions to which instruments inside the containment building were exposed were high radiation and flooding. The Board's concern was primarily with radiation because TMI-1 had not been evaluated against the radiation criteria of Regulatory Guide 1.89 or the DOR guidelines. However, the known insurances of failure at TMI-2 were due to flooding. Braulke, ff. Tr. 6802, at 1-2; Rosztoczy, ff. Tr. 21,867, at 1. The water level in the TMI-2 reactor building was eight to nine feet above the floor. Keaten, *et. al.*, ff. Tr. 7558, at 6. The matter of flooding was of particular concern to the Commonwealth of Pennsylvania, whose proposed findings we adopt in large measure.

1170. The protective measure utilized by the Licensee to prevent a recurrence of instrument failure due to reactor building flooding is the relocation of safety-related instrumentaton to above the maximum calculated flood level from design basis accidents. For this purpose, Licensee

originally calculated a flood level of 5.94 feet above the containment floor. Tr. 6886 (Braulke). Later, this level was recalculated to 5.66 feet. Croneberger, ff. Tr. 16,252, at 2-3.¹⁴⁷

1171. In explaining why the recalculated flood level was 5.66 feet rather than 5.94 feet, Mr. Croneberger explained that certain conservatisms in the original analysis were unwarranted. For example, it was projected that the entire volume of the borated water storage tank would not be injected into the containment, since a certain volume of water in the tank is below the level of suction in the tank. Tr. 16,254 (Croneberger). This does not explain, however, why the calculated flood level is lower than that experienced during the TMI-2 accident.

1172. Throughout their proposed findings the Commonwealth points to many instances wherein replies to their questions one flooding were unsatisfactory. They ask us to find:

11. In light of this uncertainty and the significant difference between Licensee's calculate flood level and the level actually experienced at TMI-2, the Board believes that a careful Staff review of Licensee's approach to this problem is warranted.
12. The NRC Staff did not, however, conduct a significant review of Licensee's calculations. The Staff witness testified that he did not review the adequacy of Licensee's calculation of the flood level in containment following a small break loss of coolant accident. Tr. 22,000-01 (LaGrange). Instead, the Staff simply assumed that the flood level calculated by Licensee was correct. *Id.*, at 22,001. Moreover, the Staff did not consider the margin between the stated flood level and instrument location. *Id.* [Footnote omitted.]

We adopt the Commonwealth proposed finding.

1173. The inadequacy of the Staff review has been called to our attention abundantly by the Commonwealth proposed findings. In its reply findings, the Staff failed to address any of the Commonwealth's proposed findings. They also failed to produce a witness knowledgeable in flood level calculations despite the Commonwealth's justified request for a witness on this topic. Tr. 22,157-58; *see also* Tr. 22,103-04.

1174. The situation with respect to flood level is different than that of radiation intensity. As we noted above, the Staff made an independent calculation of radiation exposure to equipment using the DOR criteria.

¹⁴⁷ It is not clear why the flood level was recalculated. The Board notes, however, that some important safety equipment was relocated to a level below the original 5.94 feet but above the recalculated 5.66 feet.

There is no indication that the Staff will ever make an independent calculation of flood level unless ordered to do so. Consequently, we impose the following conditions proposed by the Commonwealth:

(1) The following short-term actions must be completed and certified to the Commission prior to restart:

(a) The Staff is directed to conduct a complete review of Licensee's flood level calculations. This review shall ensure that Licensee's calculations are based on the appropriate assumptions. In particular, the Staff shall ensure that all systems, including normal system leakage, that may contribute to reactor building flooding, were included in Licensee's analysis. The Staff shall ensure that Licensee's analysis was performed with an appropriate degree of conservatism. If Licensee's calculations were not based on the appropriate conservatisms, the actions set forth in (2), below, shall be required;

(b) The Staff shall conduct a complete review of the operational limitations that must be imposed on Licensee to ensure that the reactor building flood level does not exceed Licensee's calculated maximum flood level. This analysis shall ensure, for the design basis accidents expected to result in reactor building flooding, that it is possible and appropriate from an operational standpoint to maintain the flood level within the calculated maximum flood level. In particular, the Staff shall review the ability of Licensee to enter the recirculation mode under all postulated accident circumstances where the recirculation mode would be necessary to maintain flood levels within Licensee's calculation. The Staff shall review all emergency procedures for these accidents to ensure that these operational limitatons are properly incorporated into the procedures. If the necessary operational limitations are not possible or appropriate for some postulated events, the Licensee shall be required to demonstrate prior to restart why the operation of TMI-1 under these circumstances will not endanger the health and safety of the public.

(2) If it is determined pursuant to (1)(a), above, that Licensee's calculation of maximum expected flood level did not employ the appropriate degree of conservatism, a new flood level shall be determined using the correct assumptions. Licensee shall then be required to relocate all equipment important to the safe operation of the plant above the newly calculated flood level. This relocation shall be required by June 30, 1982.

3. Cold Shutdown

1175. UCS proposed findings ¶¶ 699 and 700 reference the record for evidence that the equipment needed to take the plant from hot shutdown to cold shutdown has not been environmentally qualified nor will it be at the

time of restart. Staff witness Rosztochy concurs that an environmentally qualified path to cold shutdown is not a Staff condition of restart but will be required by June 30, 1982 as a part of IE Bulletin 79-01B and that interim operation does not represent an undue risk to the public in that hot shutdown is a safe condition. Tr. 21,946-49. There is no evidence that the lack of environmental qualification of the equipment that is used to bring the plant to cold shutdown is such an urgent matter that interim operation should not be permitted and we decline to make such a finding.

1176. Although we do not adopt the UCS position that restart should not be allowed prior to meeting all of the IE Bulletin 79-01B requirements, UCS' cross-examination and proposed findings has raised an issue that we feel should be addressed. Supplement 2 to IE Bulletin 79-01B identifies and defines safety-related equipment including equipment required to bring the plant to cold shutdown. Answer to question 5, p. 3. Supplement 3 of 79-01B states "The staff position on this issue is that licensee must identify and environmentally qualify the equipment needed to complete one method (path) of achieving and maintaining a cold shutdown condition." Supplement 3, Item 1. UCS Ex. 37.

1177. Although the wording of Supplement 3 seems quite clear and was concurred in by Staff witnesses, Licensee, as part of its cross-examination of the Staff, introduced a Generic Letter 81-05, dated January 19, 1981 from the NRC Director, Division of Licensing. Licensee Ex. 53. The letter addressed four items. Item 1, equipment necessary to achieve a cold shutdown, is reproduced below:

- (1) *Cold Shutdown* - Reference (c) requires licensees to submit E-Q information for the equipment necessary to achieve and maintain a cold shutdown condition. This Bulletin requirement was not intended to invoke a change in the licensing basis of the plant. Plants licensed to a hot "safe shutdown" condition are only required by Reference (a) to qualify the equipment necessary to achieve a hot shutdown (i.e., plant specific safety-related equipment). However, the Bulletin (Reference c) does not require that the licensee submit the presently available information for one path to achieve the cold shutdown conditions. The Reference (c) position represents an enveloping staff position to be implemented on a case-by-case basis. Regulatory Guide 1.139 contains the implementation plans for the cold shutdown requirements, of which E-Q is a part. Staff reviews are in progress on this issue.

1178. Since the letter appears to modify the Staff position, Staff witness Rosztochy was questioned at some length, both by Licensee's counsel and by the Board. Tr. 22,110-14. He explained that the letter only clarified the

Staff position regarding the licensing condition of the plant; if a plant were licensed with hot shutdown as the safe condition, that would not be changed by IE Bulletin 79-01B. Redundant safety grade equipment is required to achieve hot shutdown. However, all plants must have equipment to bring them to a cold shutdown condition. That equipment must be environmentally qualified. To quote Mr. Rosztozy,

So for this plant the redundant requirements would be still limited to hot shutdown. But in addition to that, there has to be one environmentally qualified path, a single path to go to cold shutdown.

Tr. 22,114.

1179. Licensee did not present any witnesses in rebuttal to Staff testimony and the Staff's interpretation of the Generic Letter was not further questioned. However, it now appears that the Licensee does not agree with the NRC Staff. In its reply finding ¶ 312 on BQ/UCS-12 Licensee states that "Supplement 3 to the Bulletin only requires the submission of the *presently available information* for one path to achieve cold shutdown conditions".

1180. The apparent disagreement between Licensee and Staff on the requirements of IE Bulletin 79-01B was not explored during the hearing; the Licensee did not challenge the Staff witnesses. Neither did we seek testimony concerning the safety significance of failure to environmentally qualify the equipment needed to achieve cold shutdown; we presumed it would be qualified. If we were wrong in that presumption, and if the Licensee does not plan to qualify the equipment in accordance with Supplement 3 to IE Bulletin 79-01B, then that matter should immediately be brought to the attention of the Commission.

1181. We have not addressed each of the UCS proposed findings because we believe that they have prevailed to the extent that UCS has demonstrated that all of the safety equipment at TMI-1 will not meet all the criteria of Regulatory Guide 1.89 at the time of restart. However, we believe those criteria will be addressed by June 30, 1982 and that the question of interim operation has already been addressed and decided by Commission Order CLI-80-21. We note, however, that in meeting those criteria the Staff must do an independent assessment of the flood level calculations and the Licensee must demonstrate an environmentally qualified path to cold shutdown.

U. Miscellaneous Issues and Board Questions

1182. In this our final section of findings on plant design and procedure issues we address the remaining Board questions and Contested issues not specifically addressed above.

Board Question 3:

The results of the Interim Reliability Evaluation Plan (IREP), as applied to Crystal River, was scheduled for completion in July 1980. (The Board wants to receive a copy of this report.)

- a. When will the IREP be applied to TMI-1?
- b. Does the IREP address the adequacy of the proposed actions for B&W plants?

Testimony on Board Question 3 was submitted by the Staff. Rowsome, ff. Tr. 16,907. Proposed findings were submitted only by Licensee.

1183. Board Question 3 was asked because of our concern for having adequate system interaction studies performed for TMI-1. The TMI Task Action Plan has identified the need for such studies and has included them under items II.C.1 (IREP), II.C.2 (NREP), and II.C.3 Systems Interaction Studies. Ross, ff. Tr. 15,555, at Table 3. However, none of the items were included in NUREG-0737 for application to operating reactors. We wanted to know why they were omitted.

1184. We also note that the ACRS has pointed to the need for such studies. In their status report on the restart of TMI-1 dated December 11, 1980 they included the following:

1. In accordance with our previous recommendations, we believe that the Licensee should conduct reliability assessments of the plant as modified. Such assessments should accelerate the acquisition of potentially significant safety information and would expedite the development of the basis for further changes, should they be necessary. They would also provide the Licensee with additional technical insight into the safety of the plant. In addition, we believe the Licensee should examine the plant from the standpoint of systems interactions that may degrade safety. Although both of these studies should be conducted on a timely basis, their completion should not be a condition for restart.

Staff Ex. 14, App. C

1185. A draft of the IREP report on Crystal River-3 (CR-3) was submitted to the Staff in May 1980. However, reviews of that report discovered certain deficiencies (such as IREP's inability to predict loss of NNI/ICS power supply events similar to those which have occurred at

Rancho Seco and CR-3) in the methodology employed by IREP. The contractor who performed the study, Science Applications, Inc., has been requested to revise the report and the Staff expects ultimately to publish the results of the CR-3 study. Rowsome, ff. Tr. 16,907, at 2, 3; Tr. 16,908-10, 16,913, 16,920 (Rowsome).

1186. Mr. Rowsome observed that one of the major inadequacies of the study was a failure to identify "those accident mechanisms which could both precipitate the initiating event and at the same time degrade the reliability of the safety system called upon to respond to that event". Tr. 16,911. We commend Mr. Rowsome for his well-stated and perceptive observations, and applaud the Staff's effort to improve IREP.

1187. The identification of the deficiencies in the CR-3 study did prove helpful to the Staff in evaluating the adequacy of the IREP approach and has resulted in a modification of IREP procedures to assure that such weaknesses do not recur in future studies. Tr. 16,913 (Rowsome). Four additional IREP studies,¹⁴⁸ begun in September 1980, have incorporated these revised procedures. Tr. 16,908 (Rowsome).

1188. Staff witness Rowsome testified that the event-tree/fault-tree technique currently being utilized in the IREP studies will be a proper method by which to investigate interactions between safety and nonsafety systems, a subject in which both the Board and the ACRS have expressed great interest. Tr. 16,914 (Rowsome). However, the Staff is also investigating other methodologies for performing systems interactions studies and will develop a policy on the best method for conducting such studies prior to requiring licensees to conduct systems interactions studies. Staff Ex. 14, at 54; Tr. 15,615-18 (D. Ross), 16,915 (Rowsome). One of the principal goals of the IREP program is the development, "debugging" and trial use of standard procedures for performing studies of systems interactions and multiple failure scenarios. Tr. 16,915 (Rowsome). As Dr. Ross pointed out, it would be premature to order licensees to perform these studies prior to the Staff endorsing a single best method. Tr. 15,618 (D. Ross).

1189. At the present time, the Staff has not formally issued a requirement that each licensee perform an IREP-type study of its plants. Any such decision will be made after the Office of Research has developed a standard set of procedures and a determination of what constitutes an adequate method of performing such studies; it is expected that the Office of Research will complete this task by the end of 1982. The Office of Nuclear Reactor Regulation will then determine the plants which will be requested to perform the next phase of IREP-type studies and the schedules for such studies. Tr. 16,923 (Rowsome).

¹⁴⁸ One of the four plants being studied is a B&W reactor, Arkansas Nuclear One, Unit 1. Tr. 16,908 (Rowsome).

1190. The IREP studies currently being conducted do not assess the adequacy of the proposed actions for B&W plants, nor has there been any probabilistic risk assessment to determine if the lessons learned requirements are necessary and sufficient. Rowsome, ff. Tr. 16,907, at 3; Tr. 16,928 (Rowsome). However, the Board notes that the IREP studies performed to date have not discovered any potential failure mode that has not been addressed in the modifications being undertaken at TMI-1. Tr. 16,924 (Rowsome). This fact reinforces the testimony on the inadequacy of the studies performed to date.

1191. Based upon our review of the record, we believe that the application of the IREP or follow-on studies could lead to an enhancement of safety at TMI-1 and we urge the Staff to continue the development of IREP as expeditiously as possible. However, pending the further development of a standard methodology, it would be premature to require the Licensee to begin those studies prior to restart.

1192. Board Question 7 requested the Staff to identify those recommendations of NUREG-0667 that would be implemented at TMI-1 and to explain which the remaining recommendations would not be implemented. Specifically, Board Question 7 was:

Following the investigation of the Crystal River incident, the staff issued NUREG-0667, "Transient Response of Babcock & Wilcox-Designed Reactors". Which of the recommendations in Table 2.1 of that report does the staff believe should be implemented for TMI-1 prior to start-up, which should be included in the long-term actions, and which, if any, are not needed for TMI-1 and why not?

1193. In response to our request, the Staff produced two witnesses, Dr. Denwood Ross and Mr. Robert Capra. Although the witnesses did not prepare written testimony, one of them (Capra) prepared a summary entitled "Actions Currently Being Implemented at TMI-1 that Address the Substance of the NUREG-0667 Recommendations". Staff Ex. 9. The witnesses replied orally to extensive Board questions regarding the exhibit. Tr. 15,781-96.

1194. The 22 recommendations of NUREG-0667 have been assigned priorities according to their safety significance. The seven priority 1 items applicable to TMI-1 will be or have been implemented. Staff Ex. 3. Of the eight priority 2 items, four are being implemented; two of those recommendations are NUREG-0578 items dealing with EFW system upgrade. We would have assigned the two NUREG-0578 items a priority 1 but the priority classification is not in question since the items are being implemented.

1195. Eight priority 2 items are still under Staff review. They are included in the Action Plan, NUREG-0660, but are not in NUREG-0737 and are therefore not scheduled for implementation in any operating reactor. One of those items, the Crystal River-3 IREP study was the topic of Board Question 3 and is discussed above. Another recommendation, Modifications to the Steam Line Break Detection and Mitigation System, has been addressed previously. The remaining six priority 2 items have been subcontracted to Argonne National Laboratory for further study and analysis. Staff Ex. 3; Tr. 15,792 (Capra). The study was scheduled for completion in June 1981. The Board did not inquire into the urgency of those items.

1196. Two of the 22 recommendations of NUREG-0667 have been assigned a priority 3, *i.e.*, items that will not make a significant contribution to reactor safety and should not, therefore, be done. We have no reason to question the Staff's priority assignment.

1197. The Board is satisfied with the Staff testimony with respect to Board Questions 3 and 7.

V. Commitments, Requirements, Conditions, and Implementation

1198. Typically in NRC licensing proceedings, boards will impose or require conditions which attach to licenses either as requirements precedent to operation or as technical specifications for operation pursuant to Section 182a of the Atomic Energy Act. *Portland General Electrical Company, et al.* (Trojan Nuclear Plant), ALAB-531, 9 NRC 263, 272 (1979). Where a condition attaches to a license, such as a technical specification for operation, a licensee is legally bound to abide by its terms. *Id.*, at 272-73, 278. Sometimes licenses are granted which depend upon commitments by the applicant, but those commitments might not involve considerations of such safety or environmental importance that a license condition, *i.e.*, technical specification, should attach. *Id.*, at 273. See also *Commonwealth Edison Company* (Zion Units 1 and 2), ALAB-616, 12 NRC 419, 421-422 (1980); *Virginia Electric and Power Company* (North Anna, Units 1 and 2), ALAB-578, 11 NRC 189, 217, 218 (1980). In this proceeding the NRC Staff has taken the position that it, not the Board, will determine the necessary license conditions based upon the decisions of the Board and the Commission. Tr. 21,260 (Silver). The Staff did not recommend license conditions in its proposed findings.

1199. Throughout this decision, the Board has discussed many Licensee commitments and so-called Staff "requirements". We have also employed such terms as the "Board requires" that a particular circumstance prevail as a "condition of restart". Most often we have simply recognized either

Licensee "commitments" or Staff "requirements" as bases for finding that a particular item has been resolved in favor of restart. Except in a few instances specifically discussed in context, there is no difference between a Licensee commitment and a Staff requirement; the Licensee has committed to the Staff requirements.

1200. When we have imposed specific conditions, it is usually but not always because that condition is the result of a contention by an intervenor, a position by the Commonwealth of Pennsylvania, or a Board question. It has not been the subject of a Licensee commitment. Notable exceptions are the conditions imposed as a restart requirement based upon a stipulation by the Commonwealth and the Licensee regarding training and control room staffing in our partial initial decision ¶ 583. Another exception can be seen in those stipulated conditions where we specifically required the staff to impose as *license conditions* certain staffing requirements. Most often when we have referred to "conditions" in our initial decision we have not necessarily meant to require license conditions or technical specifications to attach to the license. We have been mindful of the Commission's concern that ". . . the increased volume of technical specifications may be decreasing the effectiveness of these specifications to focus the attention of licensees on matters of more immediate importance to safe operation of the facility".¹⁴⁹

1201. Below we identify and recapitulate the major modification in design or procedure upon which we rely in arriving at the Board's conclusion of plant design issue without studied regard to whether the modification is a commitment of Board-imposed condition.

1202. Virtually every major determination in favor of restarting TMI-1 in our initial decision on plant design, modification, procedures, and separation is based wholly or in essential part upon commitments by the Licensee. Are these commitments enforceable? The Commonwealth of Pennsylvania is concerned that they may not be. It seeks to have the Board require the Staff to certify to the Commission its recommendations as to which of the various long-term Licensee commitments and Staff "requirements" should be made license conditions. Commonwealth proposed finding ¶ 9.

1203. In the series of fuel pool expansion license amendment proceedings cited above, appeal boards have addressed the question of the reliability and enforceability of licensee commitments which have not been imposed as technical specifications attached to the license.

¹⁴⁹ Advance Notice of Proposed Rulemaking, Domestic Licensing of Productions and Utilization Facilities; Technical Specifications for Nuclear Power Reactors, 45 Fed. Reg. 45916-17 (July 8, 1980).

1204. In *Trojan* (ALAB-531), *supra*, the Appeal Board noted that licensee commitments which are not important enough to warrant transition into technical specifications are nevertheless significant because, *inter alia*, 10 CFR 50.59(b) requires licensees to maintain records of changes in the facility and changes in procedures “. . . to the extent that such changes constitute changes in the facility as described in the safety analysis report or constitute changes in the procedures as described in the safety analysis report.” *Id.*, at 273 citing 10 CFR 50.59(b). This requirement permits the Staff to monitor licensed activities and to take remedial action if required. *Id.*, at 273. The Appeal Board noted that Section 50.59(b) is as enforceable as a technical specification. *Id.*, at 274-75. The Licensee’s restart report (Licensee Ex. 1) is analogous to a safety analysis report, and contains its commitments.¹⁵⁰ Many of the commitments made by the Licensee in this proceeding upon which we rely in making various determinations favoring restart have more safety significance than the fuel pool water chemistry issue involved in *Trojan*. We should not depend upon the recordkeeping requirement of 10 CFR 50.59(b) to be assured that those commitments are enforced.

1205. Presumably without any additional direction from the Board, the NRC Staff would impose many of the commitments, Staff requirements, and Board conditions and findings as technical specifications and others would be recognized as internal procedures required by technical specifications. As to the latter group, internal procedures, the Licensee would be required to adhere to them as if those procedures were incorporated into technical specifications. *North Anna* (ALAB-578), *supra*, 11 NRC at 218. While *North Anna* takes us somewhat farther in assuring that Licensee commitments will be enforceable, it still falls short of assurance we believe is required in a proceeding as complex and as important as this one is.

1206. In *Zion* (ALAB-616), *supra*, the Appeal Board addressed the same issue but found a rather easy solution. In that proceeding, the applicant for the fuel pool license amendment pledged to the Staff and to the adjudicating boards not to change or drop its commitments without prior Staff approval, and the utility expressly acknowledged that its promises were made to obtain favorable action on the proposals being considered. On that basis the Appeal Board simply incorporated the pledges, thus the commitments, into its own order, therefore transforming the commitments into technical specifications or their enforceable equivalents.

¹⁵⁰ Notwithstanding the analogy between the Licensee’s restart report and a safety analysis report, we use the term “licensee commitments” in this discussion to include any other commitment made by Licensee, whether in testimony, exhibit, representation by counsel, proposed findings or otherwise.

1207. The approach in *Zion* is tempting, but the issue before us is not so simple. The Licensee here has not made, nor was it requested to make any such pledge. See Licensee proposed finding ¶ 582. On the other hand the many commitments upon which we depend were freely made — to us at least — to obtain the right to restart. *Id.* We have no basis to believe that they were not made in good faith and that the Licensee does not intend to abide by them. Nonetheless we do not believe a blanket order incorporating every commitment into a license condition would be appropriate. We must balance on one hand reasonable assurance that important commitments will be enforced and on the other hand, the need not to freight the license unnecessarily and too rigidly.

1208. When the Board became aware that the Staff did not intend to propose specific license conditions in this proceeding, we were concerned that our decision might depend upon Licensee commitments which would not be enforced, so we directed the Staff to address the matter. Tr. 21,290. The Staff reported:

On May 14, 1981, the Licensing Board requested that the staff review its Safety Evaluation Reports and supplements to determine whether any staff conclusions are based on licensee commitments that the staff does not regard as enforceable and report to the Board if there are any (Tr. 21,289). In further discussion, the Board clarified that its concern is with "those commitments which the Staff says it has relied upon as to which if they are defaulted, the Staff would not intend to act. . ." (Tr. 21,290).

The Staff has conducted a review of the Restart Safety Evaluation Report (NUREG-0680) and its supplements and has determined that except for those identified below the Staff views all of the licensee's commitments that are identified in the SER and its supplements to be responsive to NRC requirements and would attempt to enforce them. Because the following [four] license commitments are not responses to NRC requirements, the Staff would not attempt to enforce them.

Board Ex. 10.¹⁵¹

¹⁵¹ The first three of four excepted licensee commitments relate to hydrogen recombiner, cavitating venturis in the EFW lines and minimum control room shift rotation. The hydrogen recombiner and control room shift rotation issues do not present the enforcement problem discussed here. However, the cavitating venturis demonstrate the need for clarification of the
(CONTINUED)

1209. Moreover, in its proposed finding ¶ 429 the Staff urged the Board to find:

Based on the evidence presented by the Staff, the Board concludes that all the necessary TMI-2 related recommendations have been identified. The Board also finds that completion of the August 9, 1979 Order items, NUREG-0660 items, NUREG-0694 items, and NUREG-0737 items which were identified by the Staff as a prerequisite to restart of TMI-1 will assure that TMI-1 can be operated safely and with no undue risk to the public health and safety. *Completion of those items is therefore a condition of restart. Further, the Board finds that, as a condition of restart, the Licensee must demonstrate reasonable progress toward completion of the remaining items identified by the Staff.* [emphasis added]

1210. Because of this position and the Staff's statement in Board Ex. 10, *supra*, we do not see any enforcement problem as to short-term items needed for restart. We believe that the record amply demonstrates that the Staff will enforce the Board's findings (if accepted by the Commission) as to the short-term items required before restart and will require or ascertain that the reasonable progress we have found continues to be made with respect to the long-term items.

1211. Except for a few specified instances which we resolve under our findings on Board Question 2, Section T, *supra*, the Licensee does not object to the conditions set out in Staff's proposed finding ¶ 429. *See Part*

Staff's enforcement plans. Despite the Staff's statement in Board Ex. 10 that cavitating venturis are not NRC requirements and would not be enforced, the Staff's witness Jensen relied upon them in discussing the preventive measures against SBLOCAs (Jensen (LOCA Analysis) ff. Tr. 5496, at 7); and the Staff relied upon them in its proposed finding ¶ 60. The Board, in turn relies upon this modification, which we expect to be enforced. *See* ¶943 *supra*. The fourth item refers to Licensee's commitment to comply with NUREG-0737 Action Items in accordance with NUREG-0737 schedule for operating reactors. We discuss this exception below.

Two of Licensee Reply Findings on plant design issues ¶¶ 261-285.¹⁵² See also Licensee proposed finding ¶ 582.

1212. One of the considerations in the fuel pool expansion cases was that technical specifications were desirable because the Licensee must come to the NRC *before* changes may be made. *Trojan* (ALAB-531), *supra*, 9 NRC, at 273; *Zion* (ALAB-616), *supra*, 12 NRC, at 422. As to requirements precedent to operation (in this proceeding necessary short-term items and reasonable progress toward long-term items), the Licensee must have NRC leave to restart whether or not the particular item is a license condition. Therefore there is no problem of enforceability at the time of restart. Remaining, however, is the dual consideration of whether the Licensee will be required to abide by the short-term items after restart and will the Licensee be required to implement the long-term items unless it first comes to the Commission for permission to depart from its short- and long-term commitments and other adjudicatively imposed requirements.

1213. We have considered the feasibility of reviewing the record and determining without further ado which of the various commitments and requirements should be made license conditions or technical specifications. There are several reasons why this is not practical. As large as our evidentiary record is, it is not so detailed or focused as to permit in each instance a careful determination of which items require “. . . the imposition of rigid conditions or limitations . . . deemed necessary to obviate the possibility of an abnormal situation or event giving rise to an immediate threat to the public health and safety.” *Trojan* (ALAB-531), *supra*, 9 NRC, at 273. There are five major categories of technical specifications to be considered under Commission regulations. 10 CFR 50.36. Whether the individual short- and long-term items should fall into any of these categories, or if so which ones, or whether they may be left to surveillance and enforcement by the Staff has not been litigated. The consideration involves enforcement expertise.

¹⁵² Although we had some initial concern about such a broad condition, there is more than just Licensee's failure to object that assures us that the condition is acceptable to Licensee. In its proposed findings on design issues (¶ 4) Licensee would have the Board find: "To the extent that the necessity or sufficiency of the recommended short- and long-term actions which relate to plant design and procedures have not been challenged by any party or examined with additional evidence in response to a specific Board question, the Board finds that such actions are necessary and sufficient and relies upon the Staff's assessment in the Restart SER and Supplement 3 that Licensee's plans to complete the short-term actions prior to resumption of operation are satisfactory, and that Licensee has made reasonable progress toward satisfactory completion of the long-term actions." [Footnote omitted]

1214. The Staff's plan insofar as it contemplates deciding after the Board's determinations which conditions of restart should be license conditions is sensible. Tr. 21,260 (Silver). This has been a long proceeding and much has been learned about the significance of the TMI-2 accident as the proceeding progressed. Moreover until we decide on the merits which of the short- and long-term items are necessary, and whether they are sufficient, the Staff cannot complete all decisions as to license conditions and technical specifications. However, we disagree with the Staff's TMI-1 Project Manager, Mr. Silver, when he states that the decision should be deferred until after the Commission's decision. *Id.* The responsibility for adjudicating in the first instance is ours.

1215. In its proposed finding ¶ 9 the Commonwealth requests the Board to direct the Staff to review all long-term requirements and NUREG-0737 items regarding license conditions necessary to ensure the safe operation of TMI-1 in the long-term and to certify its recommendations to the Commission. The Staff declines to accept this proposal and asserts that this Board has no authority to require such a certification, citing *Carolina Power and Light Company* (Shearon Harris Units 1-4), CLI-80-12, 11 NRC 514, 516 (1980). Staff reply findings ¶ 1.¹⁵³

1216. We need not decide whether we may direct the Staff to certify matters to the Commission to resolve this issue, because we are requiring the Staff in our order below to make its recommendations to us. This is a matter of shared responsibility between the Board and the Staff. To leave to the Staff the entire determination of license conditions would be an excessive delegation. *Public Service of Indiana* (Marble Hill Units 1 and 2), ALAB-461, 7 NRC 313, 318 (1978). On the other hand, we should not become too deeply involved in the manner in which the Staff enforces the adjudicative determinations. The Commission recognized that some of this responsibility must be shared, perhaps it even envisioned an overlap, when in its August 9, 1979 hearing order it stated:

Satisfactory completion of the required actions will be determined by the Director of Nuclear Reactor Regulation. However, prior to issuing its decision the Board shall have authority to require staff to inform it of the detailed steps staff believes necessary to implement actions the Board may require and to approve or disapprove of the adequacy of such measures.

10 NRC, at 148.

¹⁵³ Staff Project Manager, Mr. Silver, however, reported to us that the Staff would recommend conditions and look to the Commission for direction. Tr. 21,260.

1217. Therefore we will defer issuing our final decision on which of the Licensee commitments, Staff requirements, and Board conditions should be made license conditions until we have been informed by the Staff of its plan for implementation. We direct the NRC Staff to report to the Board the details of its enforcement plan with 45 days of the date of the service of this initial decision. The Staff should report which of the material Licensee commitments, Staff requirements, and Board-required conditions it intends to impose as technical specifications or other forms of license conditions. The Staff should also report how it intends to be assured that the Licensee will abide by any items the Staff does not plan to impose as license conditions or how it intends to be assured that the Licensee will seek relief from such items in an appropriate manner. Other parties may respond to the Staff's report within 15 days following its service. The Licensee must respond to the Staff's report which should be in the form of a supplemental initial decision and any responses should be organized in a similar manner. The report and responses should be limited to plant design, modifications, procedures, and separation issues. Compliance with this order by the Staff and the Licensee is not a condition precedent to restart. However, if restart otherwise is permitted before the report and response, continued operation of TMI-1 is conditioned upon compliance with this order.

1218. Below we list the major commitments and conditions relied upon by the Board in reaching its conclusion on plant design and procedures issues. They are set out for identification purposes only, and must be considered within the context of the discussion in the respective findings.

At a minimum the Staff's report and the Licensee response on implementation shall address these requirements:

Section II.A

We rely on Licensee's commitment to install adequate shielding.

Section II.B

Licensee is required in the long term to install a meter to measure water level in the reactor vessel.

Section II.C

Staff is charged with reviewing revised ATOG program and reporting to the Commission.

Section II.E

Licensee must demonstrate reactor coolant pressure control using HPI system.

Section II.F

Staff is to verify procedures for reconnecting pressurizer heater.

Licensee must demonstrate connection of heaters to emergency buses.

Section II.K

We rely on Licensee's commitment to install data logging of certain in-core temperature detectors.

Section II.L

Radio-iodine monitors must meet NUREG-0737 requirements.

Extended range noble gas effluent monitors must be in place by January 1, 1982.

Section II.N

Staff will review control room modifications against criteria of NUREG-0752 prior to restart.

Section II.O

Licensee must complete SBLOCA analysis under revised assumptions followed by staff evaluation.

We rely on Licensee's commitment to install cavitating venturis.

Section II.P

We rely on Licensee's commitment to Commonwealth to provide redundant reliable power to pressurizer-level instruments.

Section III.Q

Licensee must propose a means for preventing feedwater isolation due to failure in rupture detection system.

We rely on Licensee's long-term commitment to provide independent safety grade control of EFW plus other long-term improvements to the EFW system.

Section II.T

Licensee must environmentally qualify a single path to cold shutdown or bring the matter to the attention of the Commission.

Staff must perform an independent review of Licensee's calculations of flood level in the containment vessel.

Staff must certify to Commission a report on Licensee's compliance with CLI-80-21 with respect to radiation levels experienced at TMI-2.

Six requirements for environmental qualifications is a condition for restart as stated in Staff (Rosztoczy) testimony and Licensee's proposed findings. Staff proposed findings rejected.

1219. We wish to make it clear that our concern here is the method of implementation of the determinations in this case, not the scheduling of the long-term items which may be involved. Scheduling should be considered in the context of our discussion of each item and with due regard to the Commission's order in CLI-81-3, 13 NRC 291, where the Commission directed that TMI-1 be grouped with operating reactors unless otherwise required by the record. *Id.* 295-96. The Commission also has noted in CLI-81-3 that with respect to NUREG-0737 due dates, the Commission itself will consider developments which occur affecting the ability of the Licensee to comply with the requirements recommended by the Board or imposed by the Commission.¹⁵⁴

1220. In the interim, with respect to plant design, modifications, procedures and separation issues, any restart of TMI-1 is conditioned upon completion of those short-term August 9, 1979 Order items, NUREG-0660 items, NUREG-0694 items, NUREG-0737 items, and any additional items found by the Board to be necessary and sufficient, and upon a demonstration of reasonable progress with respect to such items found by the Board to be necessary and sufficient in the long term.

W. Conclusions of Law on Plant Design and Procedures

1221. The Board has considered all evidence presented by the parties on the contentions raised by intervenors, the questions raised by the Board, and the recommendations of the Director of Nuclear Reactor Regulation as stated in the Commission's Order and Notice of Hearing, CLI-79-8, 10 NRC 141 (1979). Based upon a review of the entire record in this proceeding and the foregoing findings, the Board reaches the following conclusions of law with respect to plant design and procedures issues.

¹⁵⁴The Commission noted that: "... whether Metropolitan Edison is treated as a licensee or an applicant, there may be items where due dates cannot be met for one reason or another, regardless of which category Unit One is placed in. It is this prospect which prompts the licensee's motion. Where developments occur which affect the ability of the licensee to comply with requirements recommended by the Board or proposed to be imposed by the Commission, the Commission will consider those developments on a case-by-case basis in reaching its decisions on immediate effectiveness and ultimate review of the Board's decision. Notwithstanding language in the original order which could be read to the contrary, we intend to retain our flexibility in this regard. To that extent, the licensee's motion is granted."

1222. The short-term actions recommended by the Director of Nuclear Reactor Regulation, and set forth in Section II of the Commission's Order and Notice of Hearing, are sufficient to provide reasonable assurance that the Three Mile Island Unit 1 facility can be operated without endangering the health and safety of the public, and should be required before resumption of operation should be permitted. The necessity of these short-term actions was not contested. Licensee proposed finding ¶ 579.

1223. The long-term actions recommended by the Director of Nuclear Reactor Regulation, and set forth in Section II of the Commission's Order and Notice of Hearing, are sufficient to provide reasonable assurance that the Three Mile Island Unit 1 facility can be operated for the long term without endangering the health and safety of the public, and should be required of Licensee as soon as practicable. The necessity of these long-term actions, with the exception noted below, was not contested. Licensee proposed finding ¶ 580. Further, the Board concludes that Licensee has demonstrated reasonable progress toward the satisfactory completion of these long-term actions.

1224. Based upon our findings of fact on the issue Detection of Inadequate Core Cooling (Section II.B), the Board concludes that reactor vessel water level instrumentation is a necessary long-term component of NUREG-0578 Recommendation 2.1.3.b, and that Licensee has demonstrated reasonable progress toward the satisfactory completion of that long-term action.

1225. The Board's conclusions on the sufficiency of the short- and long-term actions are based, in part, on Licensee's agreement to perform, *i.e.*, failure to contest (Licensee proposed findings ¶¶ 518-526, 582) certain other actions recommended by the Staff, beyond those set forth in Section II of the Commission's Order and Notice of Hearing, which were selected from NUREG-0694, NUREG-0737, and NUREG-0752. *Id. See also* Board Finding ¶ 914; Licensee proposed finding ¶ 582. The Board concludes, however, for the reasons set forth in Findings ¶¶ 1133-37 that the additional restart requirements recommended by the Staff with respect to NUREG-0737 items II.K.2.14, II.K.3.7, II.K.3.1, and II.K.3.2 are not necessary to provide reasonable assurance that the Three Mile Island Unit 1 facility can be operated without endangering the health and safety of the public, and should not be required before resumption of operation should be permitted.

III. FINDINGS OF FACT ON ISSUES RELATING TO THE SEPARATION OF TMI-1 AND TMI-2

A. Background

1226. The Commission's August 9, 1979 Order and Notice of Hearing stated that "unique circumstances at TMI require that additional safety concerns identified by the NRC staff [beyond those identified for other B&W reactors] be resolved prior to restart." 10 NRC at 143. Among those concerns were the "potential interaction between Unit 1 and the damaged Unit 2" and "the potential effect of operations necessary to decontaminate the Unit 2 facility on Unit 1." Consequently, the Commission directed that this Board consider the necessity and sufficiency of two specific short-term actions required of the Licensee:

4. The licensee shall demonstrate that decontamination and/or restoration operations at TMI-2 will not affect safe operations at TMI-1. The licensee shall provide separation and/or isolation of TMI 1/2 radioactive liquid transfer lines, fuel handling areas, ventilation systems, and sampling lines. Effluent monitoring instruments shall have the capability of discriminating between effluents resulting from Unit 1 or Unit 2 operations.
5. The licensee shall demonstrate that the waste management capability, including storage and processing, for solid, liquid, and gaseous wastes is adequate to assure safe operation of TMI-1, and that TMI-1 waste handling capability is not relied on by operations at TMI-2.

10 NRC at 145.

1227. The Board initially accepted six intervenor contentions raising issues related to the separation of TMI-1 and TMI-2. These contentions were advanced by Mr. Sholly, TMIA, ECNP, and CEA. Mr. Sholly withdrew his contention on June 5, 1980, and TMIA likewise withdrew its contention on July 31, 1980. In a Memorandum and Order issued on June 12, 1980, the Board dismissed ECNP's contention due to the party's failure to respond to Licensee's interrogatories on ECNP Contention 19 and to comply with the Board's order that ECNP respond to the interrogatories. LBP-80-17, 11 NRC 893. CEA's three contentions in this area were dismissed in the Board's August 20, 1980 Memorandum and Order. See also Tr. 2249, 2253. The Board dismissed the CEA contentions because that party had demonstrated its inability to satisfy the minimal prehearing activities necessary to assure a proper litigation of its concerns and had itself indicated that it would be unable during the evidentiary

hearing sessions to make any meaningful contribution to the record. Nonetheless, we instructed Licensee and the NRC Staff to ensure that the matters raised by CEA were adequately covered in their written direct testimony.

1228. The lack of specific contentions did not affect the independent responsibility of this board to determine whether the required actions are necessary and sufficient to provide reasonable assurance that TMI-1 can be operated without endangering the health and safety of the public, nor did it eliminate the responsibility of the Staff to certify that any actions required by the Board and the Commission have been complied with prior to resumption of operation. Consequently, in order to assure that a full record was developed on the separation issue we directed the parties to respond to Board Question No. 8 (Tr. 2397):

Even though no contentions survive on the issues raised by short-term Item 4 of the Commission's August 9, 1979 order, the board wants testimony presented on the issue raised by this item.

1229. In addition to the concerns raised by the Commission's Order and Notice of Hearing and the intervenor-proposed contentions, the Board on its own inquired into the adequacy of groundwater monitoring at TMI. Though not directly related to the separation of TMI-1 and TMI-2, we believed the issue of groundwater monitoring to be sufficiently important to require the parties to present evidence on the matter. We therefore posed Board Question No. 9 (Tr. 2397-98):

- a. What measures are taken to monitor groundwater quality at the site?
- b. What measures are taken to ensure against contamination of the groundwater under routine operations, accident conditions, and clean-up operations?
- c. Is there any evidence at the present time of changes in groundwater quality, including but not limited to radioactivity and boron, attributable to operations at TMI-1 and/or 2?
- d. If changes in groundwater quality have occurred, distinguish, if possible, the sources of any contamination, *i.e.*, routine operations at Unit 1, routine operations at Unit 2, unplanned or accident conditions at Unit 1, unplanned or accident conditions at Unit 2, or clean-up operations.
- e. What mitigative measures are available, should groundwater contamination occur?

1230. The Staff and the Licensee filed testimony on the separation of TMI-1 and TMI-2 (for Licensee, Edwin C. Fuhrer and Richard J. McGoey, ff. Tr. 10,020; for the Staff, Phillip G. Stoddart, ff. Tr. 10,159). Dr. Ronald R. Bellamy, Chief of the Technical Support Section for the NRC TMI Program Office, was also made available to answer more detailed questions (Tr. 10,160; statement of professional qualifications, ff. Tr. 10,159). None of the intervenors presented any evidence or cross-examined the witnesses on this issue. The Commonwealth of Pennsylvania participated in cross-examination.

1231. The Staff and the Licensee filed testimony on groundwater monitoring issues (for the Licensee, William E. Riethle and Edwin C. Fuhrer, ff. Tr. 16,417; for the Staff, Terry L. Johnson, on Board Question 9a, c, d, e, ff. Tr. 16,267, and Phillip G. Stoddart, Board Question 9b, ff. Tr. 16,269). No other testimony was filed. The Commonwealth of Pennsylvania participated in cross-examination.

1232. Information relevant to these issues is contained also in three exhibits: License Ex. 1, at Chapter 7; Staff Ex. 1, at Chapters C4 and C5; and Staff Ex. 14, at 19-20.

1233. Proposed findings in these areas were filed by Licensee, the Staff, and the Commonwealth of Pennsylvania. Commonwealth chose to limit its proposed findings to two specific concerns: (a) offsite disposal of low-level radioactive waste, and (b) separating the fuel handling buildings. No intervenor filed any proposed findings of fact or conclusions of law relating to separation or groundwater monitoring issues. In accordance with previous Board rulings (*see* Memorandum and Order on Prehearing Conference of May 13, 1980, dated May 22, 1980, at 12; Memorandum and Order on Schedule, and Format for Proposed Findings, dated April 22, 1981, at 2), failure to propose findings on any issue constitutes a default. 10 CFR 2.754(b).

1234. As we discuss below, due to actions taken by the Licensee, the issue of adequate separation of Units 1 and 2 with respect to waste handling has become less of a concern than it appeared to be to the Commission and the Board at the beginning of this proceeding. The basic facts are not in controversy. We have found the Licensee's proposed findings on this issue to be accurate and consistent with our views in most respects and we have therefore relied heavily on them. While not disagreeing with the basic facts, the Commonwealth seeks further assurances for the future by way of proposed conditions, which we consider in the course of our findings.

1235. The Board has reviewed the record in this area and finds that the actions taken by Licensee and the conditions we impose are necessary and

sufficient to resolve the concerns identified by the Commission with respect to the potential interactions between Units 1 and 2. The basis for this finding is explained below.

B. Discussion

1. Short-Term Action Item 4 and Board Question No. 8

1236. Short-term action item 4 raises three issues: (a) that decontamination and restoration of Unit 2 not affect safe operations at Unit 1; (b) that radioactive liquid transfer lines, fuel handling areas, ventilation systems and sampling lines between Units 1 and 2 be separated or otherwise isolated; and (c) that effluent monitoring be capable of distinguishing between effluents discharged from Unit 1 and Unit 2.

Decontamination and Restoration of Unit 2

1237. Potential effects of Unit 2 activities on Unit 1 operation could arise either from a failure to maintain the Unit 2 reactor in a safe condition or from a radioactive release associated with the decontamination or restoration activities.

1238. As a result of the March 28, 1979 accident, Unit 2 is not now capable of normal facility operation, but is in a shutdown condition with damaged fuel in the reactor vessel. Unit 2 is being maintained in a safe and stable cooling condition. Systems are in place to ensure that decay heat from fission products is continually being removed and that subcriticality of the reactor core is maintained. Fuhrer and McGoey, ff. Tr. 10,020, at 39.

1239. The NRC staff has evaluated the potential for returning Unit 2 to an active emergency status due to a lack of core cooling and finds such a situation to be "highly unlikely." Stoddart, ff. Tr. 10,159, at 12.

1240. Since shortly after the accident and until recently, decay heat has been removed by natural circulation of primary coolant through the core with heat rejection through the "A" steam generator. When Licensee's witnesses testified on this subject, plans were being developed to transfer

core cooling from natural circulation through the "A" steam generator to a cooling mode referred to as "loss-to-ambient."¹⁵⁵ *Id.* Backup cooling modes are available; these include use of a modified "B" steam generator cool-down system, the new mini-decay heat removal system, and the normal in-plant decay heat system. *Id.*

1241. Subcriticality of the reactor is being maintained by the high concentration of boron in the primary coolant. Analyses have been performed demonstrating that the boron concentrations being maintained in the primary reactor coolant system provide an adequate margin of safety considering the most adverse combination of core parameters. Both design and procedural restrictions limit the likelihood of an inadvertent boron dilution. Fuhrer and McGoey, ff. Tr. 10,020, at 40-41.

1242. The Board, therefore, finds reasonable assurance that the Unit 2 reactor can be maintained in a safe and stable cooling mode with no adverse impacts on the safe operation of Unit 1.

1243. The major decontamination and restoration activities at Unit 2 include:

- (a) cleanup of contaminated waste water in the Unit 2 auxiliary building, reactor building, and the primary reactor coolant system;
- (b) decontamination of the Unit 2 auxiliary building, reactor building, and the primary reactor coolant system;
- (c) cleanup of the Unit 2 reactor building atmosphere; and
- (d) removal of the Unit 2 reactor core.

Staff Ex. 1, at C4-1. Licensee presented testimony that the risks to safe operation of Unit 1 from these decontamination activities are less than the risks from a normally operating reactor. Fuhrer and McGoey, ff. Tr. 10,020, at 41.

1244. Unit 2 recovery operations are significantly different from normal operations in that the reactor has been shut down for an extended period of time and will not be in operation when Unit 1 restarts. As a result, power operation associated radionuclides — *i.e.*, the short-lived nuclides which were the major contributors to the Unit 2 accident dose — have

¹⁵⁵ As explained by Licensee's witness, "Loss-to-Ambient" refers to a mode of cooling the reactor core where heat loss from the reactor and the primary reactor coolant system is by convection to the surrounding reactor building atmosphere. The reactor building atmosphere is in turn cooled both by heat losses to the outside environment and by circulating air fans within the reactor building. In this mode of cooling the steam generators are secured. While the tests demonstrating the adequacy of this mode of the cooling were performed during the winter, Licensee anticipates that such cooling will be similarly effective during the summer months. Tr. 10,016-18 and 10,146-49 (McGoey). We note that the described transfer of cooling mode has not taken place. *E.g.*, NRC TMI Program Office Weekly Status Report, May 18, 1981, at p. 1.

now essentially decayed away. In this regard, the potential impact on Unit 1 from Unit 2 is not like that normally present when two or more nuclear units share a common station site. Fuhrer and McGoey, ff. Tr. 10,020, at 41. We find that the estimated doses from Unit 2 cleanup, assuming both accident and non-accident conditions, are less than the estimated doses from a normal operating reactor, again assuming both accident and non-accident conditions. *See also* the remainder of this subsection.

1245. The Unit 2 decontamination effort does not rely on any Unit 1 equipment or systems for the processing of wastes. The waste water from the Unit 2 accident is being processed by liquid waste systems installed since the March 1979 accident. Fuhrer and McGoey, ff. Tr. 10,020, at 11-15.

1246. Licensee has used the EPICOR-II system to process intermediate activity (1-100 $\mu\text{Ci/ml}$) waste water, principally from the Unit 1 auxiliary building. EPICOR-II is a liquid radwaste processing system consisting of filter elements, demineralizers, pumps, tanks, piping, and associated instrumentation. Fuhrer and McGoey, ff. Tr. 10,020, at 13 and Figure 1. Although the system was specifically constructed to process intermediate activity waste water at Unit 2, and the design and shielding requirements were set accordingly, the EPICOR-II technology is very similar to demineralizer processing systems used in a wide variety of applications. This system has successfully processed over 565,000 gallons of contaminated water and has achieved decontamination factors which exceeded those predicated by the NRC Staff. Fuhrer and McGoey, ff. Tr. 10,020 at 13-14; Stoddart, ff. Tr. 10,159, at 5-6.

1247. No accidents occurred during EPICOR-II operation. Had an accident occurred, all spilled water would have been retained within the watertight, seismic Category I concrete building that houses EPICOR-II. Stoddart, ff. Tr. 10,159, at 6; Staff Ex. 1, at C4-1. The consequences from a full range of postulated accidents resulting from EPICOR-II operation have been analyzed and are reported in NUREG-0591, Environmental Assessment of Use of EPICOR-II at Three Mile Island, Unit 2. The conservative NRC Staff analysis showed the maximum offsite dose to be less than 5 mrem to any member of the public; by comparison, accidents analyzed in Section 15 of the Unit 2 Final Safety Analysis Report (FSAR) show a possible dose in the hundreds of millirems using similar conservative assumptions for a postulated fuel drop accident. Fuhrer and McGoey, ff. Tr. 10,020, at 42.

1248. The Board, therefore, finds that cleanup of contaminated waste water in the Unit 2 auxiliary building has not and will not adversely affect safe operation of Unit 1.

1249. Presently, Licensee is planning to process the high activity (greater than 100 $\mu\text{Ci/ml}$) waste water in the reactor building and primary reactor coolant system with a submerged demineralizer system (SDS). The system is expected to provide decontamination factors of 10^6 for cesium, 10^4 for strontium and 10 to 100 for other radionuclides. It is being installed in the Unit 2 spent fuel pool¹⁵⁶ and will use the pool water for shielding. The SDS has its own gas cleanup and liquid leak collection systems. Fuhrer and McGoey, ff. Tr. 10,020, at 14-15 and 19. Consideration also has been given to using an evaporator/solidification facility and/or EPICOR-II to process the high activity waste water. Staff Ex. 1, at C4-1.

1250. An accident analysis based on realistic assumptions of SDS operation has been performed. The maximum off-site dose was estimated to be about 2×10^{-4} mrem. By comparison, analyses in the Unit 2 Environmental Report, which make similar realistic assumptions for accidents, show potential off-site doses up to tens of millirems (as from a fuel drop accident). Fuhrer and McGoey, ff. Tr. 10,020, at 42-43. In addition, the on-site NRC Staff will review and approve detailed design, installation, and operating procedures for the SDS to ensure that separation and isolation requirements are satisfied. Staff Ex. 1, at C4-1.

1251. The Board, therefore, finds reasonable assurance that cleanup of the contaminated waste water in the Unit 2 reactor building will not adversely affect safe operation of Unit 1.

1252. Decontamination of buildings and equipment, including the auxiliary building, reactor building and primary reactor coolant system, will result in minimal radiological impact outside the immediate work areas. Controlled ventilation and high efficiency filtration systems will minimize the spread of contamination. Specific procedures will be prepared for each decontamination process to aid in personnel protection. This too will minimize local airborne contamination. Should effluent release monitors detect an excessive rate of release, the exhaust system will be automatically closed. Fuhrer and McGoey, ff. Tr. 10,020, at 17-18 and 43. The

¹⁵⁶Unit 2 has dedicated for its exclusive use two spent fuel pools that are designated "A" and "B". There is a wall with a gate between these two pools so that the two fuel pools can be completely separated if necessary. The SDS is being installed in the Unit 2 "B" spent fuel pool. Tr. 10,062 (McGoey). Unit 1 also has dedicated for its exclusive use two spent fuel pools that are similarly designated "A" and "B". The Unit 1 and 2 spent fuel pools do not communicate. There is no physical way of transferring material from the Unit 2 pools to the Unit 1 pools, or vice versa, without using some form of a cask and the overhead crane. Tr. 10,064 (Fuhrer).

Board, therefore, finds reasonable assurance that these decontamination activities at Unit 2 will not adversely affect safe operation of Unit 1.

1253. Purging of krypton-85 gas from the reactor building atmosphere has been accomplished. Fuhrer and McGoey, ff. Tr. 10,020, at 37. Further minor releases of krypton-85 will occur prior to each manned entry of the Unit 2 reactor building; however, these releases pose no threat to safe operation of Unit 1. *Id.*, at 18.

1254. Disposition of the Unit 2 reactor core will involve the handling of both intact and ruptured fuel. Fission gas activity in the reactor core is at less than detectable concentrations since the short-lived radionuclides such as xenon and iodine have decayed away. With respect to damaged fuel, the nuclide which can still result in any discernible off-site dose (krypton-85) already has escaped from the fuel and has been purged. Should intact fuel be damaged during defueling, the off-site dose to the whole body from the released krypton-85 would be less than 1 mrem, and there would be essentially no dose to the thyroid from iodine. Fuhrer and McGoey, ff. Tr. 10,020, at 43-44; Staff Ex. 1, at C4-2.

1255. Notwithstanding the insignificant amounts of fission product gas present in the Unit 2 reactor core, fuel handling building ventilation and filtration systems will be required to be in service during defueling operations in order to mitigate the consequences of a postulated fuel handling accident. Staff Ex. 1, at C4-2. The specific methods that Licensee will use to handle the fuel, including the associated hardware, have not been developed, but Licensee believes that some type of canister will be used for transfer of fuel assemblies. Tr. 10,059 (McGoey). Due to the uncertainty over the methods of fuel handling, Licensee has not yet conducted any specific accident analysis relating to fuel handling. Tr. 10,058-59 (McGoey). The Board agrees with Licensee's witnesses that an accident analysis would be premature now due to lack of knowledge about the configuration of the reactor core and the fuel assemblies. Tr. 10,058, 10,070 (McGoey).

1256. Even in the absence of a specific accident analysis, the Board finds adequate assurance from the record that a postulated fuel handling accident will not adversely affect safe operation of Unit 1. As we explain below, Licensee will have installed prior to restart an environmental barrier to the spread of contamination from the Unit 2 fuel handling area to the Unit 1 auxiliary building. Tr. 10,055 and 10,074-75 (Fuhrer). With this barrier in place the only Unit 1 area that potentially could be affected by a fuel handling accident at Unit 2 is the Unit 1 fuel handling area. If a fuel handling accident at Unit 2 were to contaminate the Unit 1 fuel

handling area, work could be brought to a safe conclusion and the radiological problem would be addressed. Tr. 10,063 (Fuhrer). It is anticipated that the Unit 1 fuel handling area would be available within a matter of days. Tr. 10,069 (Fuhrer) and Tr. 10,162 (Stoddart). Since fuel handling evolutions are operations that generally need not be done immediately, Tr. 10,063 and 10,069 (Fuhrer), any delay in gaining access to the Unit¹⁵⁷ fuel handling area would not adversely affect safe operation of Unit 1.¹⁰ Moreover, the NRC Staff, as part of its Programmatic Environmental Impact Statement of Unit 2, has evaluated impacts from Unit 2 recovery actions, including those associated with fuel handling, Tr. 10,070-1 (McGoey), and has not identified any potentially adverse impacts to safe operation of Unit 1. Further, impacts on Unit 1 from a Unit 2 fuel handling accident would be no different than impacts at any nuclear station having a shared fuel handling area. Therefore, although the impacts to Unit 1 fuel handling from a Unit 2 fuel handling accident have not, at this time, been specifically addressed or quantified, the Board concludes that the evidence is sufficient for us to find reasonable assurance that such impacts will not adversely affect safe operation of Unit 1, in that during any Unit 2 fuel movements, Licensee will suspend work in the Unit 1 area of the fuel handling building and, whenever Unit 1 fuel movements are in progress, the engineered safety feature filtration system for Unit 1 will be in operation. Stoddart, ff. Tr. 10,159, at 22-23.

1257. On our evaluation of evidence of Licensee's ability to maintain the Unit 2 reactor in a safe condition and of the potential radioactive releases from Unit 2 cleanup operations, we find reasonable assurance that the decontamination and restoration of Unit 2 will not affect safe operations at Unit 1.

Separation of Unit 1 and Unit 2 Systems

1258. The second issue raised by short-term action item 4 deals with separation of Unit 1 and Unit 2 radioactive liquid transfer lines, fuel handling areas, ventilation systems, and sampling lines.

1259. At the time of the Unit 2 accident, there were five liquid transfer line interconnections between Units 1 and 2 which allowed movement of contaminated or potentially contaminated water from one unit to the other.

¹⁵⁷NRC Staff witness Stoddart, who testified on this matter, was one of the early participants in the reentry into the SL-1 reactor. He reentered within 24 hours after the accident and encountered radiation fields exceeding 1000 roentgens per hour. Tr. 10,161 (Stoddart). The Board thus feels confident that, if a true safety need required quick entry to the Unit 1 fuel handling area following some accident in the Unit 2 fuel handling area, such entry could be made. However, the record evidence indicates that a need to quickly reenter the Unit 1 fuel handling area is highly unlikely.

When the EPICOR-II system was installed, other lines interconnecting the units were installed. Fuhrer and McGoey, ff. Tr. 10,020, at 22; Licensee Ex. 1, at 7-1 to 7-3; Staff Ex. 1, at C4-4. Pursuant to the Commission's August 9, 1979 Order, Licensee has devised means for isolating each of these lines (Licensee Ex. 1, at 7-1 to 7-3) which the NRC Staff has found adequate. Staff Ex. 1, at C4-4 to C4-5. No party to the proceeding challenged the Staff's conclusion. On review of the evidence, we conclude that there will be an adequate separation of radioactive liquid transfer lines. In passing, we note the deletion of an early Commission requirement that tankage in Unit 1 be maintained ready to receive Unit 2 waste water in the event such a transfer became necessary. Licensee Ex. 32a and 32b. This eliminates the need to keep radioactive liquid transfer lines open between the units, as was the case when it was necessary in order to satisfy the Commission's earlier requirement.

1260. Other existing connections between the units, in addition to the transfer lines described above, are not likely pathways for transferring radioactive liquids from one unit to the other. These are the auxiliary steam and condensate, demineralized water, and industrial waste systems. The Licensee's evaluations of these systems concluded that there are sufficient controls, through the existence of locked valves, check valves, and system configuration, to prevent contamination of these systems. Fuhrer and McGoey, ff. Tr. 10,020, at 23; Tr. 10,077-79 (Fuhrer); *see also* Staff Ex. 1, at C4-6. Staff witness Dr. Bellamy, whose on-site work with the TMI Program Office has familiarized him with these systems, testified that he personally has reviewed two of the three designated systems and that the senior nuclear engineers who report to Dr. Bellamy have informally reviewed the third system. Based on those reviews, Dr. Bellamy agrees with Licensee's evaluation that sufficient controls exist to preclude the contamination of these systems. Tr. 10,200-02 (Bellamy).

1261. The Unit 1 and 2 fuel handling buildings have a large common air space. Licensee initially considered installing a floor-to-ceiling barrier wall between the Unit 1 and 2 areas of the fuel handling buildings, but after evaluation found it impractical for three reasons: (a) the barrier would have been in close proximity to safety-related equipment, (b) the barrier would have limited the use of the fuel handling crane for necessary fuel receipt operations, and (c) there would have been a need to temporarily breach the barrier wall in order to transfer the fuel handling crane from one unit to the other. Licensee Ex. 1, at 7-3. The Board agrees that such an approach was not feasible. *Id.*; Staff Ex. 1, at C4-8. This finding, however, is based on practical considerations rather than a literal reading of short-term Item 4.

1262. In order to comply with the Commission's separation order, Licensee will physically isolate the Unit 1 auxiliary building from the Unit 1 fuel handling building and will modify the ventilation and filtration systems in order to minimize the communication of air between the units. Licensee Ex. 1, at 7-3 and Supplement 1, Part 2, Question 52; Tr. 10,053-55 (Fuhrer). The Staff reviewed this approach and found it acceptable. Staff Ex. 1, at C4-8 to C4-9; Staff Ex. 14, at 19.

1263. The Unit 1 and 2 ventilation systems are independent and have no interconnections or common interface points. Stoddart, ff. Tr. 10,159, at 19. However, the potential for communication between ventilation systems does exist, since there is a common air space between the Unit 1 and Unit 2 fuel handling buildings and since the Unit 1 auxiliary and fuel handling buildings utilize a common ventilation system. Licensee plans to minimize this potential by installing an environmental barrier between the Unit 1 auxiliary and fuel handling buildings and by installing separate filtration systems for the Unit 1 auxiliary and Unit 1 fuel handling buildings. License Ex. 1, at Supplement 1, Part 2, Question 52; Fuhrer and McGoey, ff. Tr. 10,020 at 7.

1264. A tunnel-like barrier will be constructed which will provide personnel passage between the Unit 1 control tower and the Unit 1 auxiliary building, but will also form part of a barrier that will seal the open areas between the Unit 1 auxiliary building and the Unit 1 fuel handling building. Tr. 10,054 (Fuhrer). The purpose of this modification is to isolate the Unit 1 auxiliary building from the Unit 1 *and* Unit 2 fuel handling buildings. These modifications will be completed before restart. Licensee Ex. 1 at p. 4.

1265. Prior to the first refueling outage, Licensee will upgrade the system to include a new engineered safety feature (ESF) filter system meeting the guidelines of Regulatory Guide 1.52, Design, Testing, and Maintenance Criteria for Post-Accident Engineered-Safety-Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light-Water-Cooled Nuclear Power Plants (Rev. 2, March 1978). *Id.*; see also Stoddart, ff. Tr. 10,159, at 20-22.

1266. The Staff has determined that the design of ESF filter system meets the criteria for engineered safety feature and filtration systems. Staff Ex. 14, at 19. The Board is cognizant that conformance of the ESF filter system with the criteria of Regulatory Guide 1.52 does not necessarily mean that this system is adequate to isolate the Unit 1 auxiliary building from the joint fuel handling building. See Commonwealth proposed finding ¶ 41. However, the purpose of the ESF filter system is not protection against accidents in the Unit 2 fuel handling building, but rather to protect against Unit 1 fuel handling accidents, and consequently the Staff concluded that "[s]ince there will be no fuel movement in the

TMI-1 fuel handling area until that time [the next Unit 1 refueling outage, we find [the timing of this notification] acceptable." Staff Ex. 1, at C4-8.

1267. The Commonwealth questioned the adequacy of the Staff's review (§ 1262, *supra*), however, and asked that the Board find that the Staff had not imposed sufficient testing requirements of the proposed isolation system to ensure that Unit 1 operations can proceed either in the short or the long term. Commonwealth proposed findings §§ 56-61. The Board agrees with the Commonwealth that the record fails to disclose whether, and to what extent, Licensee will test the adequacy of its ventilation separation program. Therefore, as proposed by Licensee in its Separation Reply proposed finding § 25, we will require as a condition for restart that Licensee submit to the Staff a program designed to test the adequacy of its phase 1 ventilation separation program. The Staff is to include in its certification to the Commission that a satisfactory test program has in fact been implemented.

1268. In its proposed findings (proposed finding §§ 43-48), the Commonwealth points out that fuel handling is not the only potential source of contamination in the fuel handling building. Prior to Unit 2 fuel removal, there will be operations involving the submerged demineralizer system (SDS) used by Licensee as part of the Unit 2 decontamination process. These activities may involve the release of radioactive materials. Tr. 21,391-92 (Stoddart). The SDS decontaminates high activity water (greater than 100 $\mu\text{Ci/ml}$), principally from the TMI-2 reactor building sump; it is installed in the Unit 2 spent fuel pool in the joint handling building. Fuhrer and McGoey, ff. Tr. 10,020, at 14-15. The SDS system produces a high activity zeolite resin material waste. The ultimate disposition of this material has not been resolved. Meanwhile, the materials will remain in a spent fuel pool in the joint fuel handling building. Tr. 10,061 (McGoey); Fuhrer and McGoey, ff. Tr. 10,020 at 20.

1269. Accident analyses of the SDS operation have been performed and the consequences of those accidents have been calculated; the maximum *off-site* dose is projected to be about 2×10^{-4} mrem. Fuhrer and McGoey, ff. Tr. 10,020 at 42-43. This information has been submitted to the NRC Staff for its review. Tr. 10,069 (McGoey). The Board notes that on June 18, 1981, the NRC Staff issued an immediately effective order requiring Licensee to "promptly commence and complete processing of the highly contaminated Reactor Building and reactor coolant system water and the intermediate level water in the Auxiliary Building tanks with the SDS and, if necessary, the EPICOR II system." 46 Fed. Reg. 32716 (June 24, 1981). This order was supported by a Safety Evaluation Report (NUREG-0796) setting forth the NRC Staff's safety review and conclusions. *Id.*

1270. One of the postulated SDS accidents analyzed by Licensee was the impact of dropping a shipping cask containing an SDS resin liner. Tr. 10,059 (McGoey). Since the resin is a solid-type material, Licensee expects a minimal airborne problem. There is a very slight potential for particulate contamination to enter the air, but this is believed to be a very low probability event with this type of waste. Any such contamination would be a localized problem. Tr. 10,059-60 (McGoey). As discussed above the environmental barrier would be adequate to preclude spread of this contamination to the Unit 1 auxiliary building. While the airborne activity might spread to the operating floor of the Unit 1 fuel handling building, Licensee's witness did not believe that such an event would prevent Licensee from continuing refueling operations at Unit 1. Tr. 10,060 (McGoey). The Commonwealth cites testimony by Staff witness Stoddart that either an SDS or fuel drop accident at TMI-2 would require sealing off the Unit 1 fuel handling building. Commonwealth PF ¶ 47. Mr. Stoddart testified that, if such an accident occurred where there was airborne contamination which spread to the Unit 1 fuel handling building, the area typically would be sealed off. Tr. 10,161-62 (Stoddart). Even if this occurred, there would be no adverse effects to Unit 1 operations. Mr. Stoddart also testified that access to the Unit 1 fuel handling building is not required during either normal or emergency conditions. Stoddart, ff. Tr. 10,159, at 23; *see also* Licensee PF ¶ 26 and n. 10. The Board therefore finds that SDS accidents and the potential impacts of such accidents on Unit 1 operations have been analyzed adequately.

1271. Further, Commonwealth raised concerns related to handling of Unit 2 fuel and potential impacts from such activities on Unit 1 operations. Commonwealth PF ¶¶ 49-55. The Board addressed above the impacts from Unit 2 fuel handling on Unit 1 operations. The Commonwealth referred to testimony by Mr. Stoddart that, in his personal view, a license condition should preclude any fuel handling until completion of phase 2 of Licensee's separation program. Commonwealth PF ¶ 55. This is contrary to the NRC Staff view expressed in the SER which found the timing of phase 2 acceptable "[s]ince there will be no fuel movement in the TMI-1 fuel handling area until that time." Staff Ex. 1, at C4-8. Further, it appears at variance with Mr. Stoddart's prefiled direct testimony concluding that "an accident at TMI-2 during cleanup and decontamination will not affect TMI-1 operations through the common fuel handling building." Stoddart, ff. Tr. 10,159, at 23. Finally, the NRC Staff did not rely on this testimony by Mr. Stoddart in its proposed findings. While we take note of Mr. Stoddart's concern, since he offered no basis to support his personal view, and since it is contrary to the conclusions of the NRC Staff (both in its SER and proposed findings), the Board is not willing to accept the suggested license condition.

1272. The Commonwealth also suggests need for full core offloading at Unit 1 during certain unusual events, (Commonwealth PF ¶ 53), and urges a study by Licensee to identify potential accidents which may require such offloading. Commonwealth PF ¶ 62(3). Commonwealth's concern, as expressed in its reply finding ¶ 8, is that, should there be an accident on the Unit 2 side of the fuel handling building in the same time period that there is a need to offload the Unit 1 core, Unit 1 capability to do so would be adversely affected. While the testimony shows that a full core offloading may be necessary to accommodate access to the reactor vessel to overcome a problem that has been identified in the reactor vessel (Tr. 10,067 (McGoey)) the testimony does not establish that full core offloading is required to protect the public health and safety. Licensee's witnesses were unaware of any Technical Specification requirement for full core offloading. Tr. 10,067-68 (McGoey and Fuhrer). The Board itself is aware that, as a general matter, full core offloading is not required for any safety function.¹⁵⁸ It is, as Licensee's witness testified, a "desirable" capability. Tr. 10,068 (Fuhrer). The Board concludes, however, that this "desirable capability" is not so significant as to require the study sought by the Commonwealth. Further, the Board has reviewed the Technical Specifications for Unit 1 and finds no requirement at present for full core offloading.¹⁵⁹ While the Board acknowledges the desirability of full core discharge capability for Unit 1, as we have noted elsewhere, the potential effects of fuel handling accidents in the Unit 2 area on Unit 1 operations are no different from those in any instance where two units share a common fuel handling area and in fact may be less because of the age and other characteristics of the Unit 2 spent fuel. Therefore, we do not find it necessary within the scope of the restart proceeding to require the Licensee to conduct the study urged by the Commonwealth. As noted by the Commonwealth (in PF ¶ 2) the Board assumes that in any event, once the

¹⁵⁸ See for example NUREG-0575, Final Generic Environmental Impact Statement on Handling and Storage of Spent Light-Water Power Reactor Fuel (not in evidence), Vol. 1, at p. 1-2.

¹⁵⁹ The Board is aware that the TMI-1 reactor pressure vessel is one of those identified for possible corrective action because of embrittlement. While in-place annealing of the vessel and/or removal of outer fuel assemblies are among five possible corrective actions, the B&W Owners Group is not considering these two options but intends to depend on operator action. This approach is not acceptable to the Staff in the long term. See letter of 8/14/81 to all operating PWRs from G. Vissing and R. E. Johnson, NRC Staff, entitled, Summary of Meetings With the Babcock & Wilcox, Westinghouse, and Combustion Engineering Owners Group on July 28, 29, and 30, 1981, Respectively, Concerning Pressurized Thermal Shock To Reactor Pressure Vessels (RPV). While the corrective action approach to be adopted may require fuel offloading, at this time the Board has no authority to impose restart conditions on this basis. We assume that any potential Technical Specifications would be imposed as necessary by the Staff.

actual configuration of the Unit 2 core is determined, a comprehensive study of the potential accidents associated with handling this fuel will be conducted in conjunction with NRC regulation of Unit 2 decontamination activities. The Board expects that, in the normal course of its duties, the Staff will review this analysis and recommend appropriate limiting conditions on Unit 1 operation, if necessary at that time.

1273. At the time of the Unit 2 accident, the two units shared the Unit 1 primary sample laboratory. In order to comply with the Commission's separation order, Licensee has constructed an independent Unit 2 sampling system (Licensee Ex. 1, at 7-5 to 7-6; Fuhrer and McGoey, ff. Tr. 10,020, at 24), which the Staff has reviewed and found adequate. Staff Ex. 1, at C4-11.

1274. In summary, the Board finds that Licensee's program to separate the Unit 1 and Unit 2 fuel handling buildings complies with the Commission's short-term action item 4 and is adequate to provide reasonable assurance that the public health and safety will be protected. The Commonwealth requests that we require three additional short- and long-term actions. Commonwealth PF ¶ 62(1)-(3). We already have set forth our resolution of the substantive issues underlying the Commonwealth's requests, which we summarize below.

1275. The Commonwealth first seeks NRC Staff review of phase 1 of Licensee's separation program. As indicated above, this already has been done. In addition, the Commonwealth requests development of a testing program with respect to phase 1. We agree and will require Licensee to submit a phase 1 test program to the NRC Staff.

1276. The second action requested by the Commonwealth is a license condition precluding TMI-1 operation during Unit 2 defueling operations prior to completion of phase 2 of Licensee's separation program, based on the Commonwealth's conception that phase 2 is designed to provide the necessary protection against Unit 2 defueling accidents. Since the test program for phase 2 suggested by Commonwealth is in terms of protecting Unit 1 from Unit 2 cleanup accidents, we reject that request, too. The Commonwealth also requests that a comprehensive study of potential Unit 2 fuel handling accidents be conducted. We find the analysis to date of Unit 2 fuel handling accidents is sufficient to support restart of Unit 1. Any further analysis necessary to assure the public health and safety during the actual Unit 2 defueling is better handled in the context of the NRC Staff's ongoing regulation of Unit 2 activities. We also believe that the adequacy of any further analysis is beyond the scope of this Board's jurisdiction.

1277. The last request of the Commonwealth is for a study of potential Unit 1 accidents that may require offload of the Unit 1 core. In the context of this proceeding, we find no need for such a study and therefore reject this request.

Effluent Monitoring

1278. The final issue raised by short-term action item 4 relates to Licensee's ability to distinguish between effluents discharged from Units 1 and 2.

1279. The effluent monitoring systems are able to discriminate between releases from Unit 1 and Unit 2 since the effluents are maintained separately up to the point of discharge in the case of liquid effluents and discharge from separate points in the case of gaseous effluents. Stoddart (Separation), ff. Tr. 10,159, at 17; Fuhrer and McGoey, ff. Tr. 10,020, at 25; Tr. 10,129 (Fuhrer, McGoey). All identified plant radioactive effluent release pathways are either continuously monitored or sampled for radioactivity content during releases. Stoddart (Separation), ff. Tr. 10,159, at 16; Fuhrer and McGoey, ff. Tr. 10,020, at 25-26. Plant systems which are known to contain or could contain radioactive materials and which are potential contributors to plant effluents are also monitored or sampled prior to release of their contents. Liquid releases from the radwaste treatment systems of the individual units are made on a batch basis; electronic interlock valves ensure that only one release at a time occurs. Consequently, it is not possible for both units to concurrently discharge liquid radwaste. Independent radiation instruments on each unit's discharge monitor all liquid releases. The combined effluents are released to the Susquehanna River at a common point at which an additional radiation monitor exists. Stoddart (Separation), ff. Tr. 10,159, at 16-17; Fuhrer and McGoey, ff. Tr. 10,020, at 25-26. Gaseous effluents are released from individual vents or stacks servicing only the unit of origin. Stoddart (Separation), ff. Tr. 10,159, at 18; Fuhrer and McGoey, ff. Tr. 10,020, at 26. Also, see Staff Ex. 1, at C4-10 to C4-11. No evidence was presented which challenged the adequacy of the effluent monitoring system and its ability to distinguish between releases from TMI-1 and those from TMI-2. The Board finds the Licensee can distinguish between effluents intentionally released from Units 1 and 2.

2. Short-Term Action Item 5

1280. Short-term action item 5 addresses the adequacy of waste handling at Unit 1. It requires Licensee to demonstrate that Unit 1 handling

capabilities with respect to liquid, gaseous and solid wastes are sufficient to assure safe operation of Unit 1, and that these waste handling capabilities will not be relied upon by cleanup operations at Unit 2. Since Licensee has separated or isolated the Unit 1 and 2 waste treatment facilities, as described above, the Board assessed the adequacy of waste handling for Unit 2 cleanup operations in order to assure that such activities will not create a need to transfer wastes from Unit 2 to Unit 1. These issues are addressed below.

1281. The two subsystems for processing radioactive liquid wastes at Unit 1 are the primary coolant chain and the miscellaneous waste chain. Fuhrer and McGoey, ff. Tr. 10,020, at 3 and Tables 1-3; Licensee Ex. 1, at 7-6 to 7-9 and Table 7.3-1; Staff Ex. 1, at C4-3. Duplication of tanks, pumps, and process equipment permits operations to proceed normally in the event some equipment is unavoidably out of service for an extended period. Numerous cross connections between storage tanks and alternate process paths provide emergency or additional storage capability and treatment flexibility. Storage tank capacities and process flow rates were conservatively chosen. We find that the difference between expected waste flows and the operating capacity of the components, the provisions for interconnections between system components, and the redundancy of components are adequate to provide sufficient reserve capacity during normal operations, to process surge flows, and to meet demands during anticipated operational occurrences. Staff Ex. 1, at C5-1; Fuhrer and McGoey, ff. Tr. 10,020, at 4-5. As indicated above, the physical separation of the two units will increase the Unit 1 liquid radwaste capability over that available prior to the accident. Fuhrer and McGoey, ff. Tr. 10,020, at 4; Staff Ex. 1, at C4-3 to C4-5.

1282. In postulated accident scenarios involving the generation of large quantities of liquid wastes, the Unit 1 reactor building would be used to contain most of the liquid waste. Water from the Unit 1 reactor building sump is released by gravity and is controlled by two manually activated valves in series, not by automatically started pumps as in Unit 2. Thus, there is less likelihood at Unit 1 that substantial quantities of liquid radwaste will be inadvertently transferred from the reactor building to tankage in the auxiliary building. In the event such transfer is desired, the liquid waste tankage in Unit 1 is similar to that available in Unit 2 at the time of the accident. Fuhrer and McGoey, ff. Tr. 10,020, at 6. *See also* Tr. 10,049-53 and 10,149-50 (Fuhrer). By comparing the water generated during large break loss-of-coolant accidents and steamline and feedline break accidents to the available volume in the reactor building, Licensee calculated the maximum flood level to be 5.66 feet above the reactor

building floor. Croneberger, ff. Tr. 16,252, at 2-3. Among plant modifications being made by Licensee are relocations of the steam generator and pressurizer level instruments, previously located at low elevations in the reactor building, to higher elevations above the predicted maximum flood level of 5.66 feet. *Id.*, at 3. In Unit 1 all safety-related instruments comparable to those which failed during the Unit 2 accident (*see* Keaten, *et al.*, ff. Tr. 6802, at Tables 1 and 2) already are located above this calculated flood level. Tr. 16,256 (Croneberger). Licensee has not made an exhaustive study of the Unit 1 nonsafety-related instrumentation comparable to those instruments which failed during the Unit 2 accident, but based upon the evaluations that have occurred to date, Licensee does not believe that any of this instrumentation is located below the Unit 1 flood level. Tr. 16,257 (Croneberger). The Board, however, was not satisfied with the Licensee's calculations or with the Staff's review thereof. See Section II.T.2. Therefore, we leave open the issue of whether the Unit 1 reactor building can safely contain the maximum volume of water available from Unit 1 accident sources without endangering any safety-related instrumentation pending completion of the short-term actions specified in the conditions imposed in Section II.T.2.

1283. The capability of the Unit 1 liquid radwaste system to (a) reduce and maintain releases of radioactive materials in liquid effluents to "as low as is reasonably achievable"; (b) maintain releases below the limits specified in 10 CFR Part 20, Appendix B, Table II, Column 2; (c) meet the dose design objectives of Section II.A of Appendix I, 10 CFR Part 50; and (d) meet the cost benefit objectives set forth in Section II.D of Appendix I, 10 CFR Part 50 was analyzed by the Staff. With respect to each criterion the Staff concluded the Unit 1 liquid radwaste system adequate and the Board concurs. Staff Ex. 1, C5-1 to C5-6.

1284. The Board, therefore, finds that the Unit 1 liquid waste handling capability is adequate to assure safe operation of Unit 1.

1285. The three subsystems for the collection, hold-up, filtration, and monitoring of radioactive gases at Unit 1 are the waste gas disposal system, the auxiliary and fuel handling building ventilation system, and the reactor building purge ventilation system. Fuhrer and McGoey, ff. Tr. 10,020, at 6-7; Licensee Ex. 1, at 7-9b to 7-11a; Staff Ex. 1, at C4-6 to C4-7. Leakage from the Unit 2 waste gas system occurred during the accident but was not related to the design of the system. To prevent similar problems at Unit 1, an extensive program of leak testing, efficiency testing, chemical analyses, and operability demonstrations is being conducted; subsequent periodic retesting will be performed. Fuhrer and McGoey, ff. Tr. 10,020, at 8-9; Licensee Ex. 1, at 2.1-29b to 2.1-29c and Table 2.1-4; Staff Ex. 1, at C4-7.

1286. The Staff has evaluated the capability of the Unit 1 waste gas system to (a) reduce and maintain releases of radioactive materials in gaseous effluents to "as low as is reasonably achievable"; (b) maintain releases below the limits specified in 10 CFR Part 20, Appendix B, Table II, Column 1; (c) meet the dose design objectives of Sections II.B and II.C of Appendix I, 10 CFR Part 50; and (d) meet the cost benefit objectives set forth in Section II.D of Appendix I, 10 CFR Part 50. The Staff concluded that the Unit 1 waste gas system satisfies each of these criteria and the Board concurs. Staff Ex. 1, at C5-1 to C5-6.

1287. The Board, therefore, finds that the Unit 1 gaseous waste handling capability is adequate to assure safe operation of Unit 1.

1288. The five types of waste produced, processed, and shipped from Unit 1 as solid radioactive waste are (a) concentrated liquid waste (evaporator bottoms); (b) used filter precoat material (spent powdered resin); (c) spent resin (bead type); (d) dry compactible trash; and (e) dry non-compactible trash. Dry trash is shipped off-site without solidification. Where required by the Unit 1 Technical Specifications or applicable regulations, the concentrated liquid waste, used precoat, and spent resin will be solidified prior to being shipped off-site for disposal. Permanently installed equipment does not now exist at Unit 1 to solidify this radwaste. Fuhrer and McGoey, ff. Tr. 10,020, at 9; Licensee Ex. 1, at 7-4 to 7-5 and 7-11a to 7-11c; Staff Ex. 1, at C4-9.

1289. Should solidification of wastes be required, Licensee has initiated a two-part program. In the short term, Licensee will use a mobile, in-cask cement solidification system similar to one in use at other operating nuclear power plants. For the long term, Licensee is doing an engineering evaluation which will serve as basis for procurement and installation of a permanent facility; this program is currently projected to take about five years. Because of uncertainties in present solidification technology and changing regulatory requirements, Licensee believes, and the Board concurs, that selection of a permanent facility is premature at this time. Since the mobile system is adequate to solidify wastes generated from Unit 1 operation, the Board finds no reason for Licensee to prematurely commit to a particular permanent solidification technique. Fuhrer and McGoey, ff. Tr. 10,020, at 9-10; Licensee Ex. 1, at 7-4 to 7-5, 7-11a to 7-11c, and Supplement 1, Part 2, Question 53; Staff Ex. 1, at C4-9 to C4-10 and C5-6.

1290. All radioactive solid waste from Unit 1 operations, whether solidified or not, will be packaged and transported to a licensed burial facility in accordance with applicable Department of Transportation and NRC regulations. Fuhrer and McGoey, ff. Tr. 10,020, at 10. Licensee is constructing an interim waste staging facility (which was scheduled at the time of hearing to be completed in October 1981) that will be used to

store wastes prior to shipment off-site. Staff Ex. 14, at 20; Licensee Ex. 1, at Supplement 1, Part 2, Question 53; Fuhrer and McGoey, ff. Tr. 10,020, at 20; Tr. 10,027 and 10,032-36 (McGoey). Licensee also has implemented a volume reduction program in order to minimize the quantity of waste that must be disposed of off-site. Tr. 10,029-30 (McGoey). The NRC Staff has reviewed Licensee's on-site storage capabilities and finds them adequate. Staff Ex. 14, at 20. A draft contingency plan, covering anticipated waste generation over the next two to three years, has been prepared by Licensee. Tr. 10,027 (Fuhrer).

1291. The Commonwealth noted (PF ¶ 20) that Licensee's testimony states that "All radioactive solid waste from the operation of Unit 1, whether solidified or not, will be packaged and transported to a licensed burial facility in accordance with Department of Transportation and NRC regulations" (*id.*, at 10) and indicated that the Staff apparently accepted this commitment without analyzing the availability of off-site disposal facilities. PF ¶ 20; Staff Ex. 1, at C4-9. The Commonwealth further asserts (PF ¶ 22) that Staff's witnesses were unable to add to the SER analysis in that Mr. Stoddart was not familiar with the off-site waste disposal facilities available to the Licensee for the disposal of wastes from TMI-1 and TMI-2 and that Dr. Bellamy was only "peripherally familiar" with this issue. Commonwealth stated that the Staff has conducted no independent analysis of Licensee's options should off-site burial become unavailable. PF ¶ 22; Tr. 10,195-97 (Stoddart, Bellamy). However, Dr. Bellamy testified that the NRC is reviewing Licensee's contingency plans and is in the process of reviewing Licensee's proposed on-site storage facilities for which the criteria being imposed by the NRC Staff are no different than at any other reactor site. Tr. 10,197 (Bellamy). Subsequent to his testimony, this review was completed and reported in Supplement 3 to the SER. See Staff Ex. 14, at 20.¹⁶⁰

¹⁶⁰ The Commonwealth criticizes the NRC Staff's review as "apparently based on the projected production of solid waste from a *typical PWR* for a period of two years" and because it is alleged that the specific waste volumes from Units 1 and 2 have not been considered. Commonwealth proposed finding ¶ 30. The Board already has found that the waste generated by Unit 1 operations will be similar to that from other PWRs. The Board also finds the Commonwealth's characterization of the testimony to be somewhat misleading in view of the fact that the Commonwealth did not request a witness on the adequacy of Licensee's waste staging facility and did not know whether the witness who was available for examination was the Staff person capable of responding to questions in this area. Tr. 21,403 (Adler). In response to questioning, Mr. Stoddart testified in fact that he was not aware of the specifics of the analysis done by the NRC Staff since he did not do it. Tr. 21,403 (Stoddart). He made an assumption, which he stated "may or may not be correct", that the waste generated by a typical PWR was analyzed. *Id.* He further testified that he "presume[d]"

(CONTINUED)

1292. In its proposed findings ¶¶ 23-27 Commonwealth set forth what it considered to be restrictions on availability to Licensee of licensed burial facilities. Commonwealth's position is that current off-site low-level waste disposal facilities may be unable to accommodate all the wastes that will be generated during Unit 1 operations. Licensee in reply finding ¶ 7 noted that Commonwealth's conclusion is based on testimony that, due to an initiative passed during the last election, the waste burial facility in Richland, Washington would be available for Unit 1 use only until mid-1981 (Tr. 10,025 (Fuhrer)), and that, if the waste burial facility at Barnwell, South Carolina is the only remaining available facility, the allocation program in place there may cast into doubt Licensee's ability to dispose of all Unit 1 wastes. Tr. 10,026 (Fuhrer). This testimony has been overtaken by subsequent events. On June 26, 1981, the United States District Court for the Eastern District of Washington found the Washington initiative "unconstitutional and thus unenforceable." *Washington State Building & Construction Trades Council v. Spellman*, No. C-81-154 RJM.¹⁶¹ As a result, Unit 1 is no longer facing the prospect that it will be unable to ship low-level radioactive waste to the Richland burial facility after mid-1981. Therefore, the potential problem initially perceived by the Commonwealth no longer exists.

1293. The Board was reluctant to adjudicate the low-level waste disposal issue in this proceeding; it indicated that such concerns might be beyond the scope of this proceeding. Tr. 10,032 (Smith). The record is not as complete as we would desire for a full airing of this issue and we are aware that there is a substantial amount of relevant background information that is not in the record. The referenced court decision illustrates the rapidly changing nature of the issue which is to a large extent a

this was the manner in which the analysis was done, but he could not "of course testify that this is the way that it was done." Tr. 21,404 (Stoddart). As to whether the specific waste volumes from Units 1 and 2 were considered, Mr. Stoddart just did not give a responsive answer. *Id.* With respect to Unit 1 wastes, the Board notes that site-specific design waste quantities were provided to the NRC Staff both as a table in Licensee's Restart Report (see Licensee Ex. 1, at Table 7.3.1, Section III), and in response to a specific question (*id.*, at Supplement 1, Part 2, Question 53 (E)). With respect to Unit 2 wastes, the Board finds it unlikely that the NRC Staff is unaware of the quantity of waste that may require shipment off-site in view of the strict regulatory oversight being conducted by the NRC Staff at Unit 2. See generally Fuhrer and McGocoy, ff. Tr. 10,020, at 31-38. Dr. Bellamy testified that the NRC was "deeply into discussions with other government agencies, such as the Department of Energy, for long-term storage of the TMI-2 wastes." Tr. 10,197. Licensee also testified that NRC review will be obtained prior to selecting additional on-site storage methods for Unit 2 wastes. Fuhrer and McGocoy, ff. Tr. 10,020, at 20.

¹⁶¹ A copy of this decision was served on all parties by Licensee at the time Licensee served its reply findings on July 10, 1981.

generic rather than a site-specific problem. Taken together, these factors convince the Board that it would be premature to order the relief sought by the Commonwealth. The Board finds that, by constructing an interim waste staging facility, by initiating a waste volume reduction program, and by developing a waste contingency plan, Licensee has taken reasonable action in response to possible limitations on its ability to ship waste off-site.

1294. The Board, therefore, finds that the Unit 1 solid waste handling capability is adequate to assure safe operation of Unit 1.

1295. All of the liquid, gaseous, and solid waste handling facilities just described are reserved exclusively for the use of Unit 1. As we describe below, Unit 2 also has adequate liquid, gaseous and solid waste handling facilities dedicated for its exclusive use. This fact, together with the physical separation of the two units, assures that Unit 1 waste handling capabilities will not be relied upon for decontamination or restoration of Unit 2.

1296. Following the Unit 2 accident, Licensee evaluated the capabilities of the existing Unit 2 liquid waste treatment systems to process the waste water associated with the accident. Due to the high radioisotopic concentrations present and the existing shielding design of the systems, this option was not considered feasible. Instead, Licensee has installed and successfully operated two new liquid waste systems (EPICOR-I and EPICOR-II), has under construction another system (SDS), and is conducting planning with respect to a fourth system (the evaporator/solidification facility). Fuhrer and McGoey, ff. Tr. 10,020, at 12-15 and Figure 1. Licensee believes that these four radwaste systems will suffice to treat all accident and cleanup related water in Unit 2. *Id.*, at 15. There is no evidence to the contrary and the Board finds this conclusion reasonable. Even if there were a need for additional treatment systems, the liquid radwaste system at Unit 1 could not be used for that purpose for the above reasons similar to those which rendered use of the preaccident Unit 2 liquid waste systems impractical. Thus, there is little likelihood that Unit 1 liquid radwaste treatment systems would be relied upon for treatment of Unit 2 waste water.

1297. At present, decontaminated water must be stored on-site and not released to the river pursuant to the Commission's Order of February 11, 1980. Liquid waste holding capacity existing at the time of the accident, together with new storage capacity constructed by Licensee since the accident, brings the total water storage capacity at Unit 2 to about 1,500,000 gallons. The Board finds that this capacity is adequate to store the processed water. Fuhrer and McGoey, ff. Tr. 10,020, at 15-16; Stoddard (Separation), ff. Tr. 10,159, at 7, 9, 14.

1298. At one time, the Commission amended the Unit 2 operating license to require that suitable tankage at Unit 1 be maintained in an appropriate state of readiness for storing Unit 2 waste water. Fuhrer and

McGoey, ff. Tr. 10,020, at 23-24. Due to the freeing up of additional tankage at Unit 2, Licensee requested that its operating license be further amended to delete the requirement that Unit 1 tankage be maintained for this purpose. *Id.*, at 24-24a. This has occurred (Licensee Ex. 32a) and Licensee no longer reserves Unit 1 tankage for Unit 2 waste waters. Licensee Ex. 32b; Stoddart (Separation), ff. Tr. 10,159, at 10.

1299. The Board, therefore, finds that Unit 2 has treatment systems and storage facilities adequate to handle all Unit 2 waste water and that Unit 1 systems and facilities need not be relied upon for these purposes.

1300. During decontamination activities at Unit 2, Licensee does not plan to use any gaseous waste processing equipment not in place prior to the accident except that directly associated with EPICOR-II and SDS. Fuhrer and McGoey, ff. Tr. 10,020, at 17.

1301. The preaccident radwaste gas system is used for the accumulation, storage, and controlled disposal of gases evolved from primary coolant or radioactive liquid wastes in Unit 2. *Id.*, Tr. 10,142-3 (McGoey). The system consists of a vent collection header, two gas compressors, two waste gas decay tanks, a HEPA filter, and a charcoal filter. Fuhrer and McGoey, ff. Tr. 10,020, at 17. The auxiliary and fuel handling building ventilation system continuously filters, monitors, and disposes of radioactive gases released to the atmosphere of these buildings; the reactor building purge system performs a similar function. *Id.*, at 17-18. Additional equipment is unnecessary because (1) the short-lived noble gas and iodine radionuclides have decayed away almost completely, and most of the krypton-85 gas in the reactor building atmosphere already has been purged; (2) activities to decontaminate and clean up Unit 2 will be primarily wet operations, from which airborne releases are much less likely than from dry operations; (3) there is no stored energy source of appreciable magnitude that could provide a dispersal force of any magnitude; and (4) with the reactor shut down, there are no significant new sources of gas production. Once the existing waste water is degassed, no new sources of gas will exist during Unit 2 recovery operations. *Id.*, at 16-17.

1302. Based on these factors, our review of the Unit 2 waste gas handling capabilities (Fuhrer and McGoey, ff. Tr. 10,020, at 17-19) and the physical separation of the units, the Board finds the Unit 2 waste gas systems are adequate and that Unit 1 waste gas handling facilities will not be relied upon during Unit 2 decontamination and restoration activities.

1303. During Unit 2 cleanup operations, the three types of waste produced, processed, and planned to be shipped from Unit 2 as solid radioactive waste are spent resins and filters, dry compactible trash, and dry non-compactible trash. EPICOR-II resins and filters are now being stored in the interim liner staging facility which presently consists of two reinforced modules (it is projected that up to six may be constructed). The SDS

resins and filters initially will be stored in the flooded spent fuel pool. Handling beyond the spent fuel pool has not been finalized, nor has the need for and degree of solidification of these wastes been resolved. Fuhrer and McGoey, ff. Tr. 10,020, at 19-20. If solidification is required, the Unit 1 facilities previously described will not be used. Instead, a second system would be provided for use at Unit 2. Tr. 10,083-84 (Fuhrer). The Board, therefore, finds and in fact requires as a condition of restart that Unit 1 solid waste handling capabilities will not be relied upon for decontamination or restoration of Unit 2.

1304. The Commonwealth (PF ¶¶ 28-33) urged the Board to find that additional assurances requested by the Commonwealth are necessary to provide reasonable assurance of safe long-term operation of Unit 1 concurrent with the cleanup of Unit 2. The Commonwealth's concerns appear primarily with whether Three Mile Island will be indefinitely an "interim repository" for large quantities of radioactive wastes because of the combination of wastes from Unit 2 cleanup, from normal operations of Unit 1, and potentially from an accident at Unit 1. The Board does not agree with Licensee that there is no reason to treat Unit 1 differently from other reactors in terms of radioactive waste disposal. Licensee's Separation PF ¶ 50, n. 14. The coexistence of Unit 1 on the same small island with Unit 2, at which there are radioactive waste disposal problems unique to the commercial nuclear power industry, places on this Board a heavy responsibility not to define too narrowly the scope of the separation issue. We agree that the Licensee has made major and commendable efforts to resolve the radioactive waste disposal problem and to separate the activities of Units 1 and 2. On the other hand, neither the Board nor any party is capable of geographical separation of Units 1 and 2, *a la* Moses and his parting of the Red Sea (and that was a very brief "separation"). Consequently, the Board shares the concern of the Commonwealth that we discharge our responsibility to the fullest in ensuring that the procedures for maintaining capability of Unit 1 to handle its wastes are in place before we release jurisdiction in this proceeding.

1305. The Commonwealth requested that we require three additional long-term actions (Commonwealth PF ¶ 34(1)-(3)): (1) direct the Staff to conduct a site-specific review of the interim waste staging facility and determine a minimum and maximum time that Unit 1 can be operated in the absence of available off-site disposal facilities; (2) have Licensee develop a long-range plan for disposing of low-level wastes generated at TMI; (3) limit conditions on operation of Unit 1, if necessary, based on the analyses implied in (1) and (2). We do not agree that it is necessary to require analyses beyond what Licensee and Staff have done or will be doing, as described previously.

1306. We do not consider it within our jurisdiction to examine and resolve whether there are present or potential limitations on acceptance of wastes at off-site burial facilities, as we have noted above. On the other hand, we point out that material to our findings on the adequacy of radioactive waste management is the assumption that in the course of its normal enforcement program, the Staff will impose limiting conditions on operation of Unit 1 or take other appropriate action to preclude continued generation of radioactive wastes in the event that future circumstances, whatever they might be, restrict removal of radioactive wastes from the island or restrict ability of Unit 1 to store wastes on-site in its staging facility which has a finite capacity.

3. Board Question No. 9 — Groundwater Monitoring

1307. The issue of groundwater monitoring at TMI was neither a mandatory item included in the Commission's August 9, 1979 Order and Notice of Hearing nor a matter raised by any intervening party. Nevertheless, based on our general awareness of activities taking place at TMI, we requested Licensee and the Staff to address specific questions relating to groundwater monitoring both to assure ourselves that the potential for contamination of the groundwater did not raise any public health and safety concerns and to determine what implications, if any, the potential for contamination of the groundwater might have on the separation issue.

1308. Board Question 9a inquired into measures to monitor groundwater quality at the site. At the request of the NRC Staff, since early 1980 Licensee has installed eight monitoring wells (MW) and seven observation wells (OW) at the TMI site. Johnson, ff. Tr. 16,267, at 3; Tr. 16,420-21 (Riethle). Two of the wells (MW-1 and OW-15), located far from the power block, are utilized for background information, while the other 13 wells are sited so as to detect any leakage of contaminated water from the Unit 2 containment and auxiliary buildings. Riethle and Fuhrer, ff. Tr. 16,417, at Figure 1; Johnson, ff. Tr. 16,267, at 3. Water samples are taken from these wells on a weekly or biweekly basis and analyzed for radioactivity and chemical contaminants. Riethle and Fuhrer, *id.*, at 2; Johnson, *id.* at 3-4.

1309. Board Question 9b inquired into measures taken to ensure against contamination of the groundwater. The basic measures taken to ensure against such contamination from routine, accident, or cleanup operations are contained in the design and construction of the plant. The plant was designed to accommodate gross failure or leakage of the radioactive liquid systems without significant impact on the groundwater. Another method is to rely on administrative and operational measures to minimize the poten-

tial for groundwater contamination. Prudent practice requires that both approaches be used, *i.e.*, design the plant to prevent leakage to the groundwater as the primary line of defense, and apply administrative or operational controls over the contents of tanks containing radioactive liquids as the secondary line of defense. Stoddart (Groundwater), ff. Tr. 16,269, at 2.

1310. Under either normal or accident conditions, groundwater contamination through liquid pathways can potentially occur at Unit 1 from four sources: permanent structure leakage, tankage leakage, the piping tunnel from the borated water storage tank (BWST), and localized spills. The permanent structures which could contain significant radioactivity are the containment, auxiliary, fuel handling, and control buildings. Each of these structures is located on island bedrock, several feet below the average groundwater table. Each building is designed to minimize in-leakage and there are lower elevation sumps to collect and transfer the liquid collected to radwaste systems for processing. Riethle and Fuhrer, ff. Tr. 16,417, at 3.

1311. Board question 9c asked if there were any evidence of changes in groundwater quality attributable to Unit 1 and/or Unit 2 operations. Board question 9d inquired into sources of any identified groundwater contamination. Based on readings taken by EPA in nearby wells and in the Susquehanna River, the normal background level of tritium in the area is about 100-500 pCi/L; tritium levels in this range were observed in MW-1, north (upgradient) of the plant structures. Johnson, ff. Tr. 16,267, at 4. Above-background levels of tritium have been detected in various groundwater samples. While the readings have been variable, levels are somewhat higher in the vicinity of Unit 2 structures, with observed values as high as 4600 pCi/L. Riethle and Fuhrer, ff. Tr. 16,417, at 6 and Figures 2(a) - 2(o); Johnson, ff. Tr. 16,267, at 4-5 and Tables 1-2 and 5-6. However, observed tritium levels are all less than 3×10^6 pCi/L, the maximum permissible concentration specified in 10 CFR Part 20, Appendix B. Johnson, ff. Tr. 16,267, at 5.

1312. During the winter of 1980-81, samples from MW-2 showed higher levels of cesium-137, cesium-134, and cobalt-60 than were previously recorded. Riethle and Fuhrer, ff. Tr. 16,417, at 6 and Table 1; Tr. 16,274-76 (Johnson). The peak measurement of cesium-137 occurred February 11, 1981; since that time there has been a downward trend in cesium concentration. Tr. 16,436 (Riethle). The source of the cesium was possibly leakage from the borated storage tank and measures have been taken to fix these leaks. Tr. 16,441 (Riethle). Further, cesium monitoring will be continued. *Id.*

1313. In regard to boron levels, Staff witness had no concrete information but understood that Licensee was measuring boron. Tr. 16,274 (Johnson). Licensee's witness indicated that the only TMI boron measurement available was one done on water from MW-3. Tr. 16,418 (Riethle). Licensee intends to do some additional sampling for boron but does not consider it a high priority for locating sources of groundwater contamination (Tr. 16,419 (Riethle)), because Licensee's witness does not consider that boron levels and radioactivity levels can be correlated so that boron levels would be indicative of the source of radioactive contamination. Tr. 16,431-33 (Riethle).

1314. No other significant concentrations of fission-produced radioisotopes or nonradioactive chemicals have been found. Riethle and Fuhrer, ff. Tr. 16,417, at 6; Johnson, ff. Tr. 16,267, at 5 and Tables 3-4.

1315. Measured levels of radioisotopes are about three orders of magnitude below the maximum permissible concentrations specified in 10 CFR Part 20, (Tr. 16,280 (Johnson)), and neither the NRC Staff (Tr. 16,282 (Johnson)), nor Licensee, (Tr. 16,430 (Riethle)) believe the contamination levels warrant remedial measures. Since the groundwater system at TMI does not connect with the regional groundwater aquifer (Tr. 16,270 (Johnson)), there is little risk of contaminating any large groundwater systems. The groundwater at TMI does flow into the Susquehanna River, although the flow is not very large. Tr. 16,271 (Johnson); Tr. 16,423-24 (Riethle). Licensee estimates that it might take from 3 to 30 years for groundwater to migrate from MW-2 to the river. Tr. 16,427 (Riethle). Tritium levels measured in the Susquehanna River from Steelton to Lancaster show no increase above background. Tr. 16,424 (Riethle). Similarly, groundwater sampling at Goldsboro on the west shore of the river, at locations on the east shore of the river, and at Shelly Island show no increase above background. Tr. 16,444 (Riethle). For purposes of analysis, the Staff performed a conservative calculation which postulated that the entire volume of contaminated water above the water table in the reactor building was released to the site groundwater over a period of about 2-1/2 days. The levels of radioactivity in drinking water from the Susquehanna River were calculated to be below the levels specified in 10 CFR Part 20, Appendix B. Johnson, ff. Tr. 16,267, at 7. Licensee states that neither people nor animals can come in contact with contaminated groundwater at TMI. Tr. 16,438-39 and 16,441 (Riethle). The Board finds that the slightly elevated levels of radioactivity currently found in the groundwater at TMI pose no threat to the public health and safety. We expect and require that measures to monitor groundwater and to eliminate any TMI-generated sources of contamination will continue until no longer required as determined by the Staff.

1316. Licensee has submitted to the Staff a report identifying potential sources of the groundwater contamination. While it is not possible to identify precisely the cause of the contamination, both the Staff (Johnson, ff. Tr. 16,267, at 5-6) and Licensee (Riethle and Fuhrer, ff. Tr. 16,417, at 7-12) believe that leakage to the ground from pumps, valves, and piping at the Unit 2 borated water storage tank (BWST) is the primary contributor to the contamination. This leakage occurred several months to more than a year ago. At the request of the Staff, additional observation wells were drilled to confirm that the BWST was the source of contamination. Soil samples were taken near the BWST during the drilling of the observation wells. The concentrations of various radionuclides were measured at various depths in the soil column, from ground level to a depth of over 25 feet. Johnson, ff. Tr. 16,267, at 5-6.

1317: Tests on the soil samples recovered from the well drilling operations show higher concentrations of tritium at locations above the water table and close to the BWST. Infiltration of precipitation has carried the contamination downward to the water table, through which it has been transported to other locations. Based on the well data, soil samples, and the fact that the BWST has leaked, the Staff concludes that the analysis of the test data supports the hypothesis of the BWST leakage through the fittings as the source of contamination. Johnson, ff. Tr. 16,267, at 6; Tr. 16,274 (Johnson).

1318. The Licensee also believes that the Unit 2 BWST is a major source of radionuclides in the ground on the east side of Unit 2. Tr. 16,431-41 (Riethle). Tritium has consistently been found in the groundwater monitoring wells and well soil samples near the BWST in concentrations generally higher than in other areas near the plant, supporting the conclusion that the history of leakage from the BWST has contributed to tritium in the groundwater of the adjacent area. In addition, the groundwater monitoring data show a correlation of tritium concentration with distance from the BWST — *i.e.*, the closer to the BWST the higher the tritium concentrations. The presence of radioactive cesiums and cobalts in the groundwater and the soil also is consistent with the conclusion that leakage from the BWST is the major source of radionuclides in the adjacent area. Riethle and Fuhrer, ff. Tr. 16,417, at 9-10.

1319. Licensee has taken and is taking steps to prevent leakage from the Unit 2 BWST in the future. Tr. 16,436 (Riethle); Riethle and Fuhrer, ff.

Tr. 16,417, at 8.¹⁶² It is not believed that the Unit 2 reactor building has a prominent leak. *Id.*, at 10.

1320. Licensee has committed to reducing leakage from systems containing radioactive fluids to as-low-as-practicable levels prior to restart of Unit 1. NUREG-0680, Staff Ex. 1, at C8-31, describes the Licensee's program for leakage reduction. The Staff has reviewed the Licensee's commitment and found it to be acceptable. Stoddart (Groundwater), ff. Tr. 16,269, at 5.

1321. There is no groundwater monitoring system established specifically for Unit 1. Tr. 16,428 (Riethle); Tr. 16,285 (Johnson). Since the groundwater at TMI flows generally in a southerly direction, if leakage occurred from a Unit 1 source, it would most likely show up at the wells located around Unit 2. Tr. 16,284-85 (Johnson). While the Staff believed it would thus not be possible to determine whether the source of the contamination was from Unit 1 or Unit 2 (*id.*), Licensee's witness believed that such a determination could be made by analyzing the isotopic concentrations. Tr. 16,428 (Riethle). While the Board is skeptical as to the practical ability to make such an analysis, we do not pursue this concern further since as explained below, we find that adequate protective measures have been taken at Unit 1 against the possibility of substantial groundwater contamination and that if such contamination should occur, sufficient time exists to establish any necessary additional monitoring regime and take mitigative measures.

1322. Permanent Unit 1 structures that could contain significant quantities of radioactive liquids are designed to minimize leakage. Liquid tanks are of Seismic Class 1 design. The buildings these tanks are located in also are seismically designed and qualified structures. Unit 1 has three design features which are somewhat unique in that they are designed to remove groundwater that may seep into the plant. These consist of three sumps at below-grade elevations: (1) the borated water storage tank tunnel sump, located beneath the BWST; (2) the heat exchanger vault sump; and (3) the tendon access gallery sump. If any radioactive leakage should get into

¹⁶² The Unit 1 BWST includes a sump to collect and transfer for processing any liquid resulting from piping leakage or other water infiltration. Riethle and Fuhrer, ff. Tr. 16,417, at 4. This design feature is not included in the Unit 2 BWST. It would minimize leakage from the Unit 1 BWST to the groundwater. *See also* Tr. 16,283 (Stoddart); and the remainder of this Section.

these sumps, as in the case of a leak from the BWST, the radioactivity would be detected by the monitor and the discharge would be automatically diverted to a liquid radwaste management system for treatment. Stoddart (Groundwater), ff. Tr. 16,269, at 2-5; Riethle and Fuhrer, ff. Tr. 16,417, at 3-4.¹⁶³

1323. The Unit 1 BWST is the only significant source of radioactivity in tankage at Unit 1 that is outside a permanent structure. It is a stainless steel tank constructed on a concrete slab and designed as a Seismic Class 1 tank. The BWST level is monitored and alarmed; radiation surveys are routinely conducted around the BWST. Periodic samples are taken of the BWST fluid and are analyzed for gross activity and boron concentration. Unit 1 Technical Specifications limit the radioactive content of the BWST such that a spill to the groundwater would not cause, under worst conditions, a concentration in excess of 10 CFR Part 20 limits at the nearest potential point of water consumption. Riethle and Fuhrer, ff. Tr. 16,417, at 3-4; Stoddard, ff. Tr. 16,269, at 4-5. There have been no significant leaks from the Unit 1 BWST in the past. Tr. 16,431 (Fuhrer). The only piping external to the permanent structures which contain significant radioactivity is that running in a tunnel from the BWST to the Unit 1 Auxiliary Building. This tunnel contains a sump to collect and transfer to processing any liquid collected from water filtration or from piping leakage. Riethle and Fuhrer, ff. Tr. 16,417, at 4. We find it unlikely that liquids will leak from the Unit 1 BWST in quantities sufficient to adversely affect the groundwater at TMI.

1324. Board Question 9e addressed whether mitigative measures are available should groundwater contamination occur. Were a leak to occur from the BWST, or other form of localized spill, Licensee would conduct a radiological survey of the affected area. Soil would be removed so that the activity of the remaining soil would not exceed on average 10 percent of the maximum permissible concentrations set forth in 10 CFR Part 20,

¹⁶³ Current guidance to ensure against radioactive contamination of the groundwater is contained in Regulatory Guide 1.143, Design Guidance for Radioactive Waste Management Systems, Structures and Components Installed in Light-Water-Cooled Nuclear Power Plants (Rev. 1, October 1979). Even though TMI-1 was designed well prior to the issuance of Regulatory Guide 1.143, and the NRC Staff has not required the backfitting of this Regulatory Guide to operating reactors, the NRC Staff reviewed the Unit 1 design against Regulatory Guide 1.143. The TMI-1 design meets Regulatory Guide 1.143 in most respects and in some areas the Unit 1 radioactive liquid waste management system design exceeds current guidelines. The primary area where Unit 1 does not meet Regulatory Guide 1.143 is with respect to guidance that tanks be surrounded by elevated thresholds or curbs. The NRC Staff has reviewed this matter and in view of other design features at Unit 1 does not consider the absence of curbs or thresholds to be a significant deficiency. Stoddart, ff. Tr. 16,269, at 3-5. The Board concurs in this assessment.

Appendix B. Riethle and Fuhrer, ff. Tr. 16,417, at 4. These measures could be implemented quickly and are likely to prevent substantial contamination of the groundwater.

1325. Should measures beyond the localized removal of contaminated soil be necessary, Licensee would institute a groundwater monitoring program like that now in place around Unit 2, described above. Similarly, analyses to identify potential sources of contamination and programs to monitor and reduce leakage would be implemented. Riethle and Fuhrer, ff. Tr. 16,417, at 5. Were the situation to degrade to the point where remedial measures become necessary, Licensee would have various options, including (a) pumping water for subsequent collection and treatment from the well(s) where contaminated samples were measured; (b) pumping water from new wells drilled to intercept the flow of contaminated groundwater or from the upstream side of a grout curtain installed to contain the contaminated groundwater; or (c) recharge which is the pumping of uncontaminated water into the underground aquifer system in order to dilute the concentration of contaminants. Riethle and Fuhrer, ff. Tr. 16,417, at 13; Tr. 16,425-27 (Riethle); Johnson, ff. Tr. 16,267, at 6-7. Given the substantial time available within which to take such remedial actions, the Board finds that, in the unlikely event of an accident at TMI-1 resulting in substantial contamination of the groundwater, adequate remedial means exist to prevent the spread of such contamination and to protect the public health and safety.

C. Conditions Relating to Separation Issues

1326. Based on the foregoing considerations, the Board requires the following conditions for the Licensee, in addition to those conditions set forth in Section II.T.2:

- (a) During any Unit 2 fuel movements Licensee will suspend work in the Unit 1 area of the fuel handling building and whenever Unit 1 fuel movements are in progress the engineered safety feature filtration system for Unit 1 will be in operation.
- (b) Prior to restart the Licensee shall submit to the Staff a program designed to test the adequacy of its phase 1 ventilation separation program such that the Staff can include in its certification to the Commission that a satisfactory test program has been implemented.
- (c) Unit 1 solid waste handling capabilities shall not be relied upon for decontamination or restoration of Unit 2.

- (d) Measures currently in place to monitor radioactivity in ground-water to facilitate identification and elimination of any TMI-generated sources of contamination shall continue until the Staff determines that they are no longer required (i.e., discontinuance of monitoring shall not be by unilateral decision of the Licensee.)

1327. The NRC Staff is directed to include the foregoing conditions in its report on the plan of implementation of the Board's orders as we discuss more thoroughly under Part II, *supra*.

D. Conclusions of Law on Separation Issues

1328. In accordance with the Commission's August 9, 1979 Order and Notice of Hearing, and based on the evidence of record in this proceeding and the foregoing findings of fact related to separation of Units 1 and 2, the Board concludes that short-term action items 4 and 5 recommended by the Director of Nuclear Reactor Regulation related to separation of Units 1 and 2 are necessary and should be required before resumption of operations should be permitted. They, along with the conditions we have imposed, are sufficient to provide reasonable assurance that TMI-1 can be operated without endangering the health and safety of the public.

IV. EMERGENCY PLANNING

A. Introduction

1. Preliminary Statement

1330. The evidentiary record in this proceeding on emergency planning is extensive. It consists of approximately seven thousand transcript pages, over a thousand pages of written direct testimony, and many thousands of pages of exhibits (including Licensee and state and local emergency plans and Staff and FEMA evaluations). The Staff included a listing of testimony and exhibits on emergency planning in its proposed findings (¶¶ 2-11), which we update and attach as an appendix to our decision for the convenience of isolating emergency planning evidence from the overall appendices attached to our Partial Initial Decision of August 27, 1981.

1331. We have opened with a reference to the quantity of evidence not as an indication of the quality of the record. Rather, before embarking on the necessarily lengthy findings given such a record, we wish preliminarily to record our view that the parties, in exercising their legal right to litigate so many detailed aspects of emergency planning, in many instances unnecessarily extended the record with little or no benefit to resolving the

many important material issues. There were over 100 contentions on emergency planning, many of which overlapped. They were never properly organized, simplified, or modified as further information became available.

1332. In making these observations, we do not ascribe all of the blame to the intervenors, as Licensee's proposed findings (§§ 6-7) would do. There were significant schedule problems. Major revisions to Licensee and state and local emergency plans were made before and after emergency planning contentions were required to be filed in September 1980. Indeed changes, which were necessary given the time frame and the nature of the issue of emergency planning, continued throughout the hearing and posthearing period. Although the Board required parties to pursue simplification, organization and reevaluation of the contentions, primarily in the period of September through February 1980, this was never accomplished to the extent it should have been. In large part, this was because the parties and the Board were then very busy — first with many prehearing matters and then very quickly the hearing, which had convened on other issues on October 15, 1980. The hearing ran almost continuously between then and the beginning of the evidentiary presentations on emergency planning on March 3, 1981. We do not know the extent to which the negotiations which we required bogged down because the Staff, Licensee and the Commonwealth of Pennsylvania were not ready to inform intervenors of their final position on some matters, but given the later revisions to emergency plans, particularly off-site plans, we suspect this was part of the problem.

1333. The Board, and perhaps in retrospect even all of the parties, believe that traditional adjudication has to be implemented with greater flexibility to deal with the amount and detail of emergency planning concerns as were expressed in this hearing. *See, e.g.*, our Memorandum and Order on Revised Emergency Planning Contentions, November 12, 1980, at 16-20. With the benefit of hindsight, and given the failure of the prehearing process to provide a better structure of prioritizing the emergency planning issues which truly needed to be litigated, the Board could have delayed the commencement of the evidentiary hearing on these issues for a few weeks to permit time after the filing of the written testimony for the parties to meet and discuss the testimony, reassess and reorganize the issues, and provide stipulations of fact on issues remaining for litigation. This would have served to focus cross-examination on those aspects of important issues where material disagreements remained. Such a delay at that time might have later saved as much if not more hearing and post-hearing time. Among other things, such an approach would have provided the Commonwealth of Pennsylvania with the opportunity it de-

sired to have information, including information with which it had no disagreement, brought out for the purpose of having it in the record, without the need for oral questions and answers.

1334. In preparing the emergency planning findings, we follow the organization of the Staff's proposed findings most closely. The organization of the proposed findings of the Licensee and the Combined Intervenors (prepared by the Anti-Nuclear Group Representing York (ANGRY) and Newberry Township TMI Steering Committee), and to a lesser extent the Commonwealth of Pennsylvania, are very similar due to the fact that the parties at our request agreed to a common organization to the extent possible. Findings limited to the emergency planning issues of concern to them were filed by the Aamodt family. Extremely limited findings consisting of a few pages were filed by the Environmental Coalition on Nuclear Power (ECNP).

1335. The contentions and the Board questions dealing with off-site radiation monitoring are discussed in the context of the categories listed in the table of contents. There are issues which cut across more than one category. We attempt to cut down somewhat on repetition by emphasizing those aspects of the issues important to the category being discussed. Accordingly, it is difficult for the full picture to emerge on a particular issue, without an overly simplistic summary which could therefore be misleading, until all subject categories dealing with that issue are read. The admitted contentions include nearly all aspects of emergency planning and response.¹⁶⁴ Specific contentions are directed to the Licensee's planning and response capabilities. Most of the contentions are directed to specific details of emergency planning and response of the Commonwealth and certain counties and municipalities within those counties.

1336. In the next subsection we discuss certain procedural aspects of the Commission's new emergency planning rules, including the effect of the "rebuttable presumption" provision for FEMA's findings and determinations. Near the end of the decision, after making all of the findings on the many emergency planning issues in controversy or raised by the Board, we present in Section K a brief cross-reference and summary of our findings in the context of the Commission's order items.

2. Procedural Aspects of the New Emergency Planning Rules

1337. Approximately one year after the issuance of the Commission's Order and Notice of Hearing in this proceeding (10 NRC 141, August 9,

¹⁶⁴ At the request of the Board, the Licensee renumbered the many emergency planning contentions into one unified system beginning with the designation "EP". This numbering system was used in the hearing and is also used in this decision.

1979), the Commission published a new final rule on emergency planning (45 Fed. Reg. 55402, August 19, 1980), which became effective on November 3, 1980. The new rule substantially modified, expanded and upgraded the NRC's emergency planning regulations, requiring the submission of revised emergency plans complying with upgraded requirements and standards and extending emergency planning considerations to "Emergency Planning Zones". Under the new emergency planning rules, licensees authorized to possess and/or operate a nuclear power reactor are to follow and maintain in effect emergency plans which meet the 16 planning standards set forth in 10 CFR 50.47(b) and the requirements of 10 CFR Part 50, Appendix E. 10 CFR 50.54(q).

1338. Also under the new rules the revised licensee, state and local emergency plans were to be implemented by April 1, 1981, after which the NRC is to determine whether the state of emergency preparedness provides reasonable assurance that appropriate protective measures can and will be taken in the event of a radiological emergency. 10 CFR 50.54(s)(2). The NRC will base its findings in this regard on a review of the Federal Emergency Management Agency's (FEMA) "findings and determinations" as to whether state and local emergency plans are adequate and capable of being implemented and on the NRC's assessment as to whether the licensee's emergency plans are adequate and capable of being implemented. 10 CFR 50.54(s)(3).

1339. We have previously addressed the effect of the new emergency planning regulations on this proceeding. Memorandum and Order on Effect of New Emergency Planning Regulations, March 23, 1981. As noted in that order, earlier in this proceeding there was reason for controversy among the parties over whether the implementation dates for TMI-1 for substantive requirements of the new rule should be those applicable to new operating licenses or those applicable to plants for which operating licenses had been issued. The passage of time has rendered this largely moot with respect to substantive matters since all implementation dates in the rule for both categories of reactors have passed.¹⁶⁵

1340. A possible distinction in implementation dates raised by the Board on the record and in our order of March 23, 1981 relates to one of the provisions of 10 CFR 50.54(s)(2) (applicable by its term to "operating

¹⁶⁵ The July 1, 1981 date for implementing the mandate of 10 CFR Part 50, Appendix E (Section IV.D.3) for the so-called "15-minute requirement" for notification and instruction of the public within the plume exposure pathway EPZ may be generically extended by the Commission to February 1, 1982. See Notice of Proposed Rulemaking, 46 Fed. Reg. 46587 (September 21, 1981). The original date and the extension are applicable both to newly issued operating licenses (by direct application of Appendix E) and to existing operating licenses

(CONTINUED)

reactors”), which differs from its generally similar counterpart of 10 CFR 50.47(c)(1), applicable to new operating licenses. Both provisions provide that, in determining whether deficiencies in emergency planning should lead to denial of an operating license (or a shutdown or other enforcement action), the Commission should take account of whether it has been demonstrated to the Commission’s satisfaction:

. . . that deficiencies in the plans are not significant for the plant in question, [or] that adequate interim compensating actions have been or will be taken promptly, or that there are other compelling reasons to permit plant operation.

1341. In our emergency planning order of March 23, 1981, at 4, we forewarned that if any party seeks to rely on the flexibility provided by the above provision of Sections 50.47(c)(1) and 50.54(s)(2), the record before us must provide the basis to support any finding that a given deficiency merits the embrace of the waiver guidelines of this rule. The difference between the two sections arises in that Section 50.54(s)(2), applicable to “operating reactors”, also provides for a four month grace period for the correction of deficiencies commencing from the time of a finding by “the NRC” of deficiencies. It appears that this grace period would be permitted to expire before the weighing and balancing waiver test of the provision quoted above becomes applicable. In other words, the regulation appears to contemplate a four month grace period for “operating reactors” without regard to the seriousness or number of deficiencies in emergency planning. We do not know if the Commission intended this provision to be applicable to TMI-1, or to any plant in the posture of TMI-1. We discussed such doubts in our order of March 23, 1981, at 2-3, in the narrow context of

(as stated in 10 CFR 50.54(s)(2)). In this proceeding, however, the Licensee has committed to assure that this requirement is met prior to restart, primarily through a newly augmented siren alert system. The alerting system, and the follow-up instructions to the public, are discussed below mainly in Section E. We wish to point out here that many of our emergency planning findings explicitly and implicitly depend upon the proposed prompt alerting system being in place and tested prior to restart.

reading the language of the regulation. We note here that it is uncertain as to when such a time period has commenced or will commence in the context of this case.

1342. It is our belief that the restart of TMI-1 should not be permitted until the correction of certain deficiencies which we have identified in our findings below. Where we found deficiencies not to be so significant as to require correction before restart, based upon our findings on the evidentiary record, we did not require correction before restart. The Commission, of course, may disagree with us. We believe for TMI-1 this should be done on the basis of a review of the substance of the particular deficiency, and not on the procedural basis of a "grace period" which does not weigh the nature of the deficiency.

1343. As we also noted in our order of March 23, 1981, notwithstanding possible arguments to the contrary, we are not prepared to cloak the criteria of the joint NRC-FEMA report¹⁶⁶ referenced in the new emergency planning regulation with the legally binding mantle of a regulation. In our findings we have treated NUREG-0654 as guidance. In some cases, the report, admitted into evidence as Staff Ex. 7, assisted the Board's understanding of illustrative ways in which a requirement of the rule could be met. It should be further noted that there were many instances in which the parties centered their litigative efforts around the guidance criteria of NUREG-0654. This is not surprising since in many instances NUREG-0654 is the only source in the record of detailed examples of how the broader planning standards of the new emergency planning rule can be implemented. Accordingly, in instances where the parties' litigative efforts were directed to the contents of NUREG-0654, portions of our decision correspondingly discuss the guidance criteria of NUREG-0654. Where we cite the guidance with approval, it is because we agree with it. However, as we informed the parties in our order, we were not precluding them from attempting to show that compliance with NUREG-0654 is either not necessary or not sufficient. Similarly, we felt free to make these determinations, where required, on the basis of the record.

FEMA's Findings and Determinations

1344. Pursuant to a presidential order of December 7, 1979, FEMA is to assume lead responsibility for all off-site nuclear emergency planning and response. Consistent with this, the NRC'S new emergency planning rules provide that the NRC's determination as to whether there is reasonable

¹⁶⁶ NUREG-0654/FEMA-REP-1, Rev. 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants (November 1980), hereafter NUREG-0654.

assurance that appropriate protective measures can and will be taken in the event of a radiological emergency is to be based, in part, on FEMA's "findings and determinations" as to whether state and local emergency plans are adequate and capable of being implemented.

1345. On June 24, 1980, FEMA published proposed rules (44 CFR Part 350) establishing the formal FEMA process for evaluation and approval of state and local emergency plans. 45 Fed. Reg. 42341 (1980). The process established under the proposed rules requires a number of steps initiated by a state which submits the final state-approved state and local emergency plans for FEMA review. From this review, FEMA issues final findings and determinations culminating in formal approval or disapproval of state and local plans. See 44 CFR 350.7-350.12, at 45 Fed. Reg. 42345-46 (1980).

1346. Apart from FEMA's review process under its proposed rules, interim FEMA findings and determinations on the adequacy of state and local emergency plans may be obtained for use in the NRC's licensing process under a "Memorandum of Understanding Between NRC and FEMA Relating to Radiological Emergency Planning and Preparedness" (MOU) entered on November 4, 1980. 45 Fed. Reg. 82713.¹⁶⁷ Board Ex. 12. Pursuant to this MOU, FEMA has provided interim findings and determinations to NRC for at least nine facilities, three of which were granted NRC operating licenses. Tr. 22,528 (Dickey). Also pursuant to this MOU, the NRC Staff requested that FEMA provide its findings and determinations on the adequacy of state and local emergency preparedness for TMI.

1347. Based on its review and evaluation of the latest revised versions of the Commonwealth's emergency plan and emergency plans of Cumberland, Dauphin, Lancaster, Lebanon and York counties which surround TMI, and on observations and evaluations of the performance of the state and four of the five counties in a radiological emergency response exercise held on June 2, 1981, FEMA produced its interim findings and determinations for TMI on June 16, 1981. (Staff Ex. 18, 20, and 21). Follow-up interim findings and determinations with respect to York County, based on the August 29, 1981 exercise, were provided after the hearing and were admitted into evidence as Staff Ex. 24.a and b, pursuant to stipulation of the parties.

¹⁶⁷The MOU provides that: "[n]otwithstanding the procedures which may be set forth in 44 CFR 350 for requesting and reaching a FEMA administrative approval of State and local plans, findings and determinations on the current status of emergency preparedness around particular sites may be requested by the NRC through the NRC/FEMA Steering Committee and provided by FEMA for use as needed in the NRC licensing process. These findings and determinations may be based upon plans currently available to FEMA or furnished to FEMA by the NRC." 45 Fed. Reg. 82714, §II.4.

1348. The language of the new emergency planning rules provides that the “. . . NRC will base its finding[s] on a review of the . . . FEMA findings and determinations as to whether State and local emergency plans are adequate and capable of being implemented . . .”. 10 CFR 50.54(s)(3), 50.47(a)(2). This makes such FEMA findings and determinations a mandatory prerequisite to determining compliance with the new rules, and as we have held, compliance with the new rules is required prior to restart. *See generally*, our Memorandum and Order of March 23, 1981, and particularly at 4 and 8.

1349. There has been a lively controversy over whether the FEMA findings in this proceeding should “. . . constitute a rebuttable presumption on a question of adequacy”, in the words of Section 50.47(a)(2). *See* the Staff's reply proposed findings ¶¶ 1-4, the Licensee's proposed finding ¶ 32 and reply proposed finding ¶ 15, Combined Intervenors' proposed findings ¶¶ 26-29, 35, 40-45, and the Commonwealth's proposed findings ¶¶ 10-12, and reply finding ¶ 1.

1350. As we noted in our order of March 23, 1981, only Section 50.47(a)(2), applicable on its face to new operating licenses, contains the rebuttable presumption standard. The counterpart section of the new rule applicable to reactors with existing operating licenses as quoted above also requires the NRC to base its findings on the FEMA findings and determinations but does not refer to either licensing proceedings or a rebuttable presumption. Section 50.54(s)(3). We believed this anomaly was a mistake in the rule. The Staff (reply finding ¶ 2) and the Commonwealth (proposed finding ¶ 12) agree.

1351. The parties noted that subsection (2) of 50.47(a) states that the rebuttable presumption will apply “[i]n any NRC licensing proceeding”, and the Staff further notes that the Statement of Consideration does not distinguish between hearings on existing operating licenses and new operating licenses with respect to applicability of the rebuttable presumption. The fact remains, however, that the “in any NRC licensing proceeding” language of subsection (2) is part of Section 50.47(a). That section applies only to new operating licenses. Where the regulation applicable to existing operating seeks to apply some of the provisions of Section 50.47 to existing operating licenses, it does so by express reference. *See* Section 50.54(q). Section 50.47(a) is not included in this incorporation by reference. Below we discuss why there is no practical effect of a rebuttable presumption in this proceeding. However, if it made a real difference, we would not on our own be empowered to extend the express applicability of the rebuttable presumption beyond that found in the Commission's regulations, even if we are correct in our belief that the omission of that standard from Section 50.54(s)(3) is inadvertent.

1352. We do not rely on the argument of the Combined Intervenors that only "final" FEMA findings pursuant to its yet-to-be-promulgated regulation may constitute a rebuttable presumption. This would lead to the absurd result that the NRC, including this Board, could not make its emergency planning findings as required on the basis of FEMA findings and determinations unless and until FEMA's proposed rules are made effective. We are satisfied that there would be no substantive addition to the extensive FEMA testimony in this proceeding if the FEMA rule had been in effect. We make this statement on the basis of our own review, contained in detail in the following sections of this decision.

1353. Nowhere in our findings do we depend upon a rebuttable presumption for FEMA's findings. This would be true whether or not the rebuttable presumption language of Section 50.47(a)(2) was deemed applicable to this proceeding. This is because the Commonwealth is correct that, under Rule 301 of the Federal Rules of Evidence, 28 U.S.C., P.L. 93-595 (1975), a presumption only . . . imposes on the party against whom it is directed the burden of going forward with evidence to rebut or meet the presumption." The ultimate burden of proof (persuasion) is not shifted.

1354. In the absence of any particular definition or explanation of the rebuttable presumption standard in the Commission's Statement of Consideration or the rule itself, we may rely on the Federal Rules for Evidence and we do so here. If anything, any arguable distinction between our proceedings and a federal court civil suit would militate against according any stronger effect to a rebuttable presumption than that accorded by Rule 301. *Cf. Consumers Power Company* (Midland, Units 1 and 2), ALAB-379, 5 NRC 565, 567, (1977). Boards are not simply umpires between litigants but should apply their own expertise. Where necessary on important issues, Boards should make their own inquiries of witnesses.

1355. The legislative history of Rule 301 is presented largely in the inapplicable context of motions to dismiss at the end of a case-in-chief or the entire case, and what evidence may go to the jury under what instructions. *See* House Report No. 93-650 (Judiciary Committee), Senate Report No. 93-1277 (Judiciary Committee), and House Report No. 93-1597 (Conference Committee), excerpted at Rule 301, 28 U.S.C.A.; also *reprinted in* [1974] 93 U.S. Code Cong. & Ad. News, 7080-81, 7055-56, and 7099, respectively. However, it is clear from the legislative history that the Senate version of Rule 301, which was the one enacted, accorded the weakest status (when compared to the Supreme Court or House proposals) to a presumption upon the introduction of evidence contradicting the presumed fact. The following excerpts from the Congressional Committee Reports cited above are instructive:

Rule 301 as submitted by the Supreme Court provided that in all cases a presumption imposes on the party against whom it is directed the burden of proving that the nonexistence of the presumed fact is more probable than its existence.

.....

With respect to the weight to be given a presumption in a civil case, the Committee agreed with the judgement implicit in the Court's version that the so-called "bursting bubble" theory of presumptions whereby a presumption vanishes upon the appearance of any contradicting evidence by the other party, gives to presumptions too slight an effect. On the other hand, the Committee believed that the Rule proposed by the Court, whereby a presumption permanently alters the burden of persuasion, no matter how much contradicting evidence is introduced - a view shared by only a few courts - lends too great a force to presumptions. Accordingly, the Committee amended the Rule to adopt an intermediate position under which a presumption does not vanish upon the introduction of contradicting evidence, and does not change the burden of persuasion; instead it is merely deemed sufficient evidence of the fact presumed, to be considered by the jury or other finder of fact.

House Report No. 93-650

1356. The Senate Report labeled the House version described above as "ill-advised". In the Senate Judiciary Committee's view the House version had the effect of treating a presumption as evidence, rather than meeting the desire of the Senate version of regarding a presumption merely as a way of dealing with evidence.

1357. In adopting the Senate version, which was the one enacted as Rule 301, the Conference Report explains that under the enacted Senate version:

If the adverse party offers no evidence contradicting the presumed fact, the court will instruct the jury that if it finds the basic facts, it may presume the existence of the presumed fact. If the adverse party does offer evidence contradicting the presumed fact, the court cannot instruct the jury that it may *presume* the existence of the presumed fact from proof of the basic facts. The court may, however, instruct the jury that it may infer the existence of the presumed fact from proof of the basic facts. [emphasis in original]

1358. Thus it appears that a Rule 301 presumption dissolves in the face of contradictory evidence, provided of course that such evidence meets the always applicable tests that it is reliable. It is noteworthy that neither the Staff nor Licensee has responded in its reply findings to the Commonwealth's important findings on the standard of Rule 301 with which we agree. They are in default on this legal issue.

1359. In this proceeding important aspects of emergency planning were explored on the record and much evidence was adduced by cross-examination as well as by direct evidence. In this posture, the Board applied no presumptive weight to the FEMA findings and determinations beyond that weight to which any testimony would be entitled by virtue of the expertise of the witnesses and the bases presented for their views. Since we had the benefit of extensive FEMA factual testimony explaining the bases for FEMA's findings, and the benefit of a heavily contested litigation on those findings, the Board is in the position of deciding the issues without any remaining presumptive effect. Of course, in any instances where FEMA's findings are uncontradicted, by either evidence of non-FEMA witnesses or the examination of the FEMA witnesses by the Board and the parties, we would accept the FEMA testimony on such points. Perhaps this is all that the "rebuttable presumption" of Section 50.47(a)(2) contemplated in light of Rule 301. This would have real practical effect in a proceeding where many aspects of FEMA's findings were not contested. This is not such a proceeding.

1360. Further, in this proceeding the Commission's order in effect directs this Board by virtue of short-term order items 3a through e and long-term order items 4a and b, discussed in Section K of this decision, to consider virtually all important aspects of emergency planning. If the term "rebuttable presumption" in Section 50.47(a)(2) had hypothetically denoted a standard higher than that of Federal Rule 301, we would have had to determine with great care the extent to which the application of some greater presumptive weight would be inconsistent with the responsibilities imposed upon us by the Commission's order in this proceeding.

1361. We note also that the FEMA "interim findings and determinations" document consists of a memorandum of less than three pages. Staff Ex. 18. It serves as a convenient summary of FEMA's views. However, in the context of this proceeding it is entitled to no weight independent of the extensive FEMA testimony. Nothing in the oral testimony in support of Staff Ex. 18, presented primarily by the Acting Assistant Associate Director of the Population Preparedness Office of FEMA, Mr. John E. Dickey (Tr. 22,505, *et seq.*), discloses any supporting reasons for providing independent weight to Staff Ex. 18. We do not denigrate Mr. Dickey's important responsibilities for FEMA outside of this proceeding, and do not agree with the tone or all of the particulars of the

strong attack upon Mr. Dickey's testimony by the Combined Intervenors' proposed findings ¶¶ 46-60. However, we agree with the thrust of the Combined Intervenors' findings and accord Staff Ex. 18 FEMA witnesses. In particular it is this Board's responsibilities to make the judgment whether the overall capability of emergency planning is adequate to permit restart, and we do so based on the record as analysed below in this decision.¹⁶⁸

3. Contentions on Standards

1362. Two contentions raised by Intervenor ANGRY (Contentions EP-3(A) and EP-3(B)) challenge the conditions for restart set forth in the Commission's August 9, 1979 Order on the grounds that there are no standards for judging the adequacy of emergency plans. Specifically, it is asserted that:

ANGRY Contention EP-3:

The conditions set forth in NRC's August 9 Order (44 F.R. 47821-25) for TMI-1's resumption of operation are insufficient to provide reasonable assurance that such resumption can occur without endangering the public health and safety for the reason that they fail to require the development and effectuation of adequate and effective Radiological Emergency Response Plans to protect the population surrounding TMI-1 from the consequences of any future nuclear accident. Such insufficiency is in particular demonstrated by the following flaws:

¹⁶⁸ In discussing the concept of the rebuttable presumption we broadly were considering, for the sake of the above discussion, the totality of FEMA's testimony which discloses FEMA's extensive work in reviewing and evaluating off-site emergency planning around TMI. This work was performed largely by FEMA's regional personnel either based at, or working in liaison with, FEMA's Philadelphia regional office. If read literally, Section 50.47(a)(2) would attach a rebuttable presumption to the FEMA "findings and determinations" which is only the 3-page memorandum presented by the senior FEMA headquarters official testifying before us, Mr. Dickey. If a rebuttable presumption cloaks FEMA's findings with a higher standard than that of Rule 301, and if Section 50.47(a)(2) should be applied literally only to the FEMA "findings" of Staff Ex. 18, without regard to the extensive underlying testimony of FEMA, the result would be absurd in this proceeding.

- 3(A) There is no requirement that restart be conditioned on the Radiological Emergency Response Plan of the Commonwealth of Pennsylvania being brought into compliance with reasonable standards of adequacy and effectiveness for such plans which include but are not limited to standards promulgated by the NRC itself (e.g., NUREGS 75/111 and 0396; GAO EMD-78-110; H.R. Rept. 96-413);
- 3(B) There is no requirement that restart be conditioned on the Radiological Emergency Response Plans of local governmental units (counties) surrounding the reactor site being brought into compliance with reasonable standards of adequacy and effectiveness for such plans which include but are not limited to standards promulgated by the NRC staff. (See Paragraph (A)).

1363. As discussed above, we have determined that the emergency preparedness and plans for TMI-1 must comply with the substantive standards and requirements of the new emergency planning regulations prior to restart. It is indeed required, as set forth in detail in this decision, that the emergency plans of the Commonwealth and the five "risk" counties (within the plume EPZ) comply with the "reasonable standards of adequacy and effectiveness" of the Commission's rule, as fleshed out by the extensive evidence, including the guidance of NUREG-0654.

B. Organization and Staffing of Emergency Response Organizations

1364. Emergency response (ER) organization and staffing at all levels from Licensee to the Federal Government was the subject of numerous contentions. Among the issues examined were those relating to response personnel — the number available, their qualifications and their potential reliability to perform their duties during a radiological emergency at TMI. We deal first with Licensee's emergency response organization, then with those of the state, counties, and municipalities, and next with concerns as to whether emergency workers will report for duty. Finally, we address the NRC Staff emergency response organization.

1. Licensee's Emergency Response Organization

1365. Two contentions challenged the adequacy of Licensee's emergency response organization:

ANGRY Contention EP-4(J):

The licensee's Onsite Emergency Organization staffing provisions as set forth in Table 8 of its EP fail to conform to the standards of N. 0654 Sec. B5 in the following respects:

1. Under said standards two control room operators are assigned the function of "plant operations and assessments of operational aspects". Another shift employee is given the *exclusive* task of providing communications liaison with off-site officials. Under the licensee's staffing provisions, by contrast, the two control room operators are assigned to "operate equipment in control room *and act as communicator*" (emphasis added). This divided responsibility compromises the licensee's ability to provide prompt off-site notification of emergency conditions. The inadequacy of these staffing provisions is aggravated by the absence of any provision for the addition of three more persons with communications responsibilities within 30 minutes, as required by the aforementioned acceptability standard.
2. A similar confusion of assignments exists with regard to the shift supervisor and shift foreman, who are expected to fill three roles between them.
3. Although N. 0654 requires the emergency operations facility director to assume his assignment within 30 minutes, under the licensee's plan this will not occur for as long as four hours.
4. Two radiological analysis support engineers, who are the only employees identified as having the training and *primary* responsibility for performing "dose projection calculations and source term calculations" (EP, p. 5-10) will not be available for as long as 60 minutes.

ANGRY Contention EP-4(D):

The licensee's "Onsite Emergency Organization" (Sec. 4.5.1.3) contains insufficient personnel and expertise in the area of Health Physics to discharge adequately the responsibilities of dose assessment and projection in the event of a rapidly developing accident sequence. The time required for the mobilization of offsite health physics support (2-4 hours - see Table 8), which is given responsibility for

"overall assessment of the impact of liquid and gaseous effluents with respect to . . . protective action guides" (p. 5-12), is inconsistent with adequate radiological assessment capability.

1366. For the most part, the concerns raised in ANGRY Contentions EP-4(J) and EP-4(D) are based either on a misunderstanding of Licensee's Emergency Plan or a misunderstanding of the current NRC Staff guidance with respect to emergency organization and staffing. In one case, EP-4(J)(3), the contention deals with a subject that was a source of disagreement between Licensee and the NRC Staff, and we resolve that disagreement below. Both Licensee and the Staff presented testimony on the issues raised by these contentions. See Rogan, *et al.*, ff. Tr. 13,756, at 26-39; Chesnut, ff. Tr. 15,007, at 18-25; Donaldson, ff. Tr. 17,354, at 5-8; Chesnut, ff. Tr. 22,235, at 2-7; NRC Staff Ex. 17 (Chesnut Affidavit and Inspection Report). No other party to the proceeding presented testimony on this issue. Extensive proposed and reply findings were submitted by Licensee, Staff, and the Commonwealth. Intervenors did not propose findings on the issues raised in these contentions.

1367. The Board carefully considered the concerns expressed, the evidence presented, and the proposed findings submitted. In general, we find the arguments presented by the Staff and the Commonwealth to be more persuasive than those of the Licensee. Consequently, we rely heavily on Staff's and Commonwealth's proposed findings on these issues.

1368. The organization of Licensee's emergency response groups is described in Chapter 5 and Figures 9-14 of its Emergency Plan. Licensee Ex. 30. The Licensee's overall emergency response organization consists of both an on-site organization and an off-site emergency support organization. Rogan, *et al.*, ff. Tr. 13,756, Figures 1 and 2. With regard to the on-site organization, the shift supervisor is responsible for assessing an incident, determining necessary immediate actions and classifying the emergency. Upon declaration of an emergency, the shift supervisor becomes the Emergency Director who has the authority to immediately and unilaterally initiate emergency actions and make protective action recommendations. If the shift supervisor is unavailable or incapacitated, the shift foreman serves as Emergency Director. Rogan, *et al.*, ff. Tr. 13,756, at 17, 26-27. The Licensee's onshift complement consists of 20 personnel (Rogan, *et al.*, ff. Tr. 13,756, Table 2; Tr. 14,591 (Giangi); Tr. 14,433-34 (Chesnut)) with major functional responsibilities vested in the Emergency Director, the Operations Coordinator, the Operations Support Center Coordinator, the Radiological Assessment Coordinator, the Technical Support Center Coordinator, and the Security Coordinator. Rogan, *et al.*, ff. Tr. 13,756, at 26. The onshift staffing exceeds the staffing guidelines set forth in NUREG-0654 (Staff Ex. 7), Table B-1 (Chesnut, ff. Tr. 15,007, at 19-20) and

assures that adequate staffing in the key areas for initial on-site response will be maintained at all times. Staff Ex. 6, at 5; Tr. 22,258 (Chesnut); Tr. 22,291-92 (Chesnut); Tr. 15,518 (Grimes); Tr. 16,058 (Chesnut).

1369. Within one hour of declaration of an emergency, the shift supervisor or shift foreman is relieved as Emergency Director by the Vice President TMI-1, the Licensee's Director of Operations and Maintenance or the Radiological Controls Manager. Tr. 13,882 (Giangi). The Licensee has also developed a three section duty roster, with one section always on call to assure that all positions in the emergency organization are fully staffed with personnel assigned based on the selection criteria set forth in the Licensee's Emergency Plan, training, and driving distance from TMI. Rogan, *et al.*, Tr. 13,756, at 30-31, 37; Tr. 15,438 (Chesnut). The duty roster personnel are on call and, in an emergency, would be called up to report to the site within one hour in order to relieve and augment Licensee's onshift complement. Tr. 14,270-72 (Giangi); Tr. 14,323 (Rogan).

1370. The off-site emergency support organization includes the Emergency Support Director, Emergency Support Staff, Public Affairs Representative, Emergency Planning Representative, Group Leader Administrative Support, Environmental Assessment Coordinator, Group Leader Radiological Controls Support, Group Leader Chemistry Support, Group Leader Technical Support, Maintenance and Construction Manager, and Emergency Support Communicator. This off-site emergency support organization provides technical and logistics support in the event of a serious or potentially serious emergency. Rogan, *et al.*, ff. Tr. 13,756, at 33. This organization, when called up, can be fully manned and functional within six hours of declaration of an emergency (*Id.*, at 32; Tr. 14,348 (Giangi)), although Licensee has committed to have certain components of the organization arrive earlier and to activate certain off-site emergency response facilities within four hours. Licensee Ex. 58. As discussed below, the Staff and the Commonwealth of Pennsylvania believe the Emergency Operations Facility (EOF) should be fully operational within one hour.

1371. The NRC Staff has evaluated the Licensee's Emergency Response Organization as provided for in the Licensee's Emergency Plan and has determined that primary responsibilities for emergency response by the Licensee have been assigned and that the Licensee's principal response organization has the Staff to respond and augment response on a continuous basis, as specified in the planning standard for Assignment of Responsibility, 10 CFR 50.47(b)(1). Staff Ex. 6, at 2. With the exception of the failure of Licensee to man the EOF within one hour with its Emergency Support Director, there is no evidence to the contrary in this

regard. With this exception, which we discuss below, we find that the Licensee's emergency organization does, in fact, comply with this planning standard.

1372. In reference to subparagraph 1 of Contention EP-4(J), the assignment of two reactor operators equipment *and* act as communicators does not compromise the ability to provide prompt off-site notification. The Licensee's onshift complement far exceeds the guidelines of Table B-1 of NUREG-0654 which stipulates an onshift staffing of 10 personnel. Thus, the Licensee has extra personnel beyond the needed minimum staffing who may be assigned communications duties as needed. Chesnut, ff. Tr. 15,007, at 19-20. Two reactor operators may be assigned to operational duties and a third operator may be assigned to notification duties. Rogan, *et al.*, ff. Tr. 13,756, at 31 and Table 2. Under the Licensee's Emergency Plan provisions, the onshift staff will be augmented within one hour by a communicator and two communications assistants. Rogan, *et al.*, ff. Tr. 13,756, at 94. Through this provision, Licensee's augmentation of staffing exceeds the guidance set forth in NUREG-0654, Table B-1, specifying the addition of two communications personnel within one hour. Chesnut, ff. Tr. 15,007, at 21. The Licensee's plan does not explicitly comply with the recommendation that one person responsible for communications be available within 30 minutes. However, since the normal onshift manning at TMI-1 exceeds the number of personnel recommended on shift by Table B-1, Licensee's emergency plan does not provide additional personnel, continuously and immediately available, who could immediately undertake communications duties. *Id.*

1373. Part 2 of Contention EP-4(J) asserts that, in an emergency, the shift supervisor and shift forman are to assume three emergency response roles. While it was true under previous versions of the Licensee's Emergency Plan that these two personnel were to function as Emergency Director, Radiological Assessment Coordinator and Operations Coordinator until the on-site emergency organization was augmented within one hour by the duty section (Chesnut, ff. Tr. 15,007, at 22-23), this is not the case under the Licensee's revised Emergency Plan (Licensee Ex. 30). Tr. 22,336 (Donaldson). Rather, under current provisions of the Licensee's Emergency Plan, the onshift Health Physics Supervisor assumes the role of the Radiological Assessment Coordinator. Tr. 22,334-35 (Chesnut). Thus, the radiological assessment function is performed by the onshift Health Physics Supervisor who has four health physics technicians to assist him until the duty section personnel arrive within one hour. Tr. 22,338-39 (Donaldson). In view of this, three functions are not, in fact, assigned to only two personnel and ANGRY Contention EP-4(J)(2) has been satisfied.

1374. Subparagraph 3 of Contentions EP-4(J) alleges that Licensee's Emergency Support Director will not report to the near-site Emergency Operations Facility (EOF) within the time recommended by the NRC Staff in NUREG-0654. Although the contention incorrectly asserts that the suggested time is 30 minutes — when in fact NUREG-0654 recommends one hour (*see* Staff Ex. 7, at Table B-1 — the contention is correct since Licensee only commits to stationing its Emergency Support Director in the EOF within four hours after declaration of a Site Emergency. While ANGRY did not actually pursue this contention, either by presenting testimony or through cross-examination, there is an extensive record on the matter because the availability of the Emergency Support Director was an issue in dispute between Licensee and the NRC Staff in the emergency preparedness area. In sum, the Staff found Licensee's off-site emergency response organization deficient due to insufficient staffing of the off-site EOF during the early hours of an accident. This finding generated a controversy between the Licensee on one side and the Staff and the Commonwealth of Pennsylvania on the other. All three parties produced direct evidence on this issue. The positions of the parties are set forth in Licensee proposed findings ¶¶ 44-56, Staff proposed findings ¶¶ 35-43, and Commonwealth's proposed findings. ¶¶ 19-50.

1375. Thus, the Board must resolve this dispute. We begin by describing the importance of the EOF and the Emergency Support Director. We then set forth Licensee's commitments with respect to staffing the EOF and the reasons offered by the Licensee in support of its position. We then describe the NRC Staff and Commonwealth positions and the reasons offered in support of those positions.

1376. The importance of the EOF and the Emergency Support Director is well stated in Commonwealth proposed findings ¶¶ 21-24, on which we rely here. As pointed out by the Commonwealth, Licensee's own witnesses testified that the EOF is the "central point" for: (a) providing overall corporate management and direction in responding to an emergency, (b) coordinating administrative and logistical support, (c) interfacing with state and county representatives, and (d) establishing the basis for long-term recovery efforts. Rogan, *et al.*, ff. Tr. 13,756, at 21-22; *see also*, Licensee Ex. 30, at 7-3; Staff Ex. 8, at 16-24. The importance of the Emergency Support Director is set forth in Licensee's emergency plan:

The Emergency Support Director will be responsible for activating and directing the offsite emergency support organization and ensuring that the functional groups provide a coordinated response in support of the onsite emergency organization. The Emergency Support Director will serve as the senior management representative at or in the vicinity of the TMI site. As such, during emergency operations,

the Emergency Support Director will direct all emergency efforts and policies; the Emergency Director, however, will maintain responsibility for the operation and control of the plant. In the absence of the Emergency Support Director, the seniormost TMI-1 operations person will assume his responsibilities. As emergency situations tend to stabilize, the Emergency Support Director may relieve the Emergency Director of more and more accident management responsibilities. This will provide a controlled means of shifting to a recovery organization should that type of organizational arrangement be deemed necessary.

Lic. Ex. 30, Section 4.5.1.4.1, at 5-16 and 5-17.

1377. We now examine the applicable planning guidelines, as set forth in NUREG-0654 and the emergency planning rule. Two planning standards apply. First, planning standard 8 reads: "Adequate emergency facilities and equipment to support the emergency response are provided and maintained". 10 CFR 50.47(b)(8). As interpreted by NUREG-0654, there are two pertinent EOF requirements:

- (1) Each Licensee shall establish an Emergency Operations Facility from which evaluation and coordination of all licensee activities related to an emergency is to be carried out and from which the licensee shall provide information to Federal, State, and local authorities responding to radiological emergencies in accordance with NUREG-0696, Revision 1.
- (2) Each organization shall provide for *timely activation and staffing* of the facilities and centers described in the plan [emphasis added].

Staff Ex. 7, at 52. NUREG-0696, Revision 1, states in pertinent part:

The EOF shall be staffed to provide the overall management of licensee resources and the continuous evaluation and coordination of licensee activities during and after an accident. *Upon EOF activation, designated personnel shall report directly to the EOF to achieve full functional operation within one hour. A senior management person designated by the licensee shall be in charge of all licensee activities in the EOF.* The EOF staff will include personnel to manage the licensee onsite and offsite radiological monitoring, to perform radiological evaluations, and to interface with offsite officials. The EOF staff assignments shall be part of the licensee's emergency plan. The specific number and type of personnel assigned to the EOF may vary according to the emergency class. The staffing for each emergency class shall be fully detailed in the licensee's emergency plan. Operat-

ing procedures and staff training in the use of data systems and instrumentation shall contain guidance on the limitations of instrumentation including whether the information can be relied upon following serious accidents [emphasis added].

Staff Ex. 8, at 19.

1378. Second, planning standard 2 states:

On-shift facility licensee responsibilities for emergency response are unambiguously defined, *adequate staffing* to provide initial facility accident response in key functional areas is maintained *at all times*, *timely augmentation of response capabilities is available*, and *the interface among various onsite response activities and offsite support and response activities are specified*. [emphasis added].

10 CFR 50.47(b)(2). The guideline of Table B-1 of NUREG-0654 recommends that a senior manager serve as EOF Director within 60 minutes. Staff Ex. 7, at 37.

1379. Third, Appendix E to 10 CFR Part 50 requires that:

Adequate provisions shall be made and described for emergency facilities and equipment, including . . . 8. A licensee onsite technical support center and Licensee near-site emergency operations facility from which effective direction can be given and effective control can be exercised during an *emergency* [emphasis added].

1380. We bear in mind in our subsequent findings these roles of the EOF and of the Emergency Support Director.

1381. We next present Licensee's case, as set forth in its proposed findings. Currently, Licensee's EOF is the TMI Observation Center fronting on Highway 441, east of the TMI site. The EOF will house key technical groups of Licensee's off-site emergency support organization. The Pennsylvania Bureau of Radiation Protection (BRP) will send its nuclear engineer to this facility and the NRC will locate its senior site emergency team at this location. Rogan, *et al.*, ff. Tr. 13,756, at 56. Licensee will activate the EOF within one hour after declaration of a Site Emergency. This will be accomplished by making all EOF communication and data links operational within one hour and by staffing the EOF with at least six key personnel: representatives from the Emergency Support Staff, Emergency Preparedness Department, Environmental Command Center, Technical Functions Group, Communications Department, and a primary communicator. This commitment to staff the EOF with six people within one hour represents the bulk of the personnel Licensee intends to station at the

EOF. According to Table 8 and Figure 13 of Licensee's Emergency Plan, these six people will represent all functional areas stationed at the EOF except for two Chemistry Department personnel. Licensee Ex. 30.

1382. In addition, Licensee indicates its willingness to station its Emergency Support Director at the EOF within four hours after declaration of a Site Emergency. Under Licensee's proposed plan, during the three-hour span between activation of the EOF and arrival of the Emergency Support Director, the Emergency Director in the control room would retain decision-making authority and would function as the senior corporate management spokesman for Licensee. Licensee Ex. 58.

1383. Licensee argues (proposed finding ¶¶ 46) that its commitments generally comply with Staff guidance in this area. Licensee asserts that NUREG-0654 contains no evaluation criteria specifying when the EOF must be activated or how it should be staffed, but does acknowledge that NUREG-0654 recommends that the Emergency Support Director be stationed at the EOF within one hour. See also Staff Ex. 7, at Table B-1.¹⁶⁹

1384. Licensee (proposed finding ¶ 46) acknowledges that NUREG-0696 recommends that the EOF be activated within one hour after declaration of a Site Emergency but notes that it does not contain criteria relating to staffing. Staff Ex. 8, at 16-24. Licensee then points to the essential differences in the Staff's and Licensee's position, as voiced by Staff counsel, the *location* of the emergency support director, the EOF or the control room, and his *time of arrival*, one hour or four hours. Tr. 22,984 (Tourtellotte).

1385. In proposed finding ¶ 47, Licensee notes that, with respect to the time of arrival and location of the Emergency Support Director, all parties have identified the function of making protective action recommendations to the state as the crucial issue. Under Licensee's concept of operations this function would remain with the Emergency Director in the control room during the first four hours of an emergency, while the NRC Staff would prefer for this function to be transferred out of the control room to an off-site location within one hour. Licensee suggests consideration of two conflicting lessons learned from the TMI-2 accident, the first, that one should neither place too many people in the control room nor overburden control room personnel with too many functions, especially ones that could

¹⁶⁹ Licensee points out that NUREG-0654 includes what Licensee calls a confusing reference to NUREG-0696, Revision 1, and further that when NUREG-0654 was published in November 1980, NUREG-0696 had not yet been published. NUREG-0696 was sent to Licensee on March 5, 1981 (Staff Ex. 8) and Licensee notes that it is not clear how the Staff intended licensees to follow guidance not yet available. See also Staff Ex. 7, §§II.H.2 and II.H.4, at 52.

be performed as well from remote locations, and the second, that the accuracy of information available to people making protective action recommendations is very important, especially during the early hours of an accident when the likelihood for confusion is greatest. Thus, while the first lesson of the TMI-2 accident moves one towards placing the individual responsible for making protective action recommendations outside the control room, the second lesson pushes one towards stationing that individual in a location where misunderstandings about plant operations or radioactive releases are minimized. Tr. 23,091-96 (Rogan), Tr. 15,030-31, 22,987-88 (Zahler).

1386. The Staff has a different position. The Staff (proposed finding ¶ 39) acknowledge that Licensee has committed to modify its Emergency Plan to provide for the activation of the EOF within one hour of declaration of a site area emergency with a senior corporate manager arriving at the EOF and assuming responsibilities as the Emergency Support Director within four hours of declaration of a site area emergency. Licensee Ex. 58, at 2. According to the Staff, under NUREG-0654 (Staff Ex. 7) radiological assessment is to be performed and protective action recommendations are to be made by a senior manager acting as the EOF Director (Emergency Support Director under Licensee's nomenclature) who should be available within one hour rather than four. Chesnut, ff. Tr. 15,007, at 23-24. Thus, Licensee's EOF manning is, in the Staff's view, contrary to criteria in both NUREG-0654 and NUREG-0696, Functional Criteria for Emergency Response Facilities. Staff Ex. 23, at 11-14; Tr. 23,070-71 (Chesnut).

1387. The Staff (proposed finding ¶ 40) notes Licensee's argument that, in fact, the radiological assessment and protective action recommendations functions that the Staff wants transferred to an Emergency Support Director at the EOF within one hour are fully and adequately performed by the Emergency Director in the control room until the Emergency Support Director assumes those functions some four hours after declaration of a site area emergency. Tr. 13,763-65 (Giangi). The Staff acknowledges that the Licensee does indeed provide for the radiological assessment function under its Emergency Plan (Chesnut, ff. Tr. 15,007, at 24) but argues that it is important to transfer the radiological assessment and protective action recommendation function to a senior Licensee manager in the EOF early in the course of an incident so as to relieve the inplant Emergency Director of that responsibility and allow him to concentrate on plant operational matters and mitigation of the accident. Tr. 15,026, 15,521 (Grimes); Tr. 22,945-46, 22,971 (Chesnut). In the Staff's view, it is necessary to avoid performing too many functions in the control room (Tr. 15,035-36 (Grimes)) which can tend to complicate the response in the control room (Tr. 22,934 (Chesnut)).

1388. The Staff summarized Commonwealth's position in Staff proposed finding ¶ 41. Although the Commonwealth initially perceived no problems with the Licensee's provisions for activating and manning the EOF (Tr. 18,239 (Reilly)), it now believes that the EOF should be functional with the Emergency Support Director assuming responsibility for providing protective action recommendations within one hour. Tr. 23,013-15, 23,053-55 (Dornsife). The basis for the Commonwealth's change of position is that it now intends to send its nuclear engineer to the EOF as early as possible for face-to-face contact with the Emergency Support Director. Tr. 23,016 (Dornsife). Based on drills and exercises, it is the Commonwealth's view that such face-to-face contact is very important to the state's understanding of the protective action recommendations being made by the Licensee. *Id.*; Tr. 23,053-55 (Dornsife). Licensee acknowledges that such face-to-face contact would minimize problems involving the communication of protective action recommendations to the state but believes there are other solutions to such communications problems (Tr. 23,089 (Rogan)) although Licensee has not defined those solutions or sought to undertake them.

1389. The Staff (proposed finding ¶ 42) further acknowledges that the Licensee has had to make some difficult decisions in that Licensee desires to have only what it considers to be the most qualified person available make the protective action recommendations. Tr. 23,096-97 (Rogan). Consequently, in the Licensee's view, to provide an Emergency Support Director with protective action recommendation authority in the EOF within one hour, Licensee will be forced to either transfer the Emergency Director, the most qualified individual available, from the control room to the EOF or provide an Emergency Support Director who is not the most qualified person available. Tr. 23,091-92, 23,096-97 (Rogan). At the same time, Licensee represents that there is no manpower resource limitation and that it does have the local corporate management who could serve as the Emergency Support Director in the time period espoused by the Staff and the Commonwealth. Tr. 22,986 (Zahler).

1390. In resolving this dispute we note at the outset that we find it difficult to interpret "during an emergency" (10 CFR Part 50, Appendix E) as precluding the first four hours of an emergency.

1391. The Board explained in the introduction to the emergency planning section of this decision that compliance with NUREG-0654 constitutes guidance as to possible compliance with the planning standards of the emergency planning rule. The controlling test is compliance with the two planning standards and the applicable portion of Appendix E. The burden of proof is clearly on Licensee to demonstrate on the basis of firm record evidence the workability and adequacy of its proposed compliance.

1392. We believe that NUREG-0654, NUREG-0696, Rev. 1, and the emergency planning rule, taken together, support a finding that the EOF should be fully staffed and operable within about one hour of declaration of a site emergency. We here agree with the Commonwealth's interpretation as expressed in Commonwealth reply proposed finding ¶ B.2., *i.e.*, the fact that Staff guidance documents do not contain detailed staffing *beyond* the requirement for a director does not eliminate the Staff's guidance of "full functional operation" with a senior management director of the EOF. Staff Ex. 7, Table B-1; Staff Ex. 8, at 19. In light of the Staff and Commonwealth having come forward with this evidence, including the guidance of NUREG-0654, and the fact that Licensee has the burden of proof, the Board finds that the Licensee has not demonstrated an alternative regarding the functions performed by the Emergency Support Director. While Licensee would have us find absence of the Director at the EOF is compensated for by Licensee's large off-site response organization (Licensee proposed finding ¶ 46), we are not reassured by this argument, and we agree with the Commonwealth that a large and complex off-site response organization argues *in favor* of the need for a single coordinator in the EOF.

1393. Licensee objected to Staff's separation of functions concept. As voiced by Licensee's counsel, such separation could result in having a less senior corporate official in the EOF than in the control room. Tr. 22,972-73 (Zahler). While the Board understands Licensee's concern, we also observe that Licensee's own testimony described the numerous TMI-1 management officials, down to the level of shift foremen, trained and qualified to make protective action recommendations. *E.g.*, Rogan, *et al.*, ff. Tr. 13,756, at 26-27; Licensee Ex. 30, at 5-6 to 5-7.

1394. Notwithstanding, Licensee has made two primary choices for Emergency Support Director — Robert Arnold and Philip Clark. Tr. 13,766 (Giangi); Licensee proposed finding ¶ 49. Upon questioning by the Board, Licensee's counsel and witness acknowledged that the selection of four hours as the time for fully staffing the EOF was based on the time required for Mr. Arnold or Mr. Clark to come to the TMI site from Parsippany, the Licensee's corporate headquarters. Tr. 23,081-82 (Little, Zahler, Rogan). As Licensee notes at proposed finding ¶ 49, as a practical matter, a requirement that the Emergency Support be at the EOF within one hour means that Licensee's top two choices might not be available to fill that position during the early hours of an emergency. Licensee stated that while the Staff appeared to find second-best acceptable (Tr. 22,968-70, Chesnut), Licensee did not. Tr. 23,046-50 and 23,074-75 (Rogan), 23,037-38 (Zahler).

1395. Licensee's preference is that protective action recommendations should be made by the most senior corporate official at the site, not by someone simply designated as the Emergency Support Director. Once Licensee's on-site emergency organization reports within one hour, the most senior corporate official at the site will be the Emergency Director in the control room (most probably Mr. Hukill or Mr. Toole). Licensee therefore believes these individuals should make protective action recommendations until properly relieved by Licensee's choices for the Emergency Support Director position. *Id.*

1396. After prolonged deliberation, accompanied by our initial reluctance to overrule the personnel management judgment of the Licensee, the Board finds that the Licensee must have available to it qualified individuals who could act as Emergency Support Director in the EOF in the interim (up to four hour) period prior to the arrival of the full Off-site Emergency Support Organization without the need to transfer the Emergency Director from the control room to the EOF. Further, we are troubled at the extent of the implied reliance of the Licensee during emergency conditions on persons located so far from the site. It raises the issue of whether Licensee perceives, contrary to its stated position, that it has on-site only one or two persons it can entrust with the responsibilities of the Emergency Director and the Emergency Support Director.

1397. Contention EP-4(J) and EP-4(D) address the adequacy of Licensee's staffing in the radiological controls and dose projection areas. This was an area of particular concern to the Board and apparently in response to this concern the Staff expedited its inspections so that it could report the results to us and to the parties.

1398. Testimony and proposed and reply findings on these contentions were presented by Licensee and Staff. No direct testimony or findings on these contentions were provided by intervenors. We rely on Staff proposed findings ¶¶ 44-48 and Licensee proposed findings ¶¶ 57-61 for our resolution of these issues.

1399. Contention EP-4(J)(4) asserts that the only personnel identified in the Licensee's Emergency Plan as having primary responsibility for performing dose projection and source term calculations will not be available for as long as 60 minutes. Contrary to this assertion, the Licensee's Emergency Plan provides that off-site dose assessment is to be performed initially by the onshift Health Physics Supervisor (radiological controls foreman) assisted by onshift health physics technicians. Tr. 22,334-35 (Chesnut); Tr. 22,338 (Donaldson); Rogan, *et al.*, ff. Tr. 13,756, at 32. These personnel are immediately available on shift and are qualified to do dose projection and source term calculations. Chesnut, ff. Tr. 15,007, at 24-25. This staffing exceeds the guidance of NUREG-0654, Table B-1, which specifies that one senior health physics person should be available

within 30 minutes to perform off-site dose assessment. *Id.* Licensee's provisions for augmenting its off-site dose assessment staffing by providing an additional Radiological Assessment Coordinator and radiological analysis support engineers within one hour meet the criteria of NUREG-0654. *Id.* The Board finds that the concerns expressed in ANGRY Contention EP-4(J)(4) have been satisfactorily resolved.

1400. Contention EP-4(D) makes essentially the same point as the previous contention, although it alleges that, in the absence of Licensee's off-site emergency support organization, the off-site staff has insufficient personnel and expertise to properly discharge its dose assessment responsibilities. Under the Licensee's on-site emergency organization, the persons responsible for dose assessment and projection are the Shift Supervisor, the Radiological Controls Foreman and three Radiological Controls Technicians, all of whom are onshift. Chesnut (Unresolved Matters), ff. Tr. 22,235, at 3. The Shift Supervisor will not perform dose assessment or projection calculations himself but will have overall responsibility for this function and will be provided specialized training in dose assessment and projection. *Id.*, at 5. Upon declaration of an emergency, the Radiological Controls Foreman will assume the role of the Radiological Assessment Coordinator who has primary responsibility for doing the dose assessment and projection calculations. *Id.*, at 3-4. For this purpose, he will be given specialized training in radiological and environmental assessment and dose projection techniques and procedures. *Id.* at 5-6. The Radiological Controls Technicians, who will assist the Radiological Controls Foreman on dose assessment and projection calculations (*Id.*, at 4), also receive specialized training in this area. *Id.*, at 5-6.

1401. Within 30 to 60 minutes of an emergency declaration, the onshift personnel described above will be relieved by a replacement Radiological Assessment Coordinator who will do dose assessment and projection and by two Radiological Analysis Support Engineers who will assist in the calculations. *Id.*, at 4. Each of these personnel will receive specialized training in radiological and environment assessment and dose projection techniques and procedures. *Id.*, at 5.

1402. The evidence indicates that the Licensee's Emergency Plan and Emergency Plan Implementing Procedures describe an adequate assignment of personnel trained in dose assessment and health physics to perform the dose assessment and projection required in an emergency and that this capability will be maintained by the ongoing training program of the Licensee. *Id.*, at 6-7. The Licensee's capability in this regard was confirmed in the June 2, 1981 exercise wherein the Licensee demonstrated an adequate capability to assess and project doses on-site and off-site based on inplant parameters and meteorology. *Id.*, at 7. The Board finds that the Licensee's Onsite Emergency Organization contains sufficient numbers of

personnel with adequate expertise in the area of health physics to adequately perform dose assessment and projection functions in an accident, including, in view of the Licensee's onshift staffing, a rapidly developing accident.

1403. The time required to mobilize off-site health physics support should not have an adverse impact on the Licensee's radiological assessment capability because the initial assessment is performed by onshift personnel based on installed effluent monitors and meteorological data. With the Licensee's technique, dose projection can be performed in minutes. Monitoring teams provide confirmatory readings. Both the initial dose projections and the confirmatory monitoring can be performed by the onshift organization with the off-site health physics personnel simply providing backup support. The uncontroverted evidence shows that the onshift organization is fully capable of performing the radiological assessment function for periods in excess of the time it will take to augment the onshift staffing. Donaldson, ff. Tr. 17,354, at 6-8. The Board finds that the concerns expressed in Contention EP-4(D) have been satisfactorily resolved.

1404. In this same area of health physics, the Licensing Board inquired as to the status of 30 significant findings on health physics emergency planning matters from a health physics appraisal conducted by the NRC's Office of Inspection and Enforcement on July 28 through August 8, 1980. The significant findings dealt with inadequacies in such matters as the assignment of individuals to functional areas of emergency activities and the emergency duty roster, emergency activity training, communications for environmental monitoring teams, audibility of the reactor building alarm, procedures for in-plant radiological surveys, procedures and equipment for monitoring and sampling radioactive effluents during emergencies and for environmental monitoring and contamination surveys and the like. Staff Ex. 4, App. B, at 25-28. Based on responses and commitments by the Licensee and a special inspection conducted on May 4-7, 1981, the Staff presented evidence demonstrating that 26 of 30 significant findings have been satisfactorily resolved. Staff Ex. 17, at 6 and Attachment. The four items are unresolved involved completion of one training cycle, completion of proposed modifications that, once implemented, will satisfactorily upgrade the reactor building alarm, installation of monitoring equipment for high range noble gas and radioiodine analyses, and the completion of procedures for collecting and analyzing absorbent media for radioiodine in gaseous effluents under conditions. Staff Ex. 17, at 6-7. The Office of Inspection and Enforcement will verify that one training cycle has been completed prior to restart. Tr. 22,319 (Donaldson). Upgrading of the reactor building alarm was scheduled for completion in July 1981. Staff Ex. 17, at 6. The Licensee has committed to install the high range

monitoring equipment prior to restart (Staff Ex. 17, Attachment, at 27; Tr. 22,270-71 (Donaldson, Chesnut)) and resolution of this matter, as well as the development of the required procedures, is progressing in accordance with the commitment of the Licensee. Tr. 22,321 (Donaldson). We find that these 30 significant findings on health physics emergency planning matters have been or will, prior to restart, be satisfactorily resolved.

2. Local Emergency Response Organizations

(a) Staffing of Local Emergency Coordinators

1405. Two contentions challenged the adequacy of back-up or substitute staffing for local (*i.e.*, municipal) emergency management coordinators in two counties within the plume exposure EPZ:

Newberry Contention EP-16(B):

Appendix 2 of Annex E of the Dauphin County Plan lists Dauphin County Local Emergency Preparedness Directors and Coordinators; however, those coordinators do not list any substitutes in the event of an emergency. If these individuals cannot be reached at the telephone numbers listed, it would lead to confusion within their particular areas of responsibility. Therefore, until and unless substitutes are listed as local emergency coordinators, it is Intervenor's position that the Plan is deficient.

Newberry Contention EP-14(LL):

The York County Plan contains a thin staffing of all emergency coordinators and does not list any substitutes in the event that an emergency coordinator is ill, on vacation or otherwise indisposed. Without substitutes or standby emergency coordinators, the Plan is defective.

1406. Testimony on these contentions was presented by FEMA witnesses Adler and Bath and by Messrs. Curry and Wertz, the emergency management coordinators for York and Dauphin Counties, respectively. Proposed and reply findings were submitted by Licence, Staff, and Combined Intervenors.

1407. The FEMA witness who testified on those two contentions initially had the view that the county plans should be modified to identify substitute emergency management coordinators at the local level. Adler and Bath (3/16/81), ff. Tr. 18,975, at 48-49. In general, the guidance of NUREG-0654 section II.A.1.d states that "[e]ach organization shall iden-

tify a special individual by title who shall be in charge of the emergency response". Staff Ex. 7, at 31. While this language indicates that the criterion could be satisfied by a single individual, we note that in fact, both the Dauphin (Board Ex. 6, at App. 1, Annex A, at A-2) and the York (Board Ex. 5, at 14) County Emergency Plans list substitute or deputy county emergency management coordinators. Tr. 19,445 (Bath). The addresses and home phone numbers for the substitute county coordinators are maintained and kept current at the county emergency operations centers. Board Ex. 6, at A-2; Board Ex. 5, at 24. Thus, at the county level, the concerns expressed in the two contentions have already been satisfied.

1408. Concerning coordinators at municipal levels or levels below the county level, prior to the latest revision of the county plans, FEMA had expressed concern about the need for back-up emergency management coordinators. Adler and Bath (3/16/81), ff. Tr. 18,975, at 49; Tr. 19,444-45 (Adler); Tr. 22,408 (Bath). The major concern was that the notification list in the county plans specified only one point of contact for municipalities. Tr. 19,445 (Bath).

1409. The revised plans include more back-up municipal coordinators, or elected officials who could serve in this capacity, or contact with municipal emergency service organizations which could serve to locate back-up coordinators. See Bath, ff. Tr. 22,350, Attachment 3, at 7; Tr. 22,408 (Bath), Tr. 20,818-19 (Curry); Tr. 22,944-45 (Wertz); Belser *et al.*, ff. Tr. 20,787, Wertz Testimony at 1; Board Ex. 13.

1410. We note that at the municipal level of planning we perceive little difference between planning for radiological emergencies and planning for other emergencies, such as floods, and we reiterate our opinion that the primary responsibility for this level of planning lies with the county acting with and on behalf of the municipalities and townships. While it may indeed be desirable to have more identification of substitute management coordinators at the sub-county level, we find that an adequate showing has been made to support restart in that viable mechanisms for municipal contact in the event of an emergency exist and can be utilized to reach substitute emergency management coordinators or their functional equivalent at the municipal level. We observe further that local fire and police organizations have representation at the county EOCs and that municipal resources and emergency response could be coordinated through such representatives even in the absence of the local coordinator. Tr. 19,446-48 (Bath). We agree that there is room for improvement in planning for communications and coordination at the municipal level. Further, we agree with Intervenor (proposed finding ¶ 152) that the communications net-

work has certain problems which should be resolved prior to restart, as we indicate in Section H.2 below.

(b) Functions and Qualifications of Local Emergency Personnel

1411. Two contentions relating to York County concerned the technical capabilities of the Emergency Management Coordinator and other county personnel:

Newberry Contention EP-14(F):

Appendix 2, Section I, Subsection B of the York County Plan provides that the Emergency Management Coordinator will ensure that briefings are presented to the Commissioner and he will interpret displays and technical reports for the Commissioners. There is no statement in the Plan that the person occupying the position of Emergency Management Coordinator will have educational requirements sufficient to ensure that he will be able to interpret any displays of technical reports for the Commissioners. It is Intervenor's contention that unless the Emergency Management Coordinator is required to have an expertise in the area of nuclear science, he will be unable to sufficiently and accurately interpret the displays and technical reports for the Commissioners and thus may leave the Commissioners who ultimately are responsible for the safety and welfare of the people of York County uninformed or misinformed of actual events taking place at TMI.

Newberry Contention EP-14(G):

Appendix 2, Section II, of the York County Plan provides that the Situation Analysis Group will receive reports of plant safety degradation, potential/actual radioactive release and radiation intensity. Again, there are no job requirements for persons who sit on a Situation Analysis Group to qualify them to make such reviews and, therefore, again, without qualified people to sit on such a group, their advice to the county's Commissioners may be misinformed and unenlightened which could again then lead to chaos and confusion.

1412. These contentions apparently rest on Intervenor's interpretation of guidance relating to accident assessment in NUREG-0654 to mean that the appropriate organization level is at the county level:

Each organization, where appropriate, shall provide methods, equipment and expertise to make rapid assessments of the critical or

potential magnitude and locations of any radiological hazards through liquid or gaseous release pathways. This shall include activation, notification means, field team composition, transportation, communication, monitoring equipment and estimated deployment times, page 58, (I) Accident Assessment (8).

Staff Ex. 7.

1413. FEMA witnesses testified on these contentions; proposed findings were submitted by Licensee, Staff, and intervenors.

1414. As noted by Licensee (proposed finding ¶ 65) and Staff (proposed findings ¶¶ 53-54) and acknowledged by Intervenors (proposed finding ¶ 114), York County (and the other risk counties) will not need to have technical assessment capability because the appropriate organizations, in this instance, are at the state level, *i.e.*, the Bureau of Radiation Protection (BRP) - and the Pennsylvania Emergency Agency (PEMA). Bath and Adler (2/23/81), ff. Tr. 18,975, at 14-16. The cited passage from NUREG-0654 stipulates that an adequate radiological assessment capability is to exist off-site and the guidance provides that the off-site radiological assessment function may be fulfilled either by state or local emergency response organizations. Staff Ex. 7, at 58, Criterion I.8; Adler and Bath (2/23/81), ff. Tr. 18,975, at 14.

1415. For Pennsylvania, technical support and radiological assessment are provided by BRP. BRP, in coordination with PEMA, recommends protective actions and provides counties with these recommendations and any information necessary to effectively implement such protective actions. Commonwealth Ex. 2.a, at 15; Adler and Bath (2/23/81), ff. Tr. 18,975, at 14-15.

1416. In sum, technical radiological assessment capability is not needed at the county level and York County need not have that capability. Adler and Bath (2/23/81), ff. Tr. 18,975, at 14-15.

1417. Moreover, PEMA is preparing a training program for county emergency management coordinators to assure that accident assessment information and protective action recommendations may be communicated to the counties without the need for technical background at the county level. Since BRP, in coordination with Licensee, will interpret the reports on plant safety degradation and potential/actual radioactive release and radiation intensity, specialized training in radiological sciences is not needed for York County's (or other risk counties) emergency management coordinator or staff. Adler and Bath (2/23/81), ff. Tr. 18,975, at 15-16. In short, we find the concerns in Newberry Contentions EP-14(F) and EP-14(G) to be satisfactorily resolved.

1418. Intervenors (proposed findings ¶¶ 115-116) observed that the York County Plans should be revised to show that they will rely on PEMA for accident assessment and that in fact a recommendation has been made. Bath and Adler, ff. Tr. 18,975, at 15. We believe that the York County coordinator is quite capable of making this revision without any direction from us.

1419. In passing, the Board notes its bewilderment as to the intent of Licensee proposed finding ¶ 66 urging us to broaden these contentions and treat them as claims that the county emergency management coordinators, and in particular the York County Coordinator, are unqualified to perform their assigned duties. We do not believe that the intervenors had any such underlying intent. On the contrary, we had the distinct impression that the intervenors thought the current York County Coordinator particularly well qualified to perform his responsibilities. See, e.g., Tr. 20,794-95 (Bradford); Combined Intervenors reply finding ¶ 10.

3. Availability of Emergency Workers

1420. Throughout the entire emergency planning portion of the proceeding, intervenors consistently asserted that volunteer emergency workers may not perform their assigned functions in an emergency, particularly a radiological emergency, due to concern about the safety of their own families. This concern was specifically voiced in Contention EP-5(C);

ANGRY Contention EP-5(C):

In order to assure proper execution by emergency response personnel of duties assigned to them, the Commonwealth should adopt and apply to all levels of the emergency response network the principle that such personnel should "not have more important commitments to families within the immediate area of TMI" (Dept. of Health Plan, App. I, p.5).

1421. The Commonwealth of Pennsylvania offered testimony by Kenneth R. Lamison in response to this contention. In addition, testimony bearing on availability of emergency workers was presented in connection with other concerns, for example, transportation of school children. Extensive proposed findings were submitted by Licensee, Staff, and intervenors.

1422. Licensee (proposed finding ¶ 67) identified the heart of Contention EP-5(C), i.e., whether emergency response personnel will in fact perform their duties during a radiological emergency at TMI. In essence, Licensee's stance on this issue (proposed findings ¶¶ 67-69) is that the Commission

does not intend its licensing boards to determine whether emergency workers will perform their jobs, an issue which is essentially generic and which raises policy questions beyond the resolving capability of this Board.

1423. The thrust of intervenors' (proposed findings ¶¶ 94-126) argument is that many of the emergency workers relied on have family commitments, such as small children, which will override their commitment to their jobs and that there is no credible evidence to support the assumption that the emergency workers relied upon to facilitate state and local emergency plans will be available to implement protective responses in the case of an accident at TMI. Licensee's view of emergency workers' availability (proposed findings ¶¶ 71-86) is that the extensive record on this issue provides reasonable assurance that an adequate number of emergency workers in the TMI area stay and perform their jobs. Licensee's view was shared by the Staff (proposed findings ¶¶ 58-59). Licensee (proposed findings ¶¶ 71-73) pointed especially to the testimony of Dr. Russell Dynes who consistently reiterated his view that he was unaware of a single failure in emergency response due to a failure of emergency workers to stay and fulfill their responsibilities, including during the TMI-2 accident. Tr. 17,197-98. See also in general, Tr. 17,196-207 (Dynes). Staff (proposed finding ¶ 58) relied on FEMA witnesses' testimony that, based on previous disaster experience, FEMA believes emergency workers will in fact perform their emergency functions regardless of conflicting demands. See Adler and Bath (3/16/81), ff. Tr. 18,975 at 52; Tr. 19,213 (Pawlowski). Staff (proposed finding ¶ 59) also pointed to PEMA's experience with previous emergencies which indicates that volunteer and professional emergency workers have been available to work and that persons down to the county and municipal levels are very dedicated in this regard. Tr. 17,828 (Lamison). PEMA has not experienced, in previous emergencies in the state (including hazardous spill emergencies), a problem with emergency workers not performing their functions. Tr. 17,867-68 (Lamison). Specifically for the TMI-2 accident, volunteer workers at the state levels were available for emergency work and the PEMA witness was not aware of any large numbers of volunteer workers not being available at the local level. Tr. 17,829 (Lamison).

1424. Intervenors (proposed findings ¶¶ 95-96, 106, 117-126) relied primarily on the views of Dr. Kai Erickson and the testimony of the League of Women Voters in their conclusion that family commitments would interfere with response of not only volunteer emergency workers but also some professional persons. They also pointed to certain testimony by PEMA witness Lamison that the TMI-2 experience did not bear out general experience with emergency responses. Tr. 17,828 (Lamison); Tr. 17,826 (Lamison); see also Combined Intervenors reply findings ¶¶ 9-11. Intervenors do concede (Combined Intervenors reply finding ¶ 10) that in a

population as large as that of the TMI area there would be enough persons who would be willing to serve in an emergency and who have resolved their family commitments. We next address that specific point. Before leaving this subject, however, we direct attention to Section F, which describes our difficulties in balancing opposing viewpoints of Dr. Dynes and Dr. Erickson, and to Section H.7 for our findings on the testimony of the League of Women Voters.

1425. We address in this section the testimony which relates specifically to ANGRY contention 5(C), the assertion that the Commonwealth should apply to selection of emergency personnel the principle that these persons "not have more important commitments to families within the immediate area of TMI". Commonwealth's witness Lamison testified that "The Commonwealth can encourage but not direct by policy that emergency workers remain with their emergency task rather than their family". (Lamison (Command and Control), ff. Tr. 17,818). On cross-examination as to whether there would be a problem in ensuring the presence of emergency workers, he stated ". . . we certainly could not prescribe a policy that all persons would do certain things. We would hope from a moral obligation both to their families and to the communities, that they would be available to perform their given service". Tr. 17,826 (Lamison). Further examination of Mr. Lamison and of Mr. James N. Lothrop, who testified as a panel on behalf of PEMA, elicited a number of somewhat conflicting views as to whether sufficient workers would be available. For example, during the TMI-2 accident some professional technical people and volunteers were not available; however, witness Mr. Lamison believed that some of these people, at least at the state level, could be replaced by relocation of personnel from other parts of the state. Tr. 17,826-27 (Lamison). Mr. Lamison further testified that his experience during the accident did not bear out his feelings as to who would and would not be dependable and he indicated that there may have been some shortage of staffing in certain installations in the impact area. Tr. 17,827. On the other hand, he followed this by stating that at the state level the volunteers he expected to show up did indeed show up and that he was not aware of volunteers in any great number not being available down at the local level. Tr. 17,829. The Board believes that the best summation of Mr. Lamison's testimony is as he expressed at the beginning of his cross-examination, viz., he thinks "it is pretty difficult to arrive at an indication what the individuals are going to do". Tr. 17, 826 (Lamison).

1426. As pointed out in Licensee proposed finding ¶ 74, some emergency personnel have already faced the problem of meeting both family and emergency commitments. Mr. Curry, the York County emergency management coordinator, confirmed the position that emergency workers do make prior arrangements to ensure the protection of their families. Mr.

Curry has done so personally, and he had instructed other emergency workers to do likewise. Mr. Curry referred to such preplanning as "the old common sense scenario". Tr. 20,875-77 (Curry). Moreover, the York County emergency response plan contains explicit instructions for the evacuation and care of the families of emergency workers. See Board Ex. 5, Annex G, §§II.E and IV.A, at G-1 to G-2; see also *id.* Annex D, §III.A at D-1, and Annex T, at T-3, ¶ 1.

1427. Intervenors' major concern appears to be, as expressed in their proposed finding ¶ 106, that the problem will lie in reliance on parents of small children to work during the evacuation process, in particular those mothers who are school bus drivers. In regard to reliability of school bus drivers, both intervenors (proposed finding ¶ 106), and Licensee (proposed finding ¶ 75 rested on the testimony of the League of Women Voters, the intervenors concluding that the evidence indicated that these drivers could not be relied on and the Licensee concluding to the contrary. See Hilliard, ff. Tr. 21,508 at 4, 9, 10, 12, and 15; Tr. 21,540, 21,544, and 21,562-63 (Miller). The Board's consideration of school bus drivers is in Section H.7.

1428. On the larger issue, the Board concludes that there is no evidence which contravenes the finding that there is reasonable assurance that in the event of a nuclear emergency at TMI there will be an adequate number of emergency workers who will stay and perform their jobs.

4. NRC's Emergency Response Organization

1429. The Staff in its proposed findings ¶¶ 60 and 61 addressed a concern, raised by the Commonwealth, as to the adequacy of NRC's response in a radiological emergency. We reply on these proposed findings here to report on the resolution of this concern.

1430. To address this matter, the Staff presented witnesses and documentary evidence to describe the NRC's Incident Response Plan (Staff Ex. 10: NUREG-0728, "Report to Congress: NRC Incident Response Plan," September 1980), and to describe the NRC's planning for an incident at TMI. From the record thus made, the Commonwealth determined that its primary concern was with the communications between the NRC and various Commonwealth agencies and the correct identification of which Commonwealth agency is to be contacted under certain circumstances. Tr. 21,825 (R. Adler). Meetings were held between the NRC Staff and Commonwealth officials to discuss the Commonwealth's concerns and arrive at a resolution of them. Tr. 17,103-04 (Straube, Gray).

1431. Subsequent to those meetings, the Commonwealth's representative indicated that an agreement had been reached with the Staff whereby specific instructions on communications and contacts with Commonwealth agencies would be inserted in the NRC's emergency procedures, that the Commonwealth would consider the issue resolved when those procedures were completed, and that the Commonwealth considered the issue closed as far as this Licensing Board and the instant proceeding are concerned. Tr. 21,825 (R. Adler). That being the case, we find the matter of the Commonwealth's concerns regarding the NRC's incident response to be closed.

C. Accident Assessment and Dose Projection

1432. In general, the accident assessment issues put into controversy by the parties relate to two primary matters: the adequacy of Licensee's accident classification scheme and Licensee's ability to monitor and to project doses from off-site releases of radioactivity.

1. Accident Classification

1433. In the area of accident classification, three contentions were raised challenging the use of fractions of EPA Protective Action Guides (PAGs) for classifying an emergency (Contention EP-7), questioning certain triggering events or conditions used in accident classification (Contention EP-8) and challenging the use of adverse meteorology assumptions in accident classification (Contention EP-9). These contentions are stated as follows:

ECNP Contention EP-7:

The fractions of EPA PAGs listed on p. 4-1 of the Plan, with their associated action levels, do not take into account the total accumulated dose and dose commitment. As a result, the total exposures may exceed by large margins the listed PAG fractions prior to the advancement to a higher emergency category.¹⁷⁰

ECNP Contention EP-8:

¹⁷⁰ Under the provisions of the Licensee's Emergency Plan, projected doses from an accident exceeding certain fractions of EPA PAG doses will result in the accident being classified in the Alert, Site Emergency or General Emergency categories depending on the level of the projected dose. Licensee Ex. 30, at 4-1.

The various emergency categories (p. 4-2 to 4-8) each list a number of triggering events or conditions. Many of these are questionable indicators. For instance, on p. 4-3, "Valid" alarms are referred to. But there is no mention of the definition of a "valid" alarm, or what would be an invalid alarm. A number of reactor coolant activities (50, 130, and 300 ci/ml) are referred to, but no mention is made of how much fuel damage it takes to produce these readings. In addition, there is no indication of how or how rapidly these coolant activities will be determined.

ECNP Contention EP-9:

Reliance on "adverse meteorology" (p. 4-5, 4-6), can prove to provide little or no "built-in conservation" (p. 4-7, 4-8) since, for instance, such conditions were not at all uncommon during the nighttime in the nights following the TMI-2 accident (for instance, the night of March 29, from 10 p.m. to 8 a.m., March 30; night of March 31, about 8:00 p.m. to 8 a.m., April 1).

In a related area, the Staff raised concerns about the containment leak rate assumptions used by the Licensee in projecting doses under certain conditions.

1434. The Board believes that a definition of PAGs would be useful at this point. The principles underlying the PAG concept are set forth in an Environmental Protection Agency (EPA) publication, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, EPA-520/1-75-001 (September 1975, revised June 1979, February 1980). PAGs are the projected radiological dose or dose commitment values to individuals in the general population and to emergency workers that warrant protective action before or after a release of radioactive material. Licensee Ex. 30, at §4.1.1.42. Under this concept, protective actions would be warranted provided the reduction in individual dose expected to be achieved by carrying out the protective action is not offset by excessive risks to individual safety in taking the protective action. *Id.*; Rogan, *et al.*, ff. Tr. 13,756, at 73-74; Chesnut, ff. Tr. 15,007, at 7-8, 11-13; Tr. 19,691 (Molholt). Numerical PAGs for exposure to airborne radioactive materials have been recommended by EPA, and similar limits for exposure due to ingestion of contaminated foodstuffs and water have been recommended by the Food and Drug Administration (FDA). Rogan, *et al.*, ff. Tr. 13,756, at 74 and Table 3. The EPA and FDA recommendations have been adopted by BRP as a planning basis for protective action decisionmaking. *See* Commonwealth Ex. 2.a, Appendix 8, Sections V, IX.D and IX.F.

1435. As defined by EPA, PAGs represent that level of *projected* dose to the population that warrants the consideration of various protective actions designed to minimize or eliminate the potential dose that the population will receive. Chesnut, ff. Tr. 15,007, at 7-8; Rogan, *et al.* ff. 13,756, at 74. Consistent with this guidance, PAGs do not include the dose that has unavoidably occurred prior to evaluating the need for protective action. Chesnut, ff. Tr. 15,007, at 10-14; Rogan, *et al.*, ff. 13,756, at 74.

1436. The testimony on ECNP Contention EP-7 was given by Dr. Bruce Molholt. The Board is neither compelled to consider Dr. Molholt's testimony nor inclined to do so because intervenor ECNP did not comply with the Board's Orders of May 22, 1980 and April 22, 1981 which required the filing of proposed findings on issues at the risk of default. See PID, at ¶ 35. However, the major thrust of Dr. Molholt's testimony is included below in order to give some insight into intervenor's concerns. See Molholt, ff. Tr. 19,690, at 1-3 and 10. The oral examination of Dr. Molholt appears in the April 22-23, 1981 hearing transcripts.¹⁷¹

1437. The Board notes that Dr. Molholt's testimony on Contention EP-11 bears upon some of the considerations of PAGs and their relationship to accident classification and the quality of the Licensee's environmental monitoring program. The contention reads as follows:

ECNP Contention EP-11:

The BRP plan (Appendix 8) relies on the infant thyroid dose (1.5 rem) as the dose from milk ingestion to be avoided (p. IX-4). This does not take into account the fetus, whose sensitivity may greatly exceed that of the infant. In addition, the value of 1.5 rem, to the thyroid from milk ingestion does not take into account the inhalation exposure.

1438. Although the thrust of Contention EP-11 is not clear on its face, it was clarified in testimony presented by the intervenors. In that testimony, intervenors assert that the projected thyroid dose used by the Commonwealth to trigger protective actions may be an order of magnitude too high if the sensitivity of the fetus to iodine-131 is considered, that the sampling medium (milk) used by the Commonwealth to project doses for protective action determinations is inadequate, and that the Commonwealth considers only the ingestion pathway and ignores the inhalation pathway in making

¹⁷¹ The bulk of Dr. Molholt's testimony was unrelated to ECNP Contention EP-7. The Board addresses the other aspects of Dr. Molholt's testimony below. We discount Dr. Molholt's testimony on EP-7 because he misunderstood the use Licensee makes of PAGs in its accident classification system. See Tr. 19,939-42.

protective action determinations. Thus, according to intervenors, the Commonwealth's planning must be modified prior to restart in order to properly protect the public. Molholt, ff. Tr. 19,690, at 15-16.

1439. We shall address Molholt's major points briefly here and still further when we turn to full consideration of EP-11. (Section IV.G.4). Further, the Board notes that Dr. Molholt presented testimony over 2 days (April 22 and April 23, 1981) and a broad range of technical subject areas. The Board found for the most part that his arguments were lucid and well presented. However, we find that in some areas of his testimony he showed a lack of familiarity and/or depth of knowledge. In short, his lack of appreciation for Licensee's air sampling program weakens his testimony on I-131 sampling and the basis for inhalation PAGs. Tr. 19,813-14; 19,836-39. His unswerving support for the use of rodent thyroids to detect environmental I-131 is misdirected because of the lack of knowledge of critical parameters to allow extrapolating from the rodent receptor and potential human receptor. Tr. 19,841-48. His acceptance of the estimated quantity of radiation released during the TMI-2 accident as given in both the Takeshi and Heidelberg Reports without looking into or questioning the controversial parameters on which they were based or understanding the limitations in these reports weakens his testimony on potential fetal health effects downwind. Tr. 19,707-10; 19,754-55; 19,822-31, 19,836-38, 19,848-52. In addition, he was not aware of the availability of more accurate wind distribution data upon which to project fetal radiation effects. Tr. 19,930; 19,990-92.

1440. The record contains substantial information on matters relating to Contentions EP-7, EP-8, and EP-9, which we discuss below. Licensee's accident classification system is described in Chapter 4 and Tables 21-24 of its Emergency Plan. Licensee Ex. 30. The NRC Staff's review of the adequacy of this classification scheme and its conclusions are reported in the Staff's Emergency Preparedness Evaluation (EPE) and Supplement 1 thereto. Staff Ex. 6, at 8-10; Staff Ex. 23, at II-11 to II-12. In addition, both Licensee and the NRC Staff presented testimony on Licensee's accident classification system and ECNP Contentions EP-7, EP-8 and EP-9. See Rogan, *et al.*, ff. Tr. 13,756, at 66-76; Chesnut, ff. Tr. 15,007, at 4-14, 26-29 and 84; Levine, ff. Tr. 17,298, at 6-9. Oral examination of these witnesses relevant to this subject matter appears throughout the March 3-6, 10-12, 17 and 24, 1981 hearing transcripts. Neither the Commonwealth nor any intervenor other than ECNP presented testimony on this issue, although these other parties did participate in the cross-examination of the witnesses. The Licensee, Staff and ECNP submitted proposed findings in the areas of accident assessment and dose projection. Some of these were notably more comprehensive than others. As was mentioned above, ECNP submitted no findings related to Dr. Molholt's

testimony in this subject area and ECNP's total substantive findings consisted of a mere one and one-half pages. We have found the Staff's and Licensee's proposed findings in this area consistent with our views in most respects and we have therefore relied heavily on them.

1441. The Board's consideration of this issue is organized into three parts: (1) a brief description of Licensee's accident classification system and the basis of the particular classification methods used by Licensee, (2) identification and resolution of those minor differences identified by the Staff between Licensee's proposed classification system and one acceptable to the Staff, and (3) evaluation of each of the referenced ECNP contentions. The Board has reviewed all matters raised with respect to accident classification, and if the matter is not directly addressed in this portion of our decision, it is because the Board found the concern to be without merit.

1442. The accident classification scheme utilized by the Licensee is that required by 10 CFR Part 50, Appendix E wherein an accident is categorized in any one of the four classes of Unusual Event, Alert, Site Area Emergency, or General Emergency. Chesnut, ff. Tr. 15,007, at 4-5; Staff Ex. 6, at 9. This same accident classification scheme is followed by the Commonwealth and the five risk counties for TMI. Rogan, *et al.*, ff. Tr. 13,756, at 70-72.

1443. The Emergency Director is responsible for classifying the accident. In certain instances the shift supervisor would classify the accident and assume the duties of the Emergency Director. Rogan, *et al.*, ff. Tr. 13,756, at 17-18. Two major guides are used in determining the proper classification. The first method relies on Emergency and Abnormal Operating Procedures, which specifically refer the plant operators to the appropriate emergency category when an action level has been exceeded.¹⁷² The second method requires the plant operators to compare plant parameters and conditions to a specified list of emergency action levels (EALs). When a given action level has been exceeded, the emergency class associated with that action level is declared. Rogan, *et al.*, ff. Tr. 13,756, at 72. EALs included in Licensee's Emergency Plan are based on guidance contained in NUREG-0654, Appendix 1. Compare Licensee Ex. 30, at Tables 21-24 with Staff Ex. 7, at Appendix 1, pp. 1-5, 1-6, 1-9, 1-10, 1-13, 1-14, 1-17, 1-18 and 1-19; see Rogan, *et al.*, ff. Tr. 13,756, at 73; Staff Ex. 23, at II-11 to II-12.

¹⁷² For example, if control room instruments led the operators to conclude that a small break loss-of-coolant accident (LOCA) had occurred, one in step in Emergency Operating Procedure 1202-6B would refer the operator to the Emergency Plan Implementing Procedure for a Site Emergency (1004.3). Rogan, *et al.*, ff. Tr. 13,756, at 17-18.

1444. The accident classification scheme and EALs adopted by Licensee are designed to avoid failures in recognizing an accident and to provide for orderly and rapid accident assessment. This system accounts for the possibility of worsening accident conditions, added operator error or further equipment failures by specifying the declaration of "emergency conditions" and the initiation of emergency response for minor events that might be indicative of more serious but unrecognized conditions. The gradation in emergency classification assures that a reasonable amount of time is available to evaluate in-plant readings, initiate on-site and off-site assessment actions (if warranted), and allow for anticipatory actions on the part of on-site and off-site response organizations prior to an actual need for implementing protective actions. Chesnut, ff. Tr. 15,007, at 4-5, 6-7; Rogan, *et al.*, ff. Tr. 13,756, at 73.

1445. The Board finds that this approach provides reasonable assurance that Licensee personnel will be able to recognize and classify emergency conditions, or the precursors to such emergencies, in a timely manner.

1446. At the time the Staff's EPE for TMI-1 was prepared, a full review of the specific EALs chosen by Licensee had not yet been completed. Staff Ex. 6, at 9-10, and 31. The Staff, however, had concluded that certain EALs were more "conservative" than those specified in NUREG-0654, and suggested that Licensee conform its EALs more closely to the guidance in NUREG-0654. *Id.* at 9. When Staff witness Chesnut testified, the Staff had completed its review of Licensee's specific EALs and the results of that review are included in the Chesnut testimony. The Staff found Licensee's EALs acceptable with two exceptions: the EALs using fractions of the EPA Protective Action Guides (PAGs) classified a Site or General Emergency at projected radiation levels lower than those recommended in NUREG-0654, and the EALs using reactor coolant system activity levels also classified accidents at levels lower than recommended in NUREG-0654. Chesnut, ff. Tr. 15,007, at 5, 9, 26, 28. Licensee responded to these Staff observations by noting that the Site Emergency EALs were in fact not more conservative than those recommended in NUREG-0654 (Tr. 13,766-67 (Giangi)) and by committing to revise the General Emergency and the reactor coolant system activity EALs to make them consistent with NUREG-0654. Tr. 13,767-68, 14,252-53 (Giangi). The Staff has reviewed these commitments and found them to be adequate. Staff Ex. 23, at II-11 to II-12; Tr. 22,880 (Chesnut).

1447. The Board inquired as to why the Staff objected to the apparent conservatism of Licensee's EALs and why Licensee was willing to modify the EALs in the manner sought by the Staff. Tr. 13,768 (Smith). Licensee explained that the changes sought by the Staff affected only the category of emergency to which the accident was classified. Neither the protective action recommendations to be made by Licensee to the Commonwealth nor

the ability of on-site and off-site organizations to respond to the emergency would be affected by the changes EALs. Tr. 13,769-70 (Giangi). Moreover, the Staff hoped to achieve a substantial degree of consistency nationwide in the classification of accidents, which would assist the Staff in judging relative severity of accidents. Modification of Licensee's EALs furthers this goal without degrading public health and safety. *Id.* The Board therefore finds the modified EALs acceptable.

1448. Through the direct testimony relating to EP-7 by intervenor's witness Dr. Bruce Molholt, it became apparent that the thrust of the intervenor's assertion is that the Licensee's use of EPA PAGs for accident classification purposes ignores exposures from the ingestion pathway. Molholt, ff. Tr. 19,690, at 1-2. Such actual exposures, intervenor claims, could be higher than projected exposures because the NRC's earth-to-plant and plant-to-human transfer factors utilized in dose projection are allegedly low by orders of magnitude. Molholt, ff. Tr. 19,690, at 3. Thus, according to Dr. Molholt, actual dose received by certain segments of the population will substantially exceed PAGs under conditions where the Licensee, acting under provisions of its Emergency Plan, would project doses that are only fractions of PAGs. Molholt, ff. Tr. 19,690, at 3.

1449. As indicated in Contention EP-7, Licensee uses the EPA PAGs as an action level to classify and declare various emergency categories. Tr. 14,529 (Tsaggaris). In order to do this, Licensee converted the PAG levels, which represent a time integrated dose, into dose rates that could be compared to instrument readings in the control room. Tr. 14,530 (Tsaggaris). For purposes of classifying an accident, the Board finds this procedure appropriate, since the issue of concern during an accident is the *current* status of the plant. Releases that may have occurred the previous day, week or month do not provide useful information about current plant status, although such releases may be of significance in making protective action recommendations. However, Licensee has indicated, both in its prepared testimony, Rogan, *et al.*, ff. Tr. 13,756, at 74, and during cross-examination, Tr. 14,530 (Tsaggaris), that information about prior, closely related releases would be considered in making protective action recommendations to the Commonwealth.

1450. It is worth noting that the fact that total hypothetical exposure to an individual may exceed a PAG fraction before Licensee advances its accident classification to a higher class is of no significance because the PAG fractions are used in this regard only for accident classification, not for recommending or taking protective actions. Because of the conservatism in Licensee's use of PAG fractions, the PAG fractions could be exceeded substantially and yet projected doses would still be far below levels requiring protective actions. Chesnut, ff. Tr. 15,007, at 13-14. Moreover, the German data and studies, on which Dr. Molholt bases his claim that NRC

transfer factors are underpredicted, utilized maximal values intended to result in a maximal calculated dose. Tr. 19,762-65 (Molholt). Measured concentrations of radionuclides in the environment near 17 operating nuclear power plants in the United States were one to two orders of magnitude lower than the concentrations predicted using the data relied upon by Dr. Molholt. Tr. 19,774 (Molholt). In view of this, we find no basis to fault the Licensee for the manner in which it utilizes fractions of PAGs for accident classification or for requiring a change in Licensee's approach.

1451. As to the assertion in the contention concerning accumulated dose, it is true, consistent with EPA Guidance, that the PAGs do not account for doses unavoidably received prior to the time the dose assessment began. Rogan, *et al.*, ff. Tr. 13,756, at 74. However, to the extent that prior accumulated doses from the accident in question are known to the Licensee, they will be accounted for and included in projected doses and in determining protective actions. Tr. 14,334-35 (Rogan); Tr. 14,530-31 (Tsaggaris); Tr. 14,531-32 (Rogan). The evidence shows that the Licensee's use of fractions of lower EPA PAGs for accident classification purposes is conservative and will not prevent escalation to a more severe accident class based on plant conditions or emergency action levels. Chesnut, ff. Tr. 15,007, at 8-9. The Licensee's use of the lower limit PAGs in this manner for emergency classification is consistent with the guidance of NUREG-0654. Chesnut, ff. Tr. 15,007, at 8-9; Staff Ex. 23, at II-11. Accordingly, we find Contention EP-7 to be without merit and we reject it.

1452. As another matter, ECNP proposed findings included a request that the record be reopened to consider a Staff memorandum concerning, in part, the adequacy of EPA PAGs to provide adequate protection of the health and safety of the public. We reject this request. ECNP, as the party seeking to reopen the record bears a heavy burden. Its motion must be both timely presented and addressed to a significant issue. *Kansas Gas and Electric Co.* (Wolf Creek Generating Station, Unit No. 1), ALAB-462, 7 NRC 320, 338 (1978). Where the motion is untimely without good cause, the party has an even greater burden: it must demonstrate not merely that the issue is significant but, as well, that the matter is of such gravity that the public interest demands further exploration. *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit No. 2), ALAB-486, 8 NRC 9, 21 (1978). In addition, ECNP must establish that the evidence it wishes to proffer is of such magnitude that it could cause us to alter the result we reach in this decision. *Northern Indiana Public Service Co.* (Bailey Generating Station, Nuclear-1), ALAB-227, 8 AEC 416, 418 (1974).

1453. The staff filed a response to the ECNP request opposing reopening the record.¹⁷³ Licensee argued its opposition to the request in its reply findings on emergency preparedness issues. As those parties observe, the ECNP request to reopen the record fails to address any of the relevant considerations.

1454. ECNP offers no reason why we should not consider its request to be very late. ECNP offers no reason, let alone good cause, for its failure to bring the presence of the September 1979 memorandum to the Board's attention during the course of the hearings.¹⁷⁴ We are thus not here presented with the more usual case of "new" evidence — *i.e.*, some fact or change in circumstance occurring after the close of the evidentiary record.

1455. Nor has ECNP established that the evidence it wishes to proffer addresses a significant issue not previously considered by the Board. To the contrary, the Board has heard considerable testimony on the EPA Protective Action Guides. See Licensee PF ¶¶ 97-100, 279-313; Staff PF ¶¶ 64-67, 191-200. Significantly, ECNP is in default on these issues, since neither it nor the Combined Intervenors filed any proposed findings on the two ECNP contentions relating to PAGs. The Board has little patience for requests to reopen the record when the party making the request has not even filed proposed findings on the related evidence of record, and particularly when the request itself fails to address the relevant considerations needed to support such motions.

1456. Finally, ECNP has not demonstrated that the result we reach here is likely to be different if we had reopened the record to consider the September 1979 memorandum. Construed in a light most favorable to ECNP, the memorandum evidences the views of certain Staff members about potential problems they perceived in the PAG concept. Subsequent to this memorandum, the Commission issued new emergency preparedness regulations which instruct that guidelines for the choice of protective actions during an emergency, consistent with federal guidance — presumably including the EPA PAGs — be adopted for use during an emergency. 10 CFR 50.47(b)(10). The Staff also issued a revision to NUREG-0654 in November 1980 suggesting the use of the EPA PAGs. Staff Ex. 7, at 60, 61 (Criteria J.7 and J.9). We are thus unpersuaded

¹⁷³ Although ECNP did not provide a copy of the document it desires to move into evidence, the Staff in its opposition included copies of the relevant pages from the September 28, 1979 memorandum.

¹⁷⁴ ECNP states that a "recent communication" has brought the September 1979 memorandum to its attention. ECNP PF ¶ 11. That fact is not sufficient reason for reopening the record. Parties to an adjudicatory hearing are under an obligation to use their best efforts to discover relevant information and present it to the Board in accordance with the hearing schedule. ECNP does not discuss whether it has met this obligation.

that consideration of the September 1979 memorandum would have altered our decision on the PAG issue. For these reasons, we decline to reopen the record as requested by ECNP.

1457. The Staff's Safety Evaluation Report on emergency preparedness for TMI-1 questioned the Licensee's assumptions about containment leak rate used in dose projections. Staff Ex. 6, at 18, 30. The specific concern was that the Licensee's intended use of a containment leak rate based on the containment maximum design pressure might result in overly conservative leak rates for dose projection and in subsequent inaccurate or erroneous protective action recommendations. Tr. 13,771, 14,605 (Giangi). In response to this concern, Licensee generated a curve of estimated containment leak rate as a function of containment design pressure and actual measured pressure which will be factored into Licensee's Emergency Plan Implementing Procedures for off-site dose projection. This procedure will provide an approximate upper bound containment leak rate at a particular containment pressure and yet a lower and more realistic leak rate than that obtained using maximum design pressure. Staff Ex. 23, at II-6, II-7. The Board finds this to be a satisfactory resolution of the problem identified by the Staff.

1458. ECNP Contention EP-8 raises concerns with respect to two groups of EALs used by Licensee. The first are those EALs that refer to "valid" alarms; ECNP questions how alarms would be determined to be "valid" or "invalid". The second group of EALs are those related to reactor coolant system activity levels. We address each matter in turn.

1459. First, intervenor questions use of certain indicators of the existence of an emergency and of particular accident classifications. Using EALs based on specific instrument readings, plant parameters and equipment status, operators are to classify accidents and formulate protective action recommendations. Chesnut, ff. Tr. 15,007, at 27. In this regard, intervenors' concern is that Licensee relies on "valid alarms" without defining what valid alarms are.

1460. Licensee defines a "valid" alarm as one which is confirmed *i.e.*, by observing other supporting indicators, by actual sampling, or by ruling out events such as instrument malfunction. Rogan, *et al.*, ff. Tr. 13,756, at 75; Chesnut, ff. Tr. 15,007, at 27. Such confirmation is to ensure that an emergency is not declared in situations where invalid or erroneous alarms do not accurately indicate actual plant conditions. *Id.* While there is always the possibility that operators may ignore alarms, there are at TMI-1 redundant indicators and meters for EAL parameters. Tr. 14,564 (Giangi). Operators will normally monitor related instrumentation to determine if an alarm is valid or erroneous, Chesnut, ff. Tr. 15,007, at 27. Licensee maintains specific alarm procedures for determining whether an instrument or alarm is malfunctioning or not operating and whether there

is an erroneous indication. Tr. 15,239 (Chesnut). The Board finds that these procedures, together with the multiple indicators of abnormal conditions that should be available, will tend to minimize the likelihood that valid alarms will be ignored.

1461. EP-8 further contends that Licensee's reliance on reactor coolant activity levels for accident classification is misplaced because there is no indication of the amount of fuel damage corresponding to the reactor coolant activity EALs and because it is not clear how or how rapidly reactor coolant activity can be measured. In response, the Licensee has indicated that the 50 μ Ci reactor coolant activity level is a level greater than normally expected, is greater than any previously experienced spike in coolant activity, and is roughly equivalent to 0.1% fuel failure. Rogan, *et al.*, Tr. 13,756, at 75-76; Chesnut, ff. Tr. 15,007, at 28. The value of 130 μ Ci is approximately one-half the operational limit for failed fuel in the technical specifications (Chesnut, ff. Tr. 15,007, at 28), is a positive indication of clad failure (Rogan, *et al.*, ff. Tr. 13,756, at 75-76), and represents about 1/3 percent failed fuel. Chesnut, ff. Tr. 15,007, at 28. NUREG-0654, Appendix 1 suggests that the 300 μ Ci reactor coolant activity is indicative of clad damage approaching about 1 percent. *Id.*¹⁷⁵ Thus, the degree of fuel damage corresponding to these reactor coolant activity levels is indeed defined. As to procuring reactor coolant for determining activity levels, the Licensee has modified its reactor coolant sampling procedures to provide additional shielding, protective equipment, and dosimetry to allow high activity samples to be taken. Under these revised procedures, a reactor coolant sample can be obtained and analyzed in less than three hours, the time specified in NUREG-0737, Clarification of TMI Action Plan Requirements, for such an operation. Chesnut, ff. Tr. 15,007, at 29. In addition to this, there are other methods for classifying an accident based on fuel damage which do not require the sampling and analysis of a coolant sample. For example, letdown monitor RML-1 indicates coolant activity and may be used for this purpose. The Licensee's Emergency Plan specifically defines accident classes based on readings from that monitor. The monitor can be read in the control room, thus allowing rapid accident classification based on coolant activity levels but without requiring reactor coolant sampling. Tr. 15,156-59 (Chesnut).

1462. Based on the evidence outlined above, the Board finds the record demonstrates the assertions in Contention EP-8 to be unsubstantiated.

¹⁷⁵The Staff had raised a concern that the use of the 300 μ Ci ml EAL as proposed by the Licensee was inconsistent with the criteria of NUREG-0654. Chesnut, ff. Tr. 15,007, at 28; Staff Ex. 23, at 11-11. The Licensee has since committed to modify its EAL in this regard to precisely comply with NUREG-0654 guidance. Tr. 22,880 (Chesnut).

1463. The last of the ECNP contentions on accident classification, EP-9, deals with the use of "adverse meteorology" in setting various EALs. NUREG-0654 recommends use of adverse meteorology in setting certain EALs for the Site Emergency and use of actual meteorology in setting certain EALs for the General Emergency. Staff Ex. 7, at Appendix 1, pp. 1-13, 1-17; Rogan, *et al.*, ff. Tr. 13,756, at 76; Tr. 14,579 (Tsaggaris). In developing EALs consistent with this guidance, Licensee defined adverse meteorology as the TMI site-specific five percent probable meteorology, corresponding to a Pasquill Stability Category F and a wind speed of 1.5 mph. Rogan, *et al.*, ff. Tr. 13,756, at 76; Tr. 14,579 (Tsaggaris); Levine, ff. Tr. 17,298, at 6-7.

1464. Licensee identified two advantages derived from the use of this procedure. First, by setting the adverse meteorology and back-calculating it was possible to develop an EAL using a specific reading on a meter in the control room rather than requiring the operator to perform a calculation based on actual meteorology. Rogan, *et al.*, ff. Tr. 13,756, at 76-77. Neither ECNP nor any other party to the proceeding challenged the desirability of this feature. Second, by using the five percent meteorology, Licensee introduced a certain amount of conservatism into its decision to declare a Site Emergency. *Id.*, at 77. ECNP apparently challenges this conclusion by noting that, by definition, the actual meteorology will be worse than that used in the calculation for five percent of the time. Accepting that observation, the Board does not find it significant. The worst case meteorology ever measured at the TMI site is different from the five percent meteorology by only a factor of two. Tr. 14,952 (Riethle). Given the uncertainty present in all dose projections, the Board concludes that no useful purpose would be served by using worst case rather than the five percent meteorology. Indeed, the Staff meteorologist testified that Licensee's definition of adverse meteorology was appropriate and provided an adequate degree of conservatism. Levine, ff. Tr. 17,298, at 9. Moreover, Licensee uses this definition of adverse meteorology solely for purposes of accident classification and not for making protective action recommendations which are based on projected doses using actual meteorology. Consequently, the Board finds no reason to fault either Licensee's definition of adverse meteorology or the manner in which that definition is used to classify and declare accidents.

1465. The Board concludes that the accident classification scheme adopted by Licensee complies with the applicable regulations and is consistent with the guidance of NUREG-0654. The Board further finds that this classification scheme is designed to avoid failures in accident recognition

and provides for an orderly and rapid assessment of the emergency. The concerns raised by ECNP are without merit.

2. Radiation Monitoring

1466. In the area of radiation monitoring, specific contentions or Board Questions were raised concerning the use of mobile monitoring teams, the desirability of installing offsite remote readout monitors, the adequacy of the Licensee's offsite radiological dose analysis capability, and the adequacy of the Licensee's Radiological Environmental Monitoring Program (REMP).

1467. The contentions concerning these issues are stated as follows:

ANGRY Contention EP-4(I):

The time provided in the EP for accident assessment, 1/2 hour (EP, p. 6-7), is in excess of the maximum permissible therefore specified in the Standard Review Plan, NUREG 75/087, Sec. 13.3(II)(3). (EP fig. 21 shows the thyroid PAG of 5 rems being reached in 12 minutes at 600 meters.) Moreover, the estimate given is unsupportable for monitoring of off-site locations on nearby islands or on the west shore of the Susquehanna River. Such factors may become critical in the event of a general emergency, which produces a "shift in emphasis to greater offsite monitoring efforts" (EP, p. 6-6). (See Contention EP-3(C)(1)).

Sholly Contention EP-18 (in part):

It is also contended that the Licensee does not possess adequate portable radiation monitors to provide additional information in the event of an offsite radiation release, and that the Licensee does not exercise adequate administrative control over the maintenance of these units, nor the training of personnel in their use. It is contended that the radiation monitoring program of the Licensee must be greatly upgraded prior to restart to ensure adequate protection of the public health and safety.

1468. These two contentions challenge the adequacy of Licensee's program to dispatch mobile teams to measure off-site radiation in the event of an accident at TMI. Contention EP-4(I) questions the time it would take to dispatch such teams, while Contention EP-18 (in part) questions the adequacy of the mobile monitoring equipment, including the maintenance of such equipment, and the training emergency response personnel receive in using such equipment. The accident assessment actions Licensee takes

following declaration of an emergency are described generally in Sections 4.6.3 of Licensee's Emergency Plan; Section 4.6.3.5 contains an extended discussion on radiological assessment and offsite monitoring. Licensee Ex. 30. Equipment used for such monitoring, and the procedures to check, calibrate, and maintain the equipment, are identified in Section 4.6.5.3 and 4.8.3, in Tables 13 and 20 of the Emergency Plan. Licensee Ex. 30. In addition, Licensee has prepared Administrative Procedure 1053, Emergency Equipment Readiness, which provides detailed guidelines specifying necessary radiation monitoring equipment and the schedule for equipment checks, calibration, and maintenance. Licensee Ex. 31. The training received by personnel responsible for off-site radiation monitoring is identified in Section 4.8.1.1 and Table 12 of the Emergency Plan; Section 4.8.1.2.5 provides for an annual radiological monitoring drill. Licensee Ex. 30. The Staff's evaluation of the adequacy of Licensee's off-site radiological monitoring capabilities is reported in the EPE. Staff Ex. 6, at 19, 25, 27. Both Licensee and the Staff presented additional testimony on this subject. See Rogan, *et al.*, ff. Tr. 13,756, at 77-81, 120-21; Chesnut, ff. Tr. 15,007 at 14-18; Donaldson, ff. Tr. 17,354, at 12-15; Chesnut, ff. Tr. 22,236, at 7-10. Oral examination of these witnesses appears throughout the March 4-5 and 10-11, April 3, and June 30, 1981 hearing transcripts. No other parties to the proceeding presented testimony on these issues.

1469. Before turning to Contention EP-4(I) and EP-18 (in part), the Board first summarizes the methods used by Licensee to monitor and project off-site radiation releases. Actual field measurements by monitoring teams are only a part of the complete assessment process.

1470. In projecting off-site doses, Licensee initially factors the radiation monitoring system readings for all monitored gaseous effluent release paths into a combined source term.¹⁷⁶ Off-site whole body dose rates and iodine concentrations are then projected by applying the appropriate meteorological dispersion factor for areas of interest. A procedure has been developed which contains the necessary reference information and step-by-step method necessary to project the off-site dose; this procedure provides for manual calculation or use of a preprogrammed microcomputer. Rogan, *et al.*, ff. Tr. 13,756, at 77-78. Personnel trained in the procedure can complete the necessary calculations in about 10-15 minutes. Tr. 14,256-57, 14,378-79 (Tsaggaris).

1471. The results of this initial calculation provide information indicating the potentially affected areas and the expected radiological impact. Using this information, radiation monitoring teams are dispatched to on-site and off-site locations under the control of the Radiological Assessment Coor-

¹⁷⁶The source term describes the rate at which radioactive effluents are released by the plant.

dinator (RAC). Concurrently, the RAC begins to set up the dose assessment area in the control room. A large area map of the plume exposure pathway EPZ is utilized to track the radiation plume, determine affected areas, and select future off-site monitoring points. The RAC used input from the mobile monitoring teams, as well as additional information from the plant radiation monitoring and meteorological systems, in order to update calculations and refine dose projections. Rogan, *et al.*, ff. Tr. 13,756, at 78-79. Reliance on off-site monitoring teams for initial accident assessment and dose projection would be inappropriate since the accident should be classified and off-site agencies notified prior to plume arrival off-site. Chesnut, ff. Tr. 15,007, at 15-16.

1472. Once the off-site emergency support organization is manned and the Environmental Assessment Coordinator (EAC) announces his readiness, the responsibility for off-site radiological and environmental assessment is transferred to the EAC, who operates out of dedicated facilities at Olmsted Airport. In this manner Licensee coordinates responsibility for the receipt of all off-site monitoring data and dissemination of that information to applicable state and federal response personnel in a single individual, the EAC. Rogan, *et al.*, ff. Tr. 13,756, at 57, 80.

1473. With respect to the off-site mobile monitoring teams, on-shift personnel responsible for that function have been trained to report to the Operations Support Center immediately upon declaration of an emergency. From there the teams would report to the processing center to pick up their radiation monitoring instrument kit. The teams are directed by procedure to ensure that the seal on the kit has not been broken and that all instruments are present and accurately calibrated. From the processing center the teams proceed to their vehicles and under the direction of the RAC, proceed to an initial monitoring location. Tr. 14,669-70 (Giangi). Licensee estimates that it might take 5 minutes for the teams to muster at the Operations Support Center and report to the processing center, an additional 5 minutes to check out their equipment and proceed to their vehicles, and perhaps 15-20 minutes to drive to the monitoring location and make the initial readings. Tr. 14,670-71 (Giangi). Thus, Licensee believes that within 30 minutes after declaration of an emergency, Licensee could dispatch its mobile monitoring teams and receive back an initial set of readings. Tr. 14,056, 14,262, 14,690 (Giangi). This estimate has been confirmed by actual experience during a number of drills designed to test Licensee's methods for off-site radiation monitoring. Tr. 14,262, 14,670.

1474. Licensee has adequate on-shift staffing to immediately dispatch two mobile monitoring teams in the manner just described. Tr. 14,056, 14,690 (Giangi). Within one hour after declaration of an emergency, three additional radiological controls technicians report to augment the on-site emergency organization. *Id.* If necessary, these technicians could be used to field an additional three teams, although Licensee anticipates retaining some of the technicians for in-plant radiological controls. Tr. 14,056-60 (Giangi, Rogan). Once the EAC has assumed responsibility for off-site monitoring, he has the capability to dispatch an additional four teams as well as a mobile monitoring laboratory. Tr. 14,690-91 (Giangi); Tr. 14,845 (Riethle).

1475. Contention EP-4(I) alleges that these capabilities are inadequate to meet the standards specified in the Standard Review Plan. The Board disagrees with this conclusion. The cited section of the Standard Review Plan was never put into evidence.¹⁷⁷ Even had it been proffered, the guidance contained therein would not have been helpful or relevant, since current NRC Staff guidance is set forth in NUREG-0654, Staff Ex. 7. In any event, the NRC has not promulgated any guidance for maximum permissible times with which to conduct off-site monitoring. Chesnut, ff. Tr. 15,007, at 15.

1476. Rather, the applicable NRC guidance directs licensees to develop procedures to make a prompt *initial* assessment of the accident based on in-plant alarms, parameters, and monitors. Chesnut, ff. Tr. 15,007, at 15; Staff Ex. 7, at II.D.1, II.I.1 and II.I.4. Licensee has in fact developed such procedures. Rogan, *et al.*, ff. Tr. 13,756, at 68-69. Licensee relies on in-plant instrumentation in conducting its initial assessment of the accident (including accident classification) and in making protective action recommendations to the Commonwealth. Tr. 14,101 (Tsaggaris). The readings reported by the monitoring teams are used to confirm the estimates projected from the in-plant instrumentation. This confirmation process is actually an ongoing iterative process whereby differences between projected and field measured values are used to adjust and refine source terms and meteorology assumptions. Rogan, *et al.*, ff. Tr. 13,756, at 81; Tr. 14,101 (Tsaggaris); Tr. 14,104-05 (Rogan).

1477. Within this concept of operations, the Board finds that the ability to dispatch and receive back initial field monitoring data within 30 minutes is adequate to protect the public health and safety. We are aware that there is testimony of record that, for certain close-in areas (like Goldsboro on the west bank of the Susquehanna River), it might take Licensee from 45 minutes to one hour to receive a field monitoring report. Tr. 14,672-73

¹⁷⁷ Moreover, the Board was unable to locate a Section 13.3(ii)(3) in the Standard Review Plan.

(Tsaggaris). So long as Licensee does not require confirmatory field measurements to classify an accident or make protective action recommendations — and the record is clear that Licensee does not and will not await such field data — any delay in reaching areas like Goldsboro will not adversely affect emergency response by either the on-site or off-site organizations. Indeed, as Staff witness Chesnut points out: “[I]t is inappropriate to rely on off-site monitoring alone for accident classification, dose projection and protective action recommendations since off-site readings will do nothing more than show what levels of radiation are actually being experienced at the monitoring location at a time when protective actions, if necessary, should already have been initiated.” Chesnut, ff. Tr. 15,007, at 16 *see also id.*, at 17.

1478. As to the concerns about mobile monitoring equipment, maintenance and training raised in Contention EP-18 (in part), the Board finds that Licensee has made adequate provisions in these areas. Licensee has dedicated for emergency response purposes specific monitoring equipment. Specifically designated are 75 portable radiation monitoring instruments for emergency use: 25 air samplers, 25 dose rate meters, 20 beta/gamma survey meters, and 5 dual channel analyzers. Of these 75 instruments, 5 air samples, 5 dose rate meters, and 5 dual channel analyzers are designated for use by 5 environmental monitoring teams in an emergency. The evidence indicates that this is an adequate number of portable radiation monitoring instruments for emergency monitoring team use. Donaldson, ff. Tr. 17,354, at 12-13. In addition, the evidence indicates that the Licensee's emergency organization staffing provides sufficient numbers of personnel to operate this equipment. *Id.*, at 14. The Staff confirmed that the Licensee's portable radiation monitoring kits dedicated to emergency use were indeed in place in an inspection conducted on May 4-7, 1981. Chesnut (Unresolved Matters), ff. Tr. 22,236, at 8.

1479. Those personnel assigned to form monitoring teams and to use this portable monitoring equipment are radiological control technicians and auxiliary operators. Under the Licensee's Emergency Plan, these personnel are given specialized training in use of the equipment and in on-site/off-site monitoring techniques and procedures. Licensee has committed to complete one full training cycle for its personnel prior to restart. The Staff observed the use of such equipment by the Licensee's monitoring team personnel in the joint exercise held on June 2, 1981 and reported that the monitoring teams demonstrated an adequate working knowledge of the equipment and survey techniques. Chesnut (Unresolved Matters), ff. Tr. 22,236, at 9-10. Accordingly, the evidence shows that adequate training in the use of the portable radiation monitoring equipment has been, and will continue to be, provided to personnel assigned to use such equipment.

1480. In addition, the Licensee has a final, approved procedure for inventory, operational checks, and calibration of this portable monitoring equipment on a quarterly basis. After the quarterly checks and calibration, the monitoring kits are sealed and monthly checks made to assure that the seals are intact. In its May 4-7 inspection, the Staff verified on a spot-check basis and through review of inventory records that the portable radiation monitoring equipment had been inventoried and calibrated in accordance with the procedure. Chesnut (Unresolved Matters), ff. Tr. 22,236, at 8-9. Thus, we find that the Licensee is exercising adequate administrative control over the maintenance of this equipment.

1481. The Board has found that the Licensee possesses and has designated for emergency use adequate quantities of portable radiation monitoring equipment and has assigned adequate numbers of personnel to monitoring teams in an emergency. We have further found that Licensee exercises adequate administrative control over the maintenance of such equipment and the training of personnel in its use. Accordingly, the portion of Contention EP-18 alleging inadequacies in these regards is without merit.

1482. Board Question 4 inquires as to whether Licensee has considered installation of real-time, remote readout dose rate meters around the TMI site; ANGRY Contention EP-3(C)(1) raises the same issue. The Board is aware that neither NRC regulations nor current Staff guidance requires the installation of such equipment. Chesnut, ff. Tr. 15,007, at 73-74; Staff Ex. 7. Nonetheless, the Board deemed it appropriate to inquire into the matter to determine whether voluntary actions on the part of Licensee might provide capabilities beyond those recommended by the Staff. In response to our question and Contention EP-3(C)(1), both Licensee and the Staff presented testimony. See Rogan, *et al.*, ff. Tr. 13,756, at 84-86; Riethle, ff. Tr. 14,842, at 9-10; Chesnut, ff. Tr. 15,007, at 73-77. No intervenor presented testimony on this issue.

1483. The question and contention are as follows:

Board Question 4:

- a. Has the Licensee considered stationing a limited number of dose rate meters near the site, with the data telemetered to the control room or the response center?
- b. Has the Licensee considered placing meters which publicly measure background radiation levels at a number of public places, thereby enabling the populace to know what the level is?

ANGRY Contention EP-3(C)(1):

3(C) The NRC's vague instruction to the licensee to "upgrade" in generally unidentified respects its "Off-site monitoring capability" is insufficient to assure that such upgrading will result in the ability to obtain and analyze the type and volume of information essential for protection of the public health and safety. ANRGY contends that such capability must *at minimum* encompass the following elements or their equivalent;

- (1) Permanent off-site monitoring devices which register all forms of ionizing radiation and which can be remotely read onsite.

1484. In response to both the Licensing Board's question 4.a and Contention EP-3(C)(1), the Licensee indicated that it is installing realtime off-site dose rate meters that can be read remotely. The instruments have a sensitivity down to 1 urem/hr. Rogan, *et al.*, ff. Tr. 13,756, at 84-86; Tr. 14,822 (Rogan). The system is a 16-station array of stationary monitors that essentially circle the site; Tr. 14,822 (Rogan). Consisting of high- and low-level direct radiation sensors, transmitters, a receiver, and a central processing computer, the system will provide the instantaneous dose rate for each station location with a range of 0 to 10 R/hr. Riethle, ff. Tr. 14,842, at 9. Data from each station are transmitted at four-second intervals to the central processing computer in the Environment Assessment Command Center and printed out by the computer every five minutes. Tr. 14,844; Tr. 14,964-65 (Riethle). Locations of the 16 sensor stations were based on population density, site meteorology, and local topography. Riethle, ff. Tr. 14,842, at 9.

1485. In response to Board Question 4.b, the Licensee indicated that each off-site station of its remote reading monitoring system has both an instantaneous readout and a stripchart readout display which members of the public can view. Riethle, ff. Tr. 14,842, at 9; Tr. 14,848 (Riethle). Thus, the Licensee has, in fact, provided monitors that can be read by members of the public, enabling the populace to know what background radiation levels in the vicinity of the plant may be. The Board finds this to be a satisfactory response to its inquiry.

1486. At present, this real-time monitoring system, installation of which was to be completed by the end of April 1981 (Tr. 14,850 (Riethle)), is not a part of the Licensee's Emergency Plan and is not relied upon by the Licensee for emergency response purposes. Chesnut, ff. Tr. 15,007, at 75; Tr. 13,999 (Giangi).¹⁷⁸ The Staff indicated that current NRC requirements

¹⁷⁸ However, when the system is fully installed and operational and after it has been functionally tested, Licensee will modify its Emergency Plan and EPIPs to reflect reliance on the system for use in verifying source term and dose projection calculations. Tr. 14,613-14 (Rogan, Giangi).

and guidance do not call for use of such a system (Chesnut, ff. Tr. 15,007, at 73-74) and that a real-time remote reading monitoring system would not significantly improve or accelerate accident classification and assessment. Indeed, it was also indicated that under the Licensee's accident assessment and dose projection scheme, operators can initially assess and classify an accident, notify off-site agencies, and make protective action recommendations in many cases before a radioactive plume could travel to the off-site monitors. Chesnut, ff. Tr. 15,007, at 75-76. Since such actions are based on plant status and inplant effluent monitors, an off-site monitoring system is not needed for such purpose. Riethle, ff. Tr. 14,842, at 9-10; Tr. 14,002-03 (Tsaggaris); Rogan, *et al.*, ff. Tr. 13,756, at 84-86.

1487. While a remote reading real-time monitoring system is not necessary for accident assessment and dose projection, it could be useful for detecting releases that escaped detection by inplant monitors (Tr. 15,232 (Grimes)).¹⁷⁹ However, even for that purpose, plant operators have at their disposal many plant parameters which would indicate an abnormal situation, particularly an abnormal situation which would result in a significant unmonitored release. Tr. 14,102-03 (Tsaggaris). In addition, a remote reading off-site monitoring system would be of some use in verifying or confirming off-site dose projections without the potential time delay in obtaining off-site dose readings from monitoring teams. Its usefulness in this regard is limited, however, by the number and location of the off-site monitors. Chesnut, ff. Tr. 15,007, at 73-74, 76.

1488. Moreover as previously discussed, Licensee contends that even with respect to confirmation, mobile monitoring teams possess advantages over a fixed, real-time system. The primary advantage is that by considering actual site meteorology, the RAC or EAC can dispatch the radiation monitoring team to the precise areas of principal interest and obtain prompt information for refining the dose projection. Obviously, the real-time monitors cannot be so positioned. Rogan, *et al.*, ff. Tr. 13,756, at 85-86; Tr. 14,264-65 (Giangi). In addition, due to technical limitations, the real-time monitors are limited to gross gamma detection; they cannot monitor beta radiation nor can they distinguish between isotopes that may be present in the plume. Licensee's mobile monitoring teams, however,

¹⁷⁹ With regard to concerns raised during the course of the proceeding about the length of time it would take to dispatch a monitoring team to, and receive readings from, Goldsboro which is in the vicinity of the plant site but on the opposite side of the river, we note that the Licensee's remote reading monitoring system has one monitor location in the vicinity of Goldsboro. Riethle, ff. Tr. 14,842, at Table 2. This will allow the Licensee to receive instantaneous dose readings from the Goldsboro area without the time delay inherent in sending a mobile monitoring team to that area.

have beta detection equipment, and through use of their air samplers and sodium iodide detectors can measure iodine concentrations. Tr. 14,913-16 (Riethle).

1489. Based on this analysis, the Board agrees with Licensee that real-time, remote dose rate meters are not required in order for Licensee to discharge its accident assessment and classification obligations or for making dose projections and protective action recommendations. Nor do we believe that it would be prudent for Licensee to replace its mobile monitoring teams with the real-time dose rate meters. Apparently, Licensee intends to use its system of 16 dose rate meters as an adjunct to the mobile monitoring teams. Tr. 14,913 (Riethle). This approach seems sensible to the Board. We understand that the Staff is planning additional studies to determine whether there are advantages to using both survey teams and in-place rate meters. Chesnut, ff. Tr. 15,007, at 76. Until such studies are completed and a decision has been made as to whether real-time remote readout devices will be required at other nuclear power plant sites, the Board finds no reason to impose such a requirement on this Licensee.

1490. ANRGY contention EP-3(C)(2), see below, challenges the adequacy of Licensee's Meteorological Information and Dose Acquisition System (MIDAS), which is used by Licensee to assess and evaluate actual and potential off-site releases of radioactivity. Testimony on MIDAS, and a comparison of its capabilities with the Atmospheric Release Advisory Capability (ARAC), was provided by Licensee and the Staff. See Rogan, *et al.*, ff. Tr. 13,756, at 82-83; Tr. 14,843-44, 14,866-96 (Riethle); Levine, ff. Tr. 17,298, at 10-11. No other party to the proceeding provided testimony on this issue. ANRGY Contention EP-3(C)(2):

The NRC's vague instruction to the Licensee to "upgrade" in generally unidentified respects its "off-site monitoring capability" is insufficient to assure that such upgrading will result in the ability to obtain and analyze the type and volume of information essential for protection of the public health and safety. ANRGY contends that such capability must *at minimum* encompass the following elements or their equivalent:

- (2) Information analysis capability equal to or greater than that provided by the Atmospheric Release Advisory Capability System (ARAC). This contention now challenges the adequacy of licensee's MIDAS radiological assessment system (EP p. 6-9) to the extent that the information analysis capability it provides does not equal or exceed that provided by the ARAC system.

1491. Initial dose projections in an emergency are made by the Licensee using the in-plant radiation monitoring system and meteorological data available in the control room. Tr. 13,893 (Tsaggaris). Once the Licensee's Environmental Assessment Command Center (EACC) becomes operational, the dose projections used in formulating protective action recommendations are made from the EACC by means of the Licensee's MIDAS radiological assessment system, which utilizes real-time meteorological data and radiation monitor data input to MIDAS. Tr. 13,895-96 (Giangi); Tr. 14,909-910 (Riethle). The real-time meteorological data for MIDAS comes from the on-site meteorological tower. The MIDAS program itself incorporates parameters of the "Class A" meteorological model of NUREG-0654 and includes topographical characteristics of the site, input effluent releases, 15-minute average meteorological data, site-specific climatological effects such as seasonal-, diurnal-, and terrain-induced flows, and historical dispersion factors. Tr. 14,843-44, 14,866 (Riethle). With these data, MIDAS produces dose isopleths (Tr. 14,866 (Riethle)) and predictions of plume path and plume touchdown points. Tr. 14,882 (Riethle). Output of the MIDAS program includes distance and direction from the site where maximum doses will occur with whole body, skin, and thyroid dose projections for the maximally exposed individual. Tr. 14,882, 14,884 (Riethle). The evidence demonstrates that MIDAS satisfies the Class A model criteria of NUREG-0654, Appendix 2. Rogan, *et al.*, ff. Tr. 13,756, at 82; Tr. 17,299-300 (Levine).

1492. The MIDAS program provides accurate dose projections out to a distance of about 10 miles from the site (Tr. 17,300-302, 17,325, 17,327 (Levine)), and with the MIDAS output modified by the Licensee's local meteorologist¹⁸⁰ for projections beyond 10 miles, may be used for dose projection out to about 50 miles from the site. Tr. 14,970-71 (Riethle); Tr. 17,325, 17,331-32 (Levine).

1493. ARAC, a program similar to MIDAS run by the Environmental Protection Agency, is not used by Licensee. ARAC requires support from the Lawrence Livermore Laboratories in California and, for long distance dose projection, requires activation of computers in California which could result in delays in getting projections from the ARAC program. Tr. 17,341-42 (Levine). During the venting of krypton from the TMI-2 containment, the Licensee used MIDAS and EPA used ARAC to project off-site doses. The plume and off-site dose projections were verified with off-site monitoring teams. That experience showed that MIDAS was more reliable more often than ARAC. Tr. 14,877 (Riethle); Rogan, *et al.*, ff. Tr. 13,756, at 82-83. From the Krypton venting experience, MIDAS was

¹⁸⁰ The Licensee employs a meteorologist who normally is stationed at the EACC at the Harrisburg International Airport. Tr. 14,245-46 (Giangi).

shown to be somewhat conservative, to predict doses within a factor of two, and to be most accurate when dispersion characteristics were stable, e.g. under the condition when it is most necessary to have accurate dose projections. Tr. 14,894-97 (Riethle). The krypton venting experience also showed that ARAC was neither as sensitive nor as accurate in predicting plume location within 10 miles of the site as was MIDAS. Tr. 14,964 (Riethle).

1494.

In summary the evidence shows that, within 10 miles of the site, MIDAS provides a rapid information analysis capability which is comparable to ARAC. Beyond 10 miles, MIDAS together with the Licensee's meteorologist provides an assessment capability comparable to ARAC. Levine, ff. Tr. 17,298, at 10-11. Based on the krypton venting experience, MIDAS would appear to provide better and more timely dose projections than ARAC. Accordingly, we find that the Licensee's MIDAS radiological assessment capability is at least comparable to the capability of ARAC and that Contention EP-3(C)(2) is without merit.

1495. The last issue concerning the adequacy of Licensee's accident assessment capability relates to the TMI Radiological Environmental Monitoring Program (REMP). Sholly Contention EP-18 (in part) was addressed in testimony by both Licensee and the Staff. Rogan, *et al.*, ff. Tr. 13,756, at 83-84; Riethle, ff. Tr. 14,842, at 2-8; Donaldson, ff. Tr. 17,354, at 8-12; *see also* Licensee Ex. 30, at 4.7.6.2.1. No other party to the proceeding provided testimony on this issue.

Sholly Contention EP-18 (in part):

It is contended that the Licensee's environmental radiation monitoring program contains an insufficient number of monitoring sites and an inadequate distribution of monitoring sites within twenty miles of the Unit 1 site to provide sufficient protection of the public health and safety. It is further contended that there is in the Licensee's environmental radiation monitoring program an unwarranted reliance on the use of thermoluminescent dosimeters (TLDs) for providing information used to calculate radiation exposure data and that this unwarranted reliance on TLDs seriously underestimates radiation doses to the public.

1496. The Licensee's REMP was also the subject of the Commission's August 9, 1979 Order and Notice of Hearing in this proceeding wherein the Commission directed, as short term action 3(c), that the Licensee is to

"[U]pgrade offsite monitoring capability, including additional thermoluminescent dosimeters or equivalent." CLI-79-8, 10 NRC 141, 144 (1979).

1497. The purpose of the REMP is to provide an after-the-fact or historical assessment of radiological impact. Riethle, ff. Tr. 14,842, at 4. It is a systematic sampling and monitoring program for the major exposure pathways involving air, water, and terrestrial media to provide information to determine whether radiological exposures are within regulatory limits and to monitor for the long-term buildup of radionuclides in the environment. Riethle, ff. Tr. 14,842, at 2-3. It is not used during the initial accident assessment process or in making protective action recommendations. Therefore, the adequacy of Licensee's REMP is not directly related to the adequacy of emergency preparedness around TMI.

1498. REMP monitoring locations are based on site meteorology, river hydrology, local demography and differential land use. Riethle, ff. Tr. 14,842, at 5. For monitoring purposes, the REMP utilizes, among other devices, thermo-luminescent dosimeters (TLDs) placed in accordance with the NRC Staff's Branch Technical Position set forth in Regulatory Guide 4.8 which recommends at least 40 monitoring positions with an inner ring at approximately the site boundary, an outer ring at four to five miles from the site and a monitor in each of 16 radial sectors in each ring. Riethle, ff. Tr. 14,842, at 4-6.

1499. The REMP currently in place at TMI satisfies this guidance. TMI has 73 stations with two or more TLDs located as follows: 12 stations are located at or near the site boundary, a second ring of 7 stations is located out to a distance of 0.6 mile from the site. Two additional rings comprised of 6 and 2 stations are at distances of 1 to 3 miles, respectively. The 4-5 mile ring suggested by the Staff is composed of 16 Stations, ranging in distance from 4.3 to 5.0 miles. The remainder of the 30 stations are located in areas of special interest at distances of 5-10 and 10-20 miles from the site. Riethle, ff. Tr. 14,842, at 6, Table 1 and Figure 1. The Board thus finds, contrary to the claim of EP-18 (in part), that Licensee's REMP contains a sufficient number of monitoring sites and an adequate distribution of those sites to provide reasonable assurance that the public health and safety will be protected.

1500. Contention EP-18 also alleges that Licensee places an unwarranted reliance on thermo-luminescent dosimeters (TLDs), which it is claimed results in a serious underestimate of the radiation dose to the public. There is no evidence of record to support this position. As was previously indicated, Licensee's accident assessment program relies on numerous different types of indicators, including plant process instruments, in-plant effluent monitors, mobile monitoring teams using a wide array of detection devices, and a set of 16 real-time, remote readout dose rate meters. The

REMP provides additional means of radiation monitoring which are not limited to TLDs but also include sampling and measurement of a variety of other environmental media to verify radiation doses to the public.

1501. The Board finds that for the intended purpose for which the REMP with TLD monitoring was established — to provide an after-the-fact measure of radiological impact — the evidence shows that Licensee does not place an unwarranted reliance on TLDs. The TLDs used by the Licensee comply with the standards of Revision 1 of Regulatory Guide 4.13 (Riethle, ff. Tr. 14,842, at 7) and have been demonstrated to be effective devices for quantifying exposures off-site. Donaldson, ff. Tr. 17,354, at 11.

1502. In summary, the parties put into controversy a broad range of issues relating to Licensee's accident assessment capabilities. The Board has reviewed the evidence of record and the proposed findings set forth by the parties. In each instance the Board finds that Licensee's capabilities in these areas are adequate to provide reasonable assurance that the public health and safety will be protected in the event of an accident at TMI.

D. Initial Notification of Governmental Units

1503. Several of the contentions which were raised and admitted as issues in the proceeding deal with the initial notification of governmental units in an emergency. Specifically, these contentions are directed to the sequence of notification of government authorities and with the information transmitted to off-site authorities.

1. Sequence of Calls

1504. ANGRY Contention EP-4(G), alleging inadequacies in the procedures for notifying counties in the plume EPZ of an emergency, states:

The licensee's emergency notification procedures (pp. 6-2, 6-3, 6-4; Figure 15) (See also Pa. DOP Appendix 3) are inadequate with respect to certain areas directly at risk in the event of a nuclear accident, namely, York and Lancaster Counties. Although the Dauphin County Emergency Operations Center receives immediate notification of an emergency declaration, notification of York and Lancaster Counties must following an excessively circuitous path:

1. Licensee to Dauphin
2. Licensee to PEMA
3. PEMA to BRP
4. BRP to Licensee

5. Licensee to BRP
6. BRP to PEMA
7. PEMA to Dauphin
8. PEMA to York, Lancaster, and Cumberland Counties.

Such a notification sequence is in direct conflict with requirements that "delegations of authority that will permit emergency actions (such as evacuation) to be taken with a minimum of delay should be carefully considered" (NUREG-75/111, §A3) and that "Upon declaration of a 'general emergency' *immediate* notification shall be made *directly* to the offsite authorities responsible for implementing protective measures . . ." (EPRG II(A)(5)) [Emphasis in original]. Also, N. 0654 J7.

1505. ANGRY Contention EP-4(G) questions the adequacy of the system that Licensee uses to notify York and Lancaster Counties that an emergency has been declared. Licensee's emergency notification system is described in Sections 4.6.1, 4.6.2.3.2 and 4.6.2.6-8 and in Figure 15 of its Emergency Plan. Licensee Ex. 30. The NRC Staff has reviewed the adequacy of Licensee's emergency notification system and its favorable conclusions are reported in the Emergency Preparedness Evaluation (EPE) and Supplement 1 thereto. Staff Ex. 6, at 11-12; Staff Ex. 23, at II-3. Both Licensee and the Staff presented testimony on Licensee's emergency notification system and ANGRY Contention EP-4(G). See Rogan, *et al.*, ff. Tr. 13,756, at 86-93; Chesnut, ff. Tr. 15,007, at 36-40. Oral examination of these witnesses on this subject appears in the March 4-5, 11-12 and June 30, 1981 hearing transcripts. Neither the Commonwealth of Pennsylvania nor any intervenor presented testimony of this issue, although these parties participated in the cross-examination of the witnesses.

1506. Contrary to the allegations of the contention, the Licensee will directly notify the State *and* all five counties in the plume EPZ immediately upon declaration of a General Emergency. Chesnut, ff. Tr. 15,007, at 37; Rogan, *et al.*, ff. Tr. 13,756, at 62. Thus, the Licensee's notification provisions are wholly adequate in that regard.

1507. For emergencies in the Unusual Event, Alert and Site Emergency categories, provision is made for the Licensee to directly and immediately notify Dauphin County and PEMA and for PEMA to then notify BRP and the five counties in the plume EPZ, which includes York and Lancaster Counties. Chesnut, ff. Tr. 15,007, at 38; Rogan, *et al.*, ff. Tr. 13,756, at 86-87. Thus, the sequence of notifications alleged in the conten-

tion, which implies that counties other than Dauphin County would not be notified until after seven other calls had been made, is misleading and incorrect.

1508. For the emergency classifications in which the Licensee does not notify York, Lancaster, Lebanon and Cumberland Counties directly, the Licensee and Dauphin County have established contingency procedures whereby Dauphin County will notify the other counties in the event that PEMA has failed to do so. The evidence indicates that, with these contingency procedures, these four counties should be notified within 15 minutes of declaration of an emergency. Chesnut, ff. Tr. 15,007, at 38.

1509. As to the assertion in the contention that Licensee's delegation of notification responsibility in the Unusual Event, Alert and Site Area Emergency categories is inconsistent with federal guidance, we find, to the contrary, that such delegation in other than the General Emergency category is wholly consistent with the guidance that "delegations of authority that will permit emergency actions . . . to be taken with a minimum of delay should be carefully considered." Chesnut, ff. Tr. 15,007, at 39-40. Notification of York, Lancaster, Lebanon and Cumberland Counties by parties other than the Licensee would relieve the Licensee's onshift personnel of some notification burdens, allowing them to concentrate on other emergency response actions.

1510. In summary, the Board finds that the established notification provisions asserted to be inadequate in ANGRY Contention EP-4(G) are, in fact, adequate and that the contention is without merit.

2. Information Transmitted

1511. Aamodt Contention EP-1 (in part) and ANGRY Contention EP-4(E) state:

Aamodt Contention EP-1:

All data and plant operating personnel observations relative to all radioactive releases must be transmitted immediately and simultaneously to the NRC, Pennsylvania Department of Environmental Resources, the commissioners of Dauphin, York and Lancaster Counties and the licensee's management. It is further contended that licensee must provide this capability before restart of TMI-1.

ANGRY Contention EP-4(E):

The licensee's EP fails to provide for furnishing to the Pennsylvania Bureau of Radiation Protection (BORP) information called for in the latter's plan such as "nature of the failure, the status of

safeguards, the condition of consequence mitigating features" (p. VI-1).

1512. These two contentions question the adequacy of the information that Licensee transmits to emergency response organizations. Specific messages, developed in conjunction with the Commonwealth of Pennsylvania and local emergency response organizations, are specified in Licensee's Emergency Plan Implementing Procedures (EPIP). These messages provide information on the emergency class, type and magnitude of any actual or potential radioactive releases, affected areas, and protective action recommendations. Licensee Ex. 30, §§4.5.1.3.1 and 4.6.1, at 5-8 to 5-9, 6-1. Both Licensee and the NRC Staff presented testimony on Aamodt Contention EP-1 and ANGRY Contention EP-4(E). See Rogan, *et al.*, ff. Tr. 13,756, at 86-93; Chesnut, ff. Tr. 15,007, at 29-36, 43-45. Oral examination of these witnesses relevant to this subject matter appears throughout the March 3-5, 10, 12 and 17, 1981 hearing transcripts.

1513. As detailed below, upon declaration of any of the four classes of emergency, the Licensee will immediately notify both the NRC and PEMA and provide information on the accident class, the potentially affected populace and geographical areas, and the type and magnitude of potential or actual releases. Subsequent followup messages to the NRC and BRP transmitting a broad range of information on radioactive releases, prevailing weather conditions, projected doses and dose rates, and radioactive contamination are provided for in the Licensee's Emergency Plan. This information will be provided to the NRC over a direct "Emergency Notification System" line and to BRP over a direct dedicated "Radiological Line" which can be kept open throughout the course of the accident. Chesnut, ff. Tr. 15,007, at 29-31.

1514. Licensee's Emergency Plan specifically provides for the transmittal of data on radioactive releases to the NRC. In the event of an emergency declaration, Licensee notifies, among other facilities, NRC headquarters in Bethesda, Maryland.¹⁸¹ This initial notification provides information on the emergency class, type and magnitude of any actual or potential release, affected populace and areas, and any recommendations for protective

¹⁸¹ This initial notification is accomplished by means of the NRC Emergency Notification System (ENS), a dedicated telephone system that connects TMI and all other operating reactors with NRC headquarters in Bethesda, Maryland. ENS hotline phones are located in the ECC (control room and shift supervisor's office, from which the initial notification is made), OSC, TSC and EOF. Rogan, *et al.*, ff. Tr. 13,756, at 63. In the event a Site or General Emergency is declared, the NRC Health Physics Network Line (HPN) is activated by the NRC operations center in Bethesda, Maryland. This system is dedicated to the transmission of radiological information by NRC personnel on site to NRC personnel in Bethesda and at the regional office. HPN phones are located in the ECC, EOF, and the NRC resident site inspector's office. Rogan, *et al.*, ff. Tr. 13,756, at 64.

actions. Chesnut, ff. Tr. 15,007, at 30-31; Licensee Ex. 30, at 6-1. Subsequent to this initial notification, the NRC receives follow-up messages from Licensee, which include such information as: type of actual or projected release and projected affected areas; estimate of quantity of radioactive material released; chemical and physical form of released material, including estimates of the relative quantities and concentration of noble gases, iodines and particulates; prevailing weather; actual or projected dose rates and integrated dose at exclusion area boundary and at about 2, 5 and 10 miles; and estimate of any surface radioactive contamination. Chesnut, ff. Tr. 15,007, at 30; Licensee Ex. 30, at 5-8 to 5-9. The Board therefore finds that Licensee has provided for the timely transmission of data and plant operating personnel observations on radioactive releases to the NRC.

1515. As specified in Licensee's Emergency Plan, immediately after Licensee notifies PEMA of an emergency at TMI, PEMA notifies BRP. Rogan, *et al.*, ff. Tr. 13,756, at 86-87; Licensee Ex. 30, at 6-5. After BRP is notified that an emergency condition exists at TMI, BRP contacts the site for technical information. The applicable licensee procedures contain an "Emergency Status Report" checklist. This report, which summarizes all key plant parameters and information necessary to assess the radiological impact of the emergency, is communicated to BRP. The report includes a description of the emergency, the status of emergency safeguards systems, and information on radiological releases — *i.e.*, source terms, meteorology, anticipated duration of releases, and projected doses. Rogan, *et al.*, ff. Tr. 13,756, at 89. The Board therefore finds that Licensee has provided for the timely transmission of data and plant operating personnel observations on radioactive releases to BRP.

1516. Aamodt Contention EP-1 alleges that radiological release data must be transmitted immediately to the commissioners of Dauphin, York and Lancaster Counties. Initial notification of an emergency and an actual or potential radioactive release is made not to the county commissioners, but to the county duty officers, who in turn mobilize the county emergency response organizations, which includes contacting the county commissioners. Chesnut, ff. Tr. 15,007, at 33. We agree that it is unnecessary, unreasonable and unworkable to expect the commissioners to be directly reachable from the TMI site or from PEMA at all times.

1517. Licensee's Emergency Plan specifically provides for the direct and immediate notification of Dauphin County in the event of an emergency declaration. Dauphin County is contacted by telephone. If contact cannot be made by this method, the Dauphin County radio system is activated. Rogan, *et al.*, ff. Tr. 13,756, at 86; Tr. 14,596-97 (Rogan). This initial notification includes transmitting information on emergency class, type and magnitude of any actual or potential release, affected populace and areas,

and any recommendations to take protective actions. Chesnut, ff. Tr. 15,007, at 31-32; Licensee Ex. 30, at 6-3. Licensee's Emergency Plan also provides for the direct notification of all five counties in the plume EPZ, including York and Lancaster Counties in the event a General Emergency is declared. This notification would include the information normally transmitted to Dauphin County.

1518. Under the lower three emergency classes, Licensee does *not* directly contact York or Lancaster County to provide them with information about radioactive releases. This function is performed by PEMA based on technical information it receives from BRP. This approach is the normal operating procedure used by PEMA during all emergencies. It has been successfully used on numerous occasions and the affected parties determined that a similar system should be used in radiological emergencies. It has the advantage of maintaining a consistent chain of command for all emergencies and of ensuring that a single agency, PEMA, will provide consistent and coordinated information to the county emergency response personnel. Rogan, *et al.*, ff. Tr. 13,756, at 88-89; Chesnut, ff. Tr. 15,007, at 32. Nevertheless, for all emergency categories, the capability exists for providing information to the counties on radioactive releases directly from Licensee's emergency personnel at TMI-1, using the auto-dialer telephone. Chesnut, ff. Tr. 15,007, at 31-32. The Board therefore finds that Licensee has provided for the transmission of data and plant operating personnel observations on radioactive releases to Dauphin, York and Lancaster Counties in a timely fashion.

1519. The Licensee's Emergency Plan provides for notification of appropriate Licensee management through emergency call-out procedures. Chesnut, ff. Tr. 15,007, at 33-34. These provisions for notification and information transmission to Licensee's management as well as to Commonwealth agencies and risk counties apply in circumstances where one of the four classes of emergencies has been declared. There are no emergency plan provisions for notification and information transmission in non-emergency situations in which no emergency has been declared. Chesnut, ff. Tr. 15,007, at 34-35.

1520. Insofar as Aamodt Contention EP-1 asserts that notification should be made and information should be transmitted relative to *all* radioactive releases, we note that there is no regulatory requirement for such immediate reporting when the releases involved are planned, routine releases within the limits of NRC regulations and the TMI-1 license. Chesnut, ff. Tr. 15,007, at 35-36. There is no evidence of record which indicates that the notification and information reporting sought by Contention EP-1 for radioactive releases in non-emergency situations can or

should be required as a condition of restart. Consequently, we must reject this contention insofar as it applies to radioactive releases in non-emergency situations.

1521. Contrary to the assertions in Contention EP-4(E), the Licensee's Emergency Plan provides for the transmission of information to BRP on the nature of the failure, the status of safeguards and the condition of consequence mitigating features. At a minimum, Licensee provides BRP with all information specified in Licensee's "Emergency Status Report" checklist as noted above. This report contains information similar to that called for in the BRP plan. Chesnut, ff. Tr. 15,007, at 44; Licensee Ex. 30, at 5-8 to 5-9. The Board therefore rejects the assertion that Licensee's Emergency Plan fails to provide BRP with information called for in the latter's plan. Licensee's Emergency Plan also provides for the transmission of follow-up information to BRP and is consistent with the guidance of NUREG-0654 in this regard. Chesnut, ff. Tr. 15,007, at 43-45; Staff Ex. 6, at 11. Beyond this, as noted above, the Licensee has established an open, direct line (the "Radiological Line") between TMI and BRP. When this line is activated in an emergency, BRP can request any information it believes to be necessary on plant conditions and the status of the emergency, and TMI personnel will provide such information that is available. Chesnut, ff. Tr. 15,007, at 41-45; Tr. 14,215 (Tsaggaris). Based on these provisions of the Licensee's Emergency Plan, the Board finds ANGRY Contention EP-4(E) to be without merit and we reject it.

E. Public Education, Warning and Emergency Instructions

1522. Numerous contentions concerned public education, warning and emergency instructions to the public. We shall discuss each of these subject areas and their corresponding contentions separately below. The Emergency Instructions to the Public area is further subdivided into Concept of Operations, Emergency Broadcast System, 911 Telephone System and News Releases. In addition we shall discuss, as part of Public Education, the related subject of notifying and informing transient persons in the TMI area.

1523. The Combined Intervenors, the Commonwealth, the Aamodts, Licensee and Staff all submitted proposed findings in these areas and the Board has considered all of these in arriving at its decision. We turn first to Public Education.

1. Public Education

1524. There is no dispute among any of the parties in this hearing that a comprehensive and timely public education program is essential to as-

asuring, as much as is reasonably possible, a successful public response in the event of an emergency at TMI. The major issues are 1) what constitutes the proper content of such a program and 2) the best methods of informing the public.

1525. Combined Intervenor proposed findings ¶¶ 170-172 clearly summarize the goal of a public information program as follows:

170. The public information program as a whole must be designed and implemented to achieve appropriate and adequate emergency responses to the protective actions.
171. The program should include advance information and education with detailed information regarding local plans, educational materials on radiation, detailed information regarding protective action measures, and information for special groups. (II.G.1) [of NUREG-0654] These materials should be designed so that the information is easily understood by [the] public. Furthermore, the material should be periodically distributed and kept available for easy reference during an emergency. EBS materials during an emergency should refer to and be consistent with previous information, but cannot completely take the place of prior information, because of the limited amount of time which may be available and the inappropriateness of radio for disseminating some types of information (for example, maps).
172. The importance of the quality of the public information program in effecting evacuation or other emergency response cannot be overstated. (See Jaske, Tr. 22,729-32, and Erikson, Tr. 21,753). Mr. Belser of PEMA noted that the only way effective public information programs for schools, for example, can be accomplished is by communicating as much as you can before the event, not during or after. (Tr. 20,863).

1526. The Board believes that the level of detail for any of these subjects should be consistent with the purpose for which it is intended. Overemphasis on detail may defeat the purpose of a public information program on emergency measures. We believe this to be especially true for printed material aimed at providing information to be read and interpreted rapidly during an emergency situation. The Board observes that, for the most part, the Combined Intervenors and the Aamodts call for public information programs which we perceive to be too detailed for the five risk county brochures and PEMA pamphlet or for messages delivered over the Emer-

gency Broadcast System (EBS). For example, the Aamodts would have a detailed program on the health effects of ionizing radiation. Aamodt proposed findings on EP-1, ¶¶ 7, 8, 9. In the same vein, the Combined Intervenor's proposed findings on prepared EBS messages (¶¶ 147, 148) suggest that information on some 14 additional subject areas be included in the EBS messages, and then fault the current messages for being too long and unintelligible. This appears to the Board as not only inconsistent but also a case in which too much detailed information may be counter-productive.

1527. We first briefly discuss the standards governing emergency preparedness public education programs. 10 CFR 50.47(b)(7) and Part 50, Appendix E, §IV.D.2 establish the planning standard for emergency preparedness public education. The standard requires, in relevant part, that information be made available to the public on a periodic basis as to how they will be notified and what their initial actions should be in an emergency (e.g., listening to a local broadcast station and remaining indoors), and that procedures for coordinated dissemination of information to the public be established. NUREG-0654, §II.G provides the detailed guidance criteria used by the Staff and FEMA in evaluating public education programs. Staff Ex. 7, at 49-51. These criteria, in relevant part, essentially state that a coordinated, periodic — at least annual — program for dissemination of information to the public should be established. This program should specify the manner in which the public will be notified and what their actions should be in an emergency, including at a minimum general information on the effects of radiation, evacuation routes and protective measures, needs of special populations, and contact points for additional information. The criteria further provide that the program should reach both permanent and transient adult populations in the plume exposure pathway EPZ. The requirements of the emergency planning rule, with the guidance in NUREG-0654, Revision 1, supersede the guidance of Regulatory Guide 1.101. Chesnut, ff. Tr. 15,007, at 59-60; Chesnut and Bath, ff. Tr. 19,626, at 7-8. The responsibility for the development of an adequate emergency preparedness public education program is shared by the Licensee, and the state and local governments; that is, those entities are in effect collectively responsible for ensuring that a program meeting the planning standards for public education is developed, that the information is coordinated and consistent, and that it is made available to the entire permanent and transient population within the plume exposure pathway EPZ. Chesnut, ff. Tr. 15,007, at 61; Chesnut and Bath, ff. Tr. 19,626, at 9; Staff Ex. 7, at 49-51.

1528. The thrust of this discussion is contrary to the Aamodts' allegation that there are no criteria with regard to quality or content of public information programs. Aamodt proposed findings on EP-1 ¶ 11. The Board

finds that these allegations are without merit. In addition, contrary to the Aamodts' proposed finding on EP-1 ¶ 10, although these standards do not assign responsibility for the public information programs to any specific individuals, the overall responsible agencies are named. The Board believes that this assignment of responsibility as described above is sufficient. Further, individual responsibility is discussed in response to contentions to EP-4(C), EP-14(C) and EP-14(Q).

1529. Next we turn to the public information programs established by both the Commonwealth and the Licensee. The Commonwealth has set forth a comprehensive public information program in Annex E (Fixed Nuclear Facility Incidents) to its Disaster Operations Plan. The Annex includes direct distribution to the public and media coverage. Commonwealth Ex. 2.a, Appendix 15, Section IV. The essential elements of the program are brochures prepared for each of the five risk counties which include evacuation routes and other pertinent information. *E.g.*, Commonwealth Ex. 4, 5, and 7. These brochures have been distributed at least to the municipal level in most counties. Tr. 18,046 (Comey); Tr. 19,053 (Adler). The latest distribution prior to the close of the record in York County, for example, was November 1980. Tr. 20,799-800 (Curry). The Commonwealth (PEMA) has also prepared a booklet giving general educational information on radiation. Commonwealth Ex. 3. The record reflects that this booklet was last distributed in the TMI-1 area in September 1979. Tr. 18,065-067 (Comey). The Commonwealth in proposed finding ¶ 94 has committed to the distribution of the updated PEMA booklet and county brochures prior to restart. The Board also notes that Licensee has, by letter dated June 26, 1981, committed to assume at least financial responsibility for such printing and distribution. Tr. 22,878 (Chesnut).

1530. FEMA has reviewed the five county brochures and the PEMA brochure and has found that a combination of the information in both is required. Staff Ex. 21, at 13; Tr. 22,426 (Bath); Chesnut and Bath, ff. Tr. 19,626, at 9; Tr. 18,981 (Adler); Tr. 22,799 (Adler); Tr. 19,291 (Pawlowski). Furthermore, FEMA has found that implementation of the public education program is required prior to any restart; *i.e.*, both the county and PEMA pamphlets must be distributed to the permanent and transient population. Tr. 19,338 (Adler); Chesnut and Bath, ff. Tr. 19,626, at 8, 9; Tr. 18,983-984 (Adler); Tr. 22,799 (Adler).

1531. The Commonwealth would have the Board conclude (proposed finding ¶ 92) that the county brochures may be outdated and inadequate. Evidence is cited that the Dauphin County Coordinator indicated that revisions to his brochure were anticipated, based upon changes reflected in the April 1981 draft of the county plan. Tr. 20,962 (Wertz). In addition, the County Coordinators stated that pick-up points identified by the

municipalities would become a part of the public education materials. Tr. 20,814, 20,879 (Curry); Tr. 20,947 (Wertz). Some changes in the evacuation routes may be made following PEMA's full review of the Parsons-Brinckerhoff Evacuation Time Study (Licensee Ex. 52). Tr. 19,387 (Adler); Tr. 18,015 (Lothrop); Tr. 18,072 (Comey). FEMA has stated that information regarding school evacuations should be included in the county brochures. Tr. 22,433-34 (Bath); Tr. 19,636 (Bath). The Board also notes that a review of the final versions of the public information pamphlet by FEMA or the NRC Staff is anticipated. Tr. 19,380 (Adler); Tr. 22,916 (Chesnut).

1532. We have discussed the Commonwealth's public education program. Now we briefly describe the Licensee's program. In addition to the PEMA and county brochures, the Licensee has had an active, ongoing public education and information program involving press releases, media briefings, the TMI-observation center, and public speakers. With the revised Licensee Emergency Plan, however, a new public education and information program is being developed in coordination with the Commonwealth and the five counties in the plume EPZ for TMI. Tr. 14,014-15 (Rogan). The NRC Staff has evaluated the Licensee's public education and information program which includes meetings to acquaint and inform government officials and the public of the new siren alerting system being installed by the Licensee, general radiation seminars, briefings on emergency responsibilities, tours of facilities for media personnel, and the distribution of public education and information pamphlets. Based on that evaluation, the Staff has determined that the Licensee's public education and information program will satisfy, and, in fact, go beyond, the guidance of Section II.G of NUREG-0654. Staff Ex. 23, at II-5, II-6. FEMA has evaluated the proposed public education and information programs in the emergency plans of the state and the five counties within the plume EPZ for TMI and has determined that those programs, if implemented, will exceed the requirements of the NRC's planning standard on public education and information (10 CFR 50.47(b)(7)). Staff Ex. 23, at III-16.

1533. The Licensee has a general public information program for the plume EPZ designed to give the public an overview of emergency planning around TMI and to provide specific information on where and how they will be notified of an emergency and what protective actions may be taken. This program is being coordinated with PEMA which, together with the counties and local emergency response organizations, has a program for publishing pertinent emergency planning information in newspapers and distributing brochures and fact sheets containing emergency preparedness information. Rogan, *et al.*, ff. Tr. 13,756, at 99-101.

1534. The Board has reviewed the county brochures and PEMA pamphlet and finds their design and content acceptable for their intended purpose.¹⁸² We believe that the counties and PEMA may wish to improve and update some portions of these brochures. (For example, see Tr. 19,421 (Smith)). We conclude, however, that the primary purpose of these brochures is not to give a course in radiation biology, but to inform the public what to listen for and what to do in case of an emergency at TMI-1.

1535. The Commonwealth would have the Board direct the Staff to certify to the Commission that (1) The five risk county brochures have been revised and updated, and (2) the PEMA and updated county brochures have been distributed to the resident and transient populations in the plume exposure EPZ.

1536. The Board notes that the Commonwealth would have Licensee withhold both county and PEMA brochures from distribution until all changes and revisions desired by the Commonwealth have been made. Commonwealth reply finding ¶ 8. The changes in the PEMA pamphlet are unspecified. Based on our review of the unrevised documents, we do not agree that either the county brochures or the PEMA pamphlet¹⁸³ need be revised prior to printing and distribution by the Licensee so long as they contain up-to-date information, *e.g.*, any revisions to evacuation routes. The Commonwealth has had the opportunity to make any changes it desired before a reprinting and redistribution of the pamphlets. We do, however, direct the Staff to review any changes made in the five risk county brochures and PEMA pamphlet on emergency preparedness and advise the Commission prior to restart of the impact of the revisions on the intended purpose of these documents.

1537. The Board's review of the Licensee's and Commonwealth's public information programs on emergency preparedness gives us reasonable assurance that the proper information is currently supplied or should soon be provided to the general resident population in the vicinity of TMI-1. We believe that sufficient guidelines and criteria are in place about which to structure these programs and the FEMA and Staff reviews, supervision

¹⁸² We believe that the analogy of ionizing radiation to sunlight is not unduly strained in the context of the entire PEMA brochure and is acceptable. *See* Tr. 19,413-19,421 (Pawlowski, Adler). The analogy is not perfect, and arguably could be improved. *See e.g.*, Tr. 19,421 (Smith). However, this is a minor matter and is not an important improvement. We therefore do not require such a change.

¹⁸³ The Commonwealth (reply finding ¶ 7) relates that PEMA took the opportunity to make minor changes in its pamphlet based on the commitment of the Licensee to pay for the distribution and printing of the document. The Commonwealth's statement that the changes are minor is contrary to Combined Intervenor's allegation in proposed findings ¶¶ 173, 175. The Commonwealth (reply finding ¶ 6) states that the intervenors incorrectly cited the record that the PEMA document would be revised. In fact, the record reflects that at the time of hearing, PEMA had no present intention of revising the pamphlet. Tr. 18,067 (Comey).

and inspections will assure maintenance and improvement of the programs. Allegations by the intervenors are in the discussion of contentions which follows. Based on the evidence in the record, as discussed below, the Board is not persuaded by the arguments advanced by the intervenors. Therefore, the Board finds that the public information program as proposed for and in place for the general resident population meets the current requirements as discussed above. We require that the updated PEMA pamphlet and five risk county brochures on emergency preparedness be distributed to the general resident population within the plume EPZ prior to restart of TMI-1.

(a) Notification of Transients

1538. The Board has dealt with the transient sector of the population in a separate section, because the issues relating to transients cover two main substantive areas which cannot be easily disassociated: public education and notification. "Transients", as that term has been used in this proceeding, includes those members of the public who do not permanently reside within the plume exposure pathway EPZ; *i.e.*, tourists or other visitors, and the non-residential work force. *E.g.*, Adler and Bath (3/16/81), ff. Tr. 18,975, at 6; Staff Ex. 21, at 13, 18; Bath, ff. Tr. 22,350, at 1. The estimated size of this transient population is variable, from a minimum of approximately 9,000 people¹⁸⁴ to a maximum of approximately 24,000 people.¹⁸⁵

1539. The guidance of NUREG-0654 makes specific reference to the transient population:

The public information program shall provide the . . . transient adult population within the plume exposure EPZ an adequate opportunity to become aware of the information annually . . . Signs or other measures . . . shall also be used to disseminate to any transient population within the plume exposure pathway EPZ appropriate information that would be helpful if an emergency or accident occurs.

NUREG-0654, Planning Standard G, Criterion 2.

¹⁸⁴ This number is the sum of the estimated tourist/transient population and the estimated transient employment population under a night scenario, as presented in the Parsons-Brinckerhoff Evacuation Time Study. Licensee Ex. 52, Tables 5 and 6, pp. 10 and 12.

¹⁸⁵ *Id.*, see day scenario.

. . . plans to implement protective measures for the plume exposure pathway shall include: . . . Means for notifying all segments of the transient and resident populations.

NUREG-0654, Planning Standard J, Criterion 10.c.

1540. Clearly, the transient population is one of the segments of "the public" for whom public education and protective actions must be provided for compliance with the emergency planning rule. 10 CFR 50.47(b)(7) and (b)(10). Similarly, the transient population is part of "the public" for which notification of an emergency must be provided within about 15 minutes. 10 CFR Part 50, Appendix E, Section IV.D.3.

1541. The method of notifying transients within the EPZ for TMI-1 in the event of an emergency is tied directly to the public education process for that group of people. Planning for notification of transients is a county responsibility. Tr. 18,048 (Comey). The latest statement on county planning available to the Board indicates that the counties are relying on motel and hotel managers, park managers, and employers to notify the transients on their premises in the event of an emergency, and to inform them at that time of the appropriate actions to take. Tr. 22,372-73 (Bath). This notification should include dissemination of predistributed public education materials to the transients. The responsibility placed on the individual managers and employers is a large one. In York County, e.g., posting of the county brochure which includes instructions to turn on the radio and evacuation routes (Commonwealth Ex. 5) is not anticipated. Tr. 22,374 (Bath). Nor has the information contained in the county brochures been published in places with high visibility to transients, e.g., phone books.¹⁸⁶ Thus, at the time the siren sounds, the only source of information for the transient on what to do next is his/her "host" or employer. Without having access to the public information brochure until the time of an emergency, the transient may not even know to turn the radio on, let alone which station would carry the EBS announcement. Bath and Adler (2/23/81), ff. Tr. 18,975, at 22.

1542. FEMA has stated that distribution of public education materials to the transient population is required before the public education and information program can be found adequate. NUREG-0654, Planning Standard G; Chesnut and Bath, ff. Tr. 19,626, at 8-10; Tr. 19,628 (Bath); Tr. 19,366, 19,375 (Adler). FEMA has also indicated that distribution of the information to the transient population must be accomplished prior to an actual emergency. Chesnut and Bath, ff. Tr. 19,626, at 9. Apparently,

¹⁸⁶ The Board recognizes that the Commonwealth is working with Bell of Pennsylvania to place this information in phone books, but this appears to be an ongoing process with no known completion date. Tr. 18,049 (Comey); Tr. 20,841-42 (Belsler).

the plan of distributing at least the risk county brochures to the various hotels, motels, employers, parks, and other transient locations is acceptable to FEMA. Tr. 22,372-74 (Bath). This distribution had not, however, been accomplished as of the close of the record. Tr. 20,965 (Wertz); Belser *et al.*, ff. Tr. 20,787, at 6; Tr. 18,051 (Comey). However, FEMA has concerns about whether "hosts" have been made aware of their responsibility to distribute the pamphlets or otherwise instruct transients. Tr. 19,628-31 (Bath); Bath, ff. Tr. 22,350, Attachment 3, at 2; Tr. 22,375-77 (Bath). Other than the York County Coordinator's statement that he meets frequently with industry officials to discuss emergency preparedness of all kinds, there is no indication on the record that managers or employers are aware of the need to notify transients during an emergency, let alone that they are prepared to do so. Tr. 20,796 (Curry); Tr. 22,375 (Bath).

1543. The Board agrees with FEMA and finds that predistribution of the public information brochures on emergency preparedness to the likely transient locations is necessary prior to restart before the requirements of the emergency planning rule can be deemed to have been met. 10 CFR 50.47(b)(7); Staff. Ex. 21, at 13, 18; Chesnut and Bath, ff. Tr. 19,626, at 8-10. The Board also finds that there has been no showing that hotel and motel managers and other hosts to "temporary" transients within the plume exposure pathway EPZ are capable of implementing the notification responsibility which has been assigned to them. This is much less of a problem with respect to employees who work but do not live within the plume EPZ, since they are not temporary visitors, even though FEMA and PEMA classify such employees as transients. However, it occurs to the Board that no practical program to notify transients will be perfect. What we desire is reasonable assurance that there is widespread coverage of emergency related information aimed at and delivered to transients in the TMI area. It also occurs to us that the same types of information may not be as necessary for transients as for residents. It seems obvious that information such as on school evacuation and livestock protection would be of small interest to an overnight motel resident. The Board believes that it is necessary to make transients aware of such actions as what the siren means, what to do in case the siren system is activated, what protective actions to take and/or where to go or whom to contact to get such information. At this time we have little assurance that motel-hotel managers and park managers, and to a lesser extent business owners, will provide the necessary information or even pass out the brochures to temporary transients/employees. Therefore, the Board finds that the level of preparedness regarding notification to the transient population must be improved prior to any restart.

1544. The Commonwealth would have the Board direct the Staff to certify to the Commission that (1) updated public information has been distributed to identified transient locations within the plume exposure EPZ; and (2) steps have been taken to specifically inform the owners or key individuals at transient locations and businesses of their responsibilities in the event of an emergency at TMI-1.

1545. In its Proposed Findings of Fact, the Commonwealth has committed to the distribution of updated County brochures to identified transient locations (e.g., hotels, motels, parks, employers) within the plume exposure pathway EPZ. The distribution must be accomplished prior to restart. The Commonwealth will also encourage the five risk counties and respective Chambers of Commerce to follow up at each transient location to urge key individuals to make provisions for informing guests or employees in the event of an emergency at TMI-1. In addition, the Board directs the Licensee, it is to be hoped with the assistance of PEMA, the counties, and the Chambers of Commerce, etc., to offer briefings to operators of temporary transient locations and major employers. The briefings should include key emergency planning information, and the importance of planning in advance about how the "hosts" will provide such information to transients in the event of an emergency. For example, hosts, particularly employers, should be encouraged to predistribute the county and PEMA brochures to transients/employees. This briefing program should be an ongoing one. We require that it at least be under way with respect to major "hosts" by the time of any restart. In addition, although we cannot directly require it and do not find it an essential requirement, the Board suggests strongly that the provisions for informing guests or employees include placards displayed in prominent places, such as motel lobbies, park entrances, outside of public facilities, and bulletin boards of local businesses, etc.

(b) Contentions

1546. We turn now to the contentions in the area of public education. ANGRY Contention EP-4(C) and Newberry Contentions EP-14(Q) and the quoted portion of EP-14(C) generally challenge the sufficiency of the emergency preparedness public education program in the area surrounding TMI. These contentions state:

ANGRY Contention EP-4(C):

The adoption of the Commonwealth of Pennsylvania Disaster Operations Plan Annex E (DOP) designation of "the 'risk county' as responsible for the preparation and dissemination of information

material on protective actions to the general public" (p. 6-8) conflicts with the requirements in EPRG II(A)(7) and RG 1.101 §6.4(2) to "make available on request to occupants in the LPZ information concerning how the emergency plans provide for notification to them and how they can expect to be advised what to do." Also, N. 0654 G4.

Newberry Contention EP-14(C) (in part):

The York County Plan in Section VI, Subsection (c) provides that posting of evacuation maps and semi-annual distribution of evacuation routes in local newspapers will be accomplished. It is submitted that there is no set designation of the responsibility for the effecting of this part of the Plan and it is Intervenor's contention that unless the Plan directs and places responsibility upon someone to effect this part of the Plan, the Plan is defective.

Newberry Contention EP-14(Q):

Annex E of the York County Plan, Subsection III, provides that the local Emergency Management Directors are responsible for the distribution of printed handout material to the populace within their respective municipalities. The Plan is defective in this area in that there is no set timetable for the distribution of said materials to the local Emergency Management Directors, and, likewise, there are no provisions within the Plan as to how local Emergency Management Directors are going to distribute the information to the local populace. Again, it is submitted that, in the event of an incident at the TMI nuclear facility, local volunteers will not be able to be counted upon to effect such distribution and that without some other means of distributing the materials, local Emergency Management Directors will be impotent to effect such a Plan. The same problem arises in Section K of this area in that the Public Information Officer is responsible for the posting in all public areas, parks, etc., of public information and evacuation instructions for transient populations.

1547. The NRC Staff, with FEMA's assistance, reviewed the TMI emergency preparedness public education program, and reported its conclusions in the Emergency Preparedness Evaluation and Supplement 1 thereto. Staff Ex. 6, at 13, 14; Staff Ex. 23, at II-4 to II-6, III-16. In addition, the Licensee, NRC Staff and FEMA presented direct testimony on the TMI public education program and ANGRY Contention EP-4(C), Newberry Contention EP-14(Q), and the relevant part of Newberry Contention EP-14(C). See Rogan, *et al.*, ff. Tr. 13,756, at 99-101; Chesnut, ff.

Tr. 15,007, at 59-63; Adler and Bath (3/16/81), ff. Tr. 18,975, at 12-14; Chesnut and Bath, ff. Tr. 19,626, at 7-10; Bath, ff. Tr. 22,350, Attachment 3, item 3. The Commonwealth also presented direct testimony on the subject. See Belser, *et al.*, ff. Tr. 20,787, at 5-6 (Curry). In addition, the Commonwealth presented a witness on a related contention who was also cross-examined extensively on the Commonwealth's role in TMI emergency preparedness public education. See Tr. 18,042, *et seq.* (Comey). Oral examination of witnesses relevant to this subject matter pervades the transcripts of the emergency planning hearings in this proceeding.

1548. ANGRY Contention EP-4(C) alleges that the Commonwealth's designation of the risk counties as "responsible for the preparation and dissemination of information material on protective actions to the general public" conflicts with the provisions of Regulatory Guide 1.101.

1549. The PEMA pamphlet was distributed in September 1979 to households within approximately 10 miles of TMI (Tr. 18,064-65 (Comey); Tr. 14,014, 14,016, 14,023 (Giangi); Tr. 14,138-39 (Giangi)) and the York County pamphlet was distributed to households in the plume EPZ portion of York County. Tr. 20,799, 20,927 (Curry). However, the Licensee has committed to print the state and county pamphlets and distribute them to the public within the TMI plume EPZ with a target date for completion of distribution of September 1, 1981. Tr. 22,878-79 (Chesnut); Staff Ex. 23, at II-4, II-5. We find that the Licensee's commitment in this regard, which we require as a condition of restart, will assure that the necessary emergency preparedness information is disseminated to the public in accordance with the guidance of NUREG-0654 and the emergency planning regulation. Accordingly we reject ANGRY Contention EP-4(C).

1550. Newberry Contention EP-14(C) alleges that, though the York County Plan provides for the posting of evacuation maps and for semi-annual publication of evacuation routes in local newspapers, no one is designated as responsible for effecting those provisions of the plan, rendering the plan defective.

1551. Contrary to the assertion in this contention, in the revised York County Plan the Emergency Management Coordinator is, in fact, responsible for the development, coordination with PEMA, distribution, annual update and dissemination of pre-emergency information in York County. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 3. York County will not post such information for transients but will provide the information in the form of brochures and information sheets to hotels, motels, parks and other transient areas. Bath, ff. Tr. 22,350, Attachment 3, at 2. The responsibility for distributing such information to transients has been explicitly assigned to the risk municipality emergency management coordinators. Board Ex. 5, at F2, §IV.B; Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 3.

1552. While it is, indeed, true that the York County Emergency Plan does not specifically assign responsibility for the semi-annual publishing of evacuation routes in local newspapers, we find that this is not a defect or inadequacy in the plan. The evidence shows that the York County Emergency Management Coordinator caused copies of the York County evacuation route maps and basic emergency instructions to be published in the York Dispatch, the largest circulation newspaper in York County. In addition, notice of the distribution of the county emergency information pamphlets was published in the York Daily Record. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 3; Adler and Bath (3/16/81), ff. Tr. 18,975, at 13. Thus, the distribution of evacuation maps in local newspapers has been accomplished despite the fact that the responsibility for such action is not explicitly and specifically assigned in the York County Emergency Plan.

1553. Based on the foregoing, we find that there is an adequate assignment of responsibility for the dissemination of pre-emergency information in the York County Emergency Plan and that the portion of Newberry Contention EP-14(C) asserting to the contrary is without merit.

1554. Newberry Contention EP-14(Q) acknowledges that the York County Plan assigns responsibility to the local emergency management coordinators for the distribution of printed public education materials within their respective municipalities, but asserts that the plan is defective in that it includes no timetable for the distribution of the materials to the local coordinators and no provisions as to how the local coordinators are to distribute the materials to the local populace. The contention further asserts that, in the event of an accident at TMI, local volunteers would be unable to effect such distribution and — without some other prescribed means of distribution — the local coordinators will also be unable to effect the distribution. The contention raises the same concern with respect to the Public Information Officers' responsibility, under the York County Plan, for the posting of information and evacuation instructions in transient populated areas.

1555. At the outset, requirements and criteria for public education relate to programs to be carried out prior to an accident, not after one occurs. To the extent that this contention implies that distribution of educational materials is to be accomplished during the course of an emergency, it misconstrues the public education needs. Chesnut and Bath, ff. Tr. 19,626, at 9.

1556. As to the dissemination, prior to an emergency, of emergency preparedness information, the evidence indicates that the York County Pamphlet (Commonwealth Ex. 5) was distributed to households in the plume EPZ portion of York County. Such distribution was made by the municipalities in tax notices. Tr. 20,799 (Curry). In addition, as previously

indicated, the Licensee will undertake prior to any restart to distribute both the PEMA and appropriate county pamphlets throughout the TMI plume EPZ, including that portion of the EPZ in York County. Thus, emergency preparedness information has been and will continue to be properly distributed in York County despite the lack of provisions in the York County Emergency Plan explicitly setting forth a timetable¹⁸⁷ for distribution of the materials or specific methods by which they are to be distributed. There is no evidence indicating that such specific details need be explicitly addressed in an emergency plan. Rather, the evidence indicates that emergency preparedness information materials have been and will be successfully distributed without such detail set out in the York County Emergency Plan. In addition, FEMA will monitor the TMI emergency preparedness public education program to ensure that it is carried out. Any significant deficiencies found by FEMA during plant operation will be reported to the NRC. Adler and Bath (3/16/81), ff. Tr. 18,975, at 14.

1557. As to posting of emergency information in transient areas, York County no longer plans on using this method for providing information to transients. Instead, the local emergency management coordinators are responsible to see that emergency preparedness information brochures are predistributed to motels, hotels, area employers and park managers. Board Ex. 5, at F-1 and F-2. In the event of an emergency, the managers of such hotels, motels, parks, and the like are to distribute the emergency information materials to transients within their charge. Bath, ff. Tr. 22,350, Attachment 3, at 2; Tr. 22,374-75 (Bath). While the evidence indicates that specific planning by the managers of transient areas such as hotels and motels is not yet in place (Tr. 22,374-75 (Bath)), the York County emergency management coordinator is taking action to inform transient area managers of their responsibilities for distributing emergency information materials to transients. Bath, ff. Tr. 22,350, Attachment 3, at 2. Our requirement for briefings to "hosts"/employers, in combination with the above activities, reasonably assures the Board that the distribution of information to transients planned by York County is adequate (Tr. 22,375 (Bath)) and that Newberry Contention EP-14(Q) is without merit in this regard. In addition, for greater assurance we have previously indicated our desire to have conspicuous postings of public emergency preparedness information.

¹⁸⁷The York County Emergency Plan does provide for the annual updating of pre-emergency public information. Board Ex. 5, at F-2, §IV.A.

2. Warning

1558. Numerous contentions in the proceeding contested the adequacy of the system for prompt notification of an emergency at TMI to the public within the plume exposure EPZ. We believe that an overall discussion of this system at this point, including some of the major criticisms of the Combined Intervenors and Commonwealth, will give a better basis for discussion of the contentions later on. The contentions themselves will be stated and addressed in turn following this discussion. The Commonwealth, Combined Intervenors, Licensee and Staff all presented proposed findings in this subject area. The Combined Intervenors (PF ¶¶ 130-135, 156, 158, 159, 164) and the Commonwealth (PF ¶¶ 106-110) essentially are in agreement in this area. They both stress the importance of demonstration that the alerting system will meet the 15-minute requirement for notification of the general public. The Combined Intervenors, as does the Commonwealth in most cases, raise issues about (1) the completion time for a siren system able to cover the entire plume exposure EPZ, (2) provisions for testing the system in the light of changing original siren locations and the Licensee's intent of one-at-a-time-siren testing rather than a final full-scale testing of the system, and (3) lack of independent analyses of the system. They call for testing of the system prior to restart and for a determination to be made of where additional means for alerting the public are needed. They would also have a demonstration of the efficacy of the entire system, including the remote control system, prior to restart. The Combined Intervenors raise additional issues about (1) the need for back-up electrical power for the siren system, (PF ¶¶ 133, 168, 169), (2) the possibility of confusion over the siren tone warning (PF ¶¶ 165-167), and (3) the effectiveness of the supplementary notification system due to its dependence on a proper public information program (PF ¶¶ 136, 137).

1559. The proposed findings of the Licensee and the Staff agree on a description of the siren system and that the system is adequate and will be operational and adequately tested before restart.

1560. The following summarizes where in the record testimony appears on this subject. The means for prompt notification of the public within the plume exposure EPZ around TMI in the event of an emergency are discussed in Licensee's plan at pages 6-23 and 6-24 (Licensee Ex. 30); in Appendix 12 to the Commonwealth's Plan (Commonwealth Ex. 2.a); in Annex B to the York County Plan; in Annex C to the Dauphin County Plan; in Annex C to the Cumberland County Plan; in Annex J to the Lancaster County Plan; and in Annex J to the Lebanon County Plan. Board Ex. 5-9. The NRC Staff reviewed the adequacy of the prompt notification system and reported its conclusions in the Emergency Preparedness Evaluation (EPE) and Supplement 1 thereto; these conclusions were updated by the oral testimony of Staff witness Chesnut. Staff Ex. 6, at 11-12; Staff Ex. 23, at II-1 to II-3; Tr. 22,877-78

(Chesnut). The Staff, FEMA and Licensee presented direct testimony on the prompt notification system and the listed ANGRY and Newberry contentions. See Rogan, *et al.*, ff. Tr. 13,756, at 101-02; Chesnut, ff. Tr. 15,007, at 52-58; Bath and Adler (2/23/81), ff. Tr. 18,975, at 16-19, 21-23; Adler and Bath (3/16/81), ff. Tr. 18,975, at 14-18; NRC Staff Position on Emergency Preparedness for TMI-1, ff. Tr. 22,881. The Commonwealth also presented testimony on the subject. See Lamison (Warning), ff. Tr. 17,818; Belser, *et al.*, ff. Tr. 20,787, at 4, 7 (Curry, Wertz). The examination of witnesses about the prompt notification system appears throughout the March 3, 5, 10-12 and 17, April 15-17, 21 and 30, May 1, and the July 1, and 7-8 hearing transcripts.

1561. 10 CFR 50.47(b)(5) requires, in part, that means to provide early notification to the populace within the plume EPZ be established. Appendix E of 10 CFR Part 50, §IV.D.3, requires that licensees demonstrate that the physical and administrative means are established for promptly alerting the public within the plume EPZ, with a design objective to have the capability for essentially completing initial alerting within 15 minutes of the decision by state and local officials to alert. To comply with these requirements, the Licensee proposes to install a network of sirens throughout the plume EPZ for TMI. The siren system design is based on site-specific sound studies and engineering studies accounting for local topography and population density. Rogan, *et al.*, ff. Tr. 13,756, at 101-102; Tr. 13,761 (Giangi). The system is designed to provide a minimum of 10 dB over ambient sound levels, providing a 60 dB signal for areas where the population density is less than 2000 persons per square mile and a 70 dB signal for areas where the population density is greater than 2000 persons per square mile. Tr. 13,909-10 (Rogan). Through the placement and sound levels of the sirens, the system is designed to provide full coverage of the plume EPZ. Tr. 13,761 (Giangi).

1562. The siren system itself consists of 83 sirens distributed throughout the plume EPZ. The sirens will be activated by a radio signal from the risk county EOCs. Licensee will supply to the counties the radio transmission equipment needed for activation of the sirens and that control equipment will be compatible with the existing siren systems in the counties. Staff Ex. 23, at II-1, II-2.

1563. The Staff has reviewed a theoretical sound coverage analysis of the siren system provided by the Licensee. Based on that review, the Staff has determined that the assumptions used in the design of the system for ambient noise levels and siren range are consistent with the Staff's criteria in NUREG-0654, Appendix 3 (See Tr. 15,455 (Grimes)), and that the design of the siren system is adequate and meets the criteria for coverage of the plume EPZ. Tr. 22,889, 22,894-95 (Chesnut). There is no evidence of record to the contrary.

1564. The Licensee has been working to install the new siren system and the completion date for installation was estimated to be in late July or early August 1981. Tr. 22,887 (Chesnut). For each siren, once installed, the Licensee will conduct a separate startup and test program to confirm the operability of both the radio-control equipment that activates the siren and the siren itself. In addition, an acoustical expert will sample selected siren sites for sound level to confirm the Licensee's original sound study and full sound coverage of the plume EPZ. Tr. 22,904-95, 22,907 (Rogan). On turning over the siren system to the counties, the Licensee will perform a silent test of the sirens from each county EOC to identify any sirens which are not functioning properly. Tr. 22,908-09 (Rogan). The siren system will be maintained by the Licensee after it is turned over to the counties. Tr. 22,909-10 (Rogan). From the evidence presented, the Board is reasonably assured that the siren system proposed for the TMI plume EPZ can provide to the public adequate early emergency warning. However, we are not convinced that the currently proposed system testing program is acceptable. We believe that the sample testing of individual sirens, especially those which have been relocated from their originally designed locations, is necessary. However, in addition to the testing program proposed as described above, the entire system shall be tested audibly at least once prior to restart. We find that such a test is necessary to serve at least two additional purposes — to familiarize the public with what the system sounds like and to indicate fully and accurately the extent of any needed secondary notification. There should be prior notification of the public of the reason for the test and its scheduling. The Staff shall review and certify to the Commission prior to restart the satisfactory completion and the results of the various siren tests required above.

1565. Next we turn to the intervenors' contentions which have challenged the adequacy of providing prompt alerting to the public within the TMI plume EPZ, including those Dauphin and York County residents living within approximately a 10-mile radius of TMI. ANGRY Contention EP-5(D) states:

1. The physical means to provide warning to all persons within the plume EPZ in a manner conforming to the standards set forth in N. 0654 Sec. E6 (and App. 3 referenced therein) and in the Pa. DOP, App. 13, Sec. IIIA(6) should exist before TMI-1 is allowed to restart.
2. The Commonwealth's DOP fails to identify the time required to alert the public within the plume EPZ under present circumstances as required by the aforementioned provision of N. 0654. Such estimates as the Commonwealth has provided elsewhere are found

ded upon a totally inadequate data base and are thus not credible. Although the Pa. DOP App. 13, Sec. IID states that "the primary means of emergency warning is outdoor siren systems", the York County plan reveals that less than 1/2 of the population in York County within 10 miles of TMI are capable of being warned by sirens (Annex C). Information as to the time required for implementation of "back-up" notification measures of mobile "public address systems" and "knocking on doors" (Annex G, App. 1) is to be provided in local emergency plans which do not as yet exist.

1566. As to part 1 of this contention, we have found that the siren system being installed by the Licensee should provide the physical means for alerting the populace within the plume EPZ, and have determined that a condition of restart should be the completion and verification testing of the siren system. Thus, ANGRY Contention EP-5(D)1 is satisfied. Contention EP-5(D)2 and Newberry Contention EP-14(B) express concern about siren notification of the York County population within the plume exposure pathway EPZ. Contention EP-5(D)2 also alleges, in part, that the Commonwealth's Plan does not identify the time required to alert the public within the plume exposure pathway EPZ, in contravention of NUREG-0654, and that the York County Plan states that the time for notification via route alerting and "knocking on doors" is to be included in local emergency plans which ANGRY asserts do not exist. Newberry Contention EP-14(A) challenges the siren system in York County generally, and in Newberry Township in particular; Newberry Contentions EP-16(E) and EP-16(M) raise the same concern with respect to Dauphin County; and Newberry Contention EP-14(O) questions the adequacy of the siren system to notify all York County residents within a 20-mile radius of TMI.

1567. The evidence indicates that the Licensee's siren alert system is designed to provide virtually full coverage to plume EPZ and therefore, subject to testing results, should not require substantial reliance on emergency workers to provide supplementary alerting within the plume EPZ. Adler and Bath (3/16/81), ff. Tr. 18,975, at 14, 15-16. PEMA will advise the counties as to when to activate the sirens (Tr. 17,874 (Lamison)) and will coordinate siren activation within the five risk counties (Tr. 20,899-900 (Belser)). In view of this coordination and of the fact that the sirens are activated by radio remote control from each county EOC (Tr. 13,915 (Rogan)), there is no reason to believe that the sirens cannot be activated within 15 minutes of the decision to alert in accordance with the design objectives for prompt alerting systems. We find that once the Licensee's siren system is installed, the capability for prompt alerting within 15 minutes of a decision to alert will exist and that the lack of an

explicit identification in the Commonwealth's Emergency Plan of the time required to alert the public is not a defect. Thus we conclude that Contention EP-5(D)2 is without merit and we reject it. If the results of the siren testing program disclose the need for supplementary alerting, that should be specified in the Staff's certification to the Commission.

1568. Three admitted contentions challenge the adequacy of the population warning system for York County. These are Newberry Contentions EP-14(O), EP-14(T) and EP-14(A). Contention EP-14(O) asserts that the York County Plan is deficient since local governments lack the manpower to effect prompt notice throughout the risk area of York County through the use of police and fire vehicles. Similarly, Contention EP-14(T) alleges that the York County Plan is deficient to the extent that it relies on local fire companies to alert residents of rural communities in York by knocking on doors, since there are too few firemen. Contention EP-14(A) contests the existence of the capability for prompt public notification in the TMI plume EPZ and asserts that prompt notification must be given to residents beyond the plume exposure EPZ. These contentions state:

Newberry Contention EP-14(O):

Annex C of the York County Plan is deficient in that its total concept of operations is based upon tone-coded siren control and that nowhere in the Plan is it stated that all individuals are within hearing distance of the sirens located within a 20-mile radius of the TMI nuclear plant. Moreover, the Plan provides as a backup or supplementary system to the siren system that police and fire vehicles would travel throughout the communities and again it is stated that the townships, boroughs and municipalities located within the 20-mile radius of the TMI nuclear facility do not have the necessary commitments of manpower to effect such a plan. Therefore, it is Intervenor's position that the York County Plan remains deficient.¹⁸⁸

Newberry Contention EP-14(T):

¹⁸⁸ The reference in this contention to alerting individuals within a 20-mile radius of TMI is inconsistent with emergency planning requirements and with existing planning for York County. 10 CFR 50.47(b)(5) requires that means be provided for the early notification of the public "within the plume exposure pathway Emergency Planning Zone." 10 CFR 50.47(c)(2) and 50.54(s)(1) generally define the plume EPZ for a nuclear plant as "an area of about 10 miles . . . in radius." Insofar as Contention EP-14(O) may be inferred to assert that means are required for promptly alerting the public within 20 miles of TMI, we reject such assertion. The York County Emergency Plan addresses the matter of prompt alerting within the plume EPZ in York County (Board Ex. 5, at B-2) and is consistent with the cited regulations in this regard. *See also* Section F below for the Board's findings on the definition of the EPZ.

Appendix I of the York County Plan regarding warning is deficient in that it assumes that local fire companies will be able to alert all members of a rural community by direct notification such as knocking on doors. There is absolutely no conceivable way in which individual direct notification can be made in Newberry Township because of the number of residents versus the number of volunteer firemen and it is submitted that the same conditions exist in all local municipalities located within the 20-mile radius of the TMI nuclear facility. Therefore, until and unless a system is designed that can adequately insure that a substantial majority of the population can be notified of an incident at TMI, the Plan is deficient.

Newberry Contention EP-14(A):

Section VI, Concept of Operations, Subsection 7(a) is deficient in that there is an assumption that notification by siren can be heard throughout Newberry Township and surrounding communities. It is questionable at best whether this is, in fact, true in that at least in the York County Plan there is an assumption of one Civil Defense siren being in place in Newberry Township which does not exist. Oversights such as this may still exist within the Emergency Plan drafted by York County and verification of all sirens must be required in order to insure at least minimum siren coverage of the county. Therefore, it is Intervenor's position that there are not sufficient numbers of Civil Defense warning sirens in place in the county in order to adequately insure that all members of the community are within hearing distance of a siren. It is Intervenor's contention that until the Emergency Plan specifically states that a siren alert system is in place and that the warning emitted by the system can be heard at any point in the county surrounding the plant site, that the Emergency Plan as drafted is unacceptable.

1569. Each of these contentions obviously was formulated prior to the time that the Licensee proposed and began installing its siren system. We have previously found that, once installed, that siren system should provide essentially full coverage of the plume EPZ, and this finding extends to the portion of the plume EPZ in York County. Although the York County Emergency Plan does provide for backup or supplementary alerting by police and fire vehicles (Board Ex. 5, at B-2, §§IV D, E), the testimony indicates that, with the Licensee's siren system, the need for such supplementary alerting will be reduced to a minimum. Adler and Bath (3/16/81), ff. Tr. 18,975, at 14. There is no evidence indicating that substantial supplementary alerting by police or fire personnel will be needed with the Licensee's siren system and, in fact, the testimony is to

the contrary. Adler and Bath (3/16/81), ff. Tr. 18,975, at 15-16. With the installation and testing of the Licensee's siren system, the extent of the need for supplementary alerting will be determined. We are reasonably assured that the system will operate essentially as designed and the need for supplementary notification minimized. Of course, as we stated above, the matter will be part of the Staff's certification to the Commission on the testing results. Therefore, we find Contention EP-14(O), EP-14(T) and EP-14(A) to be without merit subject to the results of the testing program.

1570. We similarly reject Newberry Contention EP-16(E) which states:

Appendix 5 of the Dauphin County Plan provides that alert warnings will be initiated through siren activation. Again, this part of the Plan makes a broad base assumption that the populace within the county can hear the sirens at all locations and it is Intervenor's position that this is not true. Therefore, until and unless a sufficient number of sirens are placed throughout the county area at locations that will ensure that the total populace of the county is within hearing distance of the sirens, the Plan will remain deficient.

1571. As with the previous contentions directed to York County, we have found that the Licensee's siren system should provide, subject to being tested, sound coverage for essentially all of the plume EPZ for TMI, including that portion of the plume EPZ which is in Dauphin County. In effect, the Licensee, Staff and by our findings above, the Board, essentially agree with the last sentence of Newberry Contention EP-16(E).

1572. Newberry Contention EP-14(B) states:

Section VI, Subsection 7(b). The York County Plan as drafted indicates that selective evacuation of pregnant women and pre-school children and their families would be effected upon order of the Governor. Again, the notification would be by a five (5) minute steady siren which cannot be assured will be heard in all points within the affected areas. Moreover, the Plan assumes that there will be appropriate EBS announcements followed by door-to-door notification which would be conducted by appropriate boroughs and townships. Again, the Intervenor raises the contention that the time factor required in order to recruit volunteers to man vehicles and the many miles of road which are located in the various rural communities which would have to be traveled in order to ensure that notification of all members of the population of the impending emergency conditions would render the Plan as written inoperable. Moreover, it is contended by the Intervenor that the selected evacuation notification is initially effected by the same type of notification that would be required in a general evacuation. Both evacuations are initiated by a five (5) minute

steady siren tone, then followed by appropriate EBS announcements. It is Intervenor's contention that similarity and warning evacuation tones may lead to confusion on behalf of the public and that orderly evacuation of the affected areas could not be effected. Furthermore, this section of the York County Plan anticipates parents and/or families evacuating the area will be able to pick up children at schools. This again would lead to confusion within the Plan in that if a selected evacuation was ordered and pre-school children were to be removed from the area, the Plan anticipates that action would be taken by school superintendents in the evacuation of the children from schools and that there may be interference or lack of effective execution of the Emergency Plan set forth for the school systems.

1573. This contention alleges the same inadequacies in York County's prompt alerting provision with regard to the ability of the populace to hear sirens and the need for supplementary, door-to-door alerting as were raised in Contentions EP-14(O), EP-14(T) and EP-14(A). We have previously addressed these matters.

1574. Contention EP-14(B) also alleges that the siren signals to be used for both a selective and a general evacuation in York County are similar and will confuse the public. A similar assertion is made in Contention EP-16(M) which states, in part:

The Dauphin County Plan does not specifically state a differentiated commonly recognized evacuation signal that could be recognized by the citizenry throughout the county.

1575. Under both the York County and Dauphin County Emergency Plans, the only siren signal to be used for a fixed nuclear facility accident is the general "attention-alert" signal which is a three-to-five minute siren blast. Board Ex. 5, at B-1, §IV.C; Board Ex. 6, at C-1, §IV.B; Adler and Bath (2/23/81), ff. Tr. 18,975, at 21. The nuclear emergency signal is differentiated from other siren signals, such as fire signals, by the length of the siren blast. Tr. 20,802 (Curry). This signal has only one meaning, regardless of how many times it is sounded, and that is that members of the public, upon hearing the signal, are to turn on their radios or televisions to receive a message and information from government authorities. Both the Dauphin County emergency information pamphlet (Commonwealth Ex. 7) and the York County pamphlet (Commonwealth Ex. 6) indicate that the public will be alerted to an emergency at TMI by a three-to-five minute siren blast and that persons should turn on their radios and tune to the EBS station in their county. Distribution of the county pamphlets to be made by the Licensee will assure that residents or Dauphin and York Counties will be made aware of the meaning of the

sirens and what their actions should be when they hear them. There will not be different siren signals for different protective actions but a single signal — the three-to-five minute siren blast. Specific information on the emergency and specific instructions on protective actions will then be provided over the EBS. Adler and Bath (2/23/81), ff. Tr. 18,975, at 21-22. In view of this, the nuclear emergency siren signal should not be confusing and we find those portions of Newberry Contentions EP-14(B) and EP-16(M) alleging inadequacies in the planned siren signal for nuclear emergencies to be without merit.

1576. Contention 16-(M) also asserts, in part, that:

The [Dauphin County] Plan does not indicate whether the alarm system that is to be used is to be driven by a regular power system and if the source was terminated, whether the system would still work. The Plan does not indicate whether all areas within the county are within hearing distance of the sirens. Such deficiencies render the Emergency Response Plan inadequate.

1577. We have previously addressed the allegations about the siren coverage for the plume EPZ, including the Dauphin County portion, and have found them to be without merit. As to the power supply for the Licensee's siren system, the system is operated from normal commercial power sources. There are no regulatory requirements that prompt alerting systems have backup power sources. Adler and Bath (2/23/81), ff. Tr. 18,975, at 22. The Staff's bases for not requiring backup power are the low likelihood of the occurrence of a nuclear facility incident coincident with loss of power to the sirens and the fact that the types of nuclear facility accidents which are initiated by loss of off-site power are generally slow in developing, thereby providing time to procure other means of notification or to restore power to the siren system. Tr. 15,253-54 (Grimes). There were not sufficient analyses of these broad generic conclusions in this record by the Staff to justify their acceptance by us. However, in addition, the Licensee has studied the power grid in the TMI area and has concluded that there is no way that the loss of off-site power to TMI would render the Licensee's siren alert system inoperative. Tr. 14,286-87 (Rogan). FEMA's view is that commercial power for sirens is considered to be dependable as evidenced by the fact that fire sirens and nuclear attack outdoor warning systems throughout the United States are not provided with backup emergency power sources. Adler and Bath (2/23/81), ff. Tr. 18,975, at 22-23. In general, then, the evidence tends to indicate that commercial power for the prompt alerting system will be dependable and will not be dependent upon the availability of TMI and that there is no need for a backup power source for such system. It is our

view that the evidence on this point is very sketchy, but since it was not pursued at the hearing we have no reason to doubt its accuracy from the record. We know of no other information which would give us pause to doubt the uncontradicted record conclusions. Based on that evidence, we reject that portion of Contention EP-16(M) related to the power source for sirens.

1578. In summary the Board finds that the siren system being installed by the Licensee should, upon installation and subject to testing, provide the capability to essentially complete the notification of the public within the TMI plume EPZ within 15 minutes, in compliance with applicable regulations and the guidance of NUREG0654. We further conclude that — given the extensive coverage of the siren system — any supplemental public notification (should it prove necessary) could be minimized. The concerns raised by ANGRY and Newberry about the system for prompt notification of the public in the event of an emergency at TMI have either been satisfied or are rejected.

3. Emergency Instructions to the Public

(a) Concept of Operations

1579. Another class of contentions raised various issues relating to the instructions to be given to the public in the event of an emergency at TMI. We have divided this class into four groups (a) Concept of Operations, (b) Emergency Broadcast System (EBS), (c) 911 Telephone System, and (d) News Releases, and present the corresponding contentions separately.

1580. Three contentions (EP-14(Y), EP-14(C) (in part) and EP-1 (in part) relate to concept of operations. These contentions are:

Newberry Contention EP-14(Y):

Annex N, Subsections VII, Subsection G provides for certain duties and responsibilities for a County Director and these duties and responsibilities conflict directly with those of the Emergency Management Coordinator. Specifically, this section provides that the County Director shall provide appropriate notice of information received and emergency actions taken and proposed to the York County Police and Fire Departments, other echelons and emergency operational chains, and local news media for emergency public information and news announcements, whereas, Appendix II provides that the Public Information Officer is responsible for the issuance of official information, advice and instructions from the county to the public. This conflict renders the Plan deficient.

Newberry Contention EP-14(C) (in part):

Section IV, Subsection 7(c). This section of the York County Plan is deficient in that it depends upon the York County Chamber of Commerce to notify and pass on the general evacuation information to business and industry. There is no assurance that the Chamber of Commerce has the necessary manpower, equipment, and training to pass on such information to the general public. For example, does the York County Chamber of Commerce possess necessary trunk lines to advise all industry within an affected area? What happens in the event that telephone communications are jammed or overloaded and that notification of industries cannot be effected by the York County Chamber of Commerce? Furthermore, does the York County Chamber of Commerce and all industry within the possible affected area have radio communication capabilities?

Aamodt Contention EP-1 (in part):

It is contended that the licensee has not made provision for timely dissemination of information in the event of accidental release of airborne radioactive gases or particulates. It is contended that licensee must make information available to the public which will allow appropriate action to be taken to protect persons, livestock, foodstuff and feed in the event of a discharge of significant proportions.

1581. The NRC Staff, FEMA and Licensee presented testimony on these contentions. *See Rogan, et al.*, ff. Tr. 13,756, at 18-19, 23, 62-63, 81, 86-93; Chesnut, ff. Tr. 15,007, at 51-58; Bath and Adler (2/23/81), ff. Tr. 18,975, at 19-21; Adler and Bath (3/16/81), ff. Tr. 18,975, at 10-12, 16-17. Additionally, the Commonwealth presented a witness on a contention related to the quoted part of EP-1; that witness's testimony on cross-examination provides background for other testimony on Contention EP-1. *See Tr. 18,042, et seq.* (Comey). The Licensee and Staff presented proposed findings directly related to these contentions. The Combined Intervenors presented proposed findings germane to only a portion of EP-1 (in part). In general, their findings are more relevant to public education issues (Section IV.E.1) and were considered under that subject. We present an abstract of their pertinent proposed findings, and then discuss our findings in the content of the contentions.

1582. The Combined Intervenors broadly attack the substance and bases of the EBS messages which appear in the county plans. Proposed findings ¶¶ 140-147, 150. They allege that these messages are inadequate and confusing and that they must be rewritten and coordinated with the public

information program. Further, they do not believe that the proper information about the emergency status and protective actions can be accomplished on an *ad hoc* basis. They cite TMI-2 accident experiences as examples of misinformation and lack of information disseminated to the public. They note that this poor information transfer produced unexpected responses by the public, such as more extensive evacuation than called for by the Governor of Pennsylvania. They list fourteen categories of information which are not in the present EBS material but which they consider must be included. Proposed finding ¶ 148 asserts that the information currently contained in EBS materials is too lengthy and repetitive in format taking some 15 minutes to read aloud at an unintelligibly fast pace or considerably longer if emphasis is placed on content. They suggest that most of this material could be predistributed or disseminated in some other fashion such as on television.

1583. We turn now to Newberry Contention EP-14(Y) which alleges that the York County Plan assigns certain duties and responsibilities to the "County Director" which conflict with those of the "County Emergency Management Coordinator". The contention further alleges that the plan provides that the County Director will give certain information to emergency response agencies and local news media, which conflicts with the Public Information Officer's responsibility for the issuance of official information, advice and instructions from the county to the public.

1584. At the outset, it should be noted that for York County, the "County Director" and the County "Emergency Management Coordinator" are one and the same person and the two titles refer to the same position. Adler and Bath (3/16/81), ff. Tr. 18,975 at 16-17. Thus, responsibilities assigned to the County Director and the County Emergency Management Coordinator are not conflicting and the York County Emergency Plan is not deficient in this regard.

1585. The revised York County Emergency Plan assigns specific duties and responsibilities for disseminating emergency information to both the County Emergency Management Coordinator (EMC) and the County Public Information Officer (PIO) and those assignments of responsibilities do not appear to be in conflict. The PIO, assisted by PEMA, is to prepare and update "canned" messages for broadcast over the EBS. Board Ex. 5, at F-2, §IV.D. When an emergency occurs, the EMC, at the direction of the County Commissioners, is to release the pre-prepared or "canned" EBS messages for broadcast. Board Ex. 5, at F-2, §IV.E. For contact with the news media, the PIO is to serve as the County's spokesperson. Board Ex. 5, at 18, at F-3, §IV.G. The issuance of EBS emergency information and protective action instructions by the County EMC does not conflict with the PIO's responsibility for providing general information on the emergency through non-EBS media sources. Adler and Bath (3/16/81), ff. Tr.

18,975, at 17. From the clear provisions of the York County Emergency Plan we find that the conflicts of responsibilities alleged in Newberry Contention EP-14(Y) do not exist.

1586. Newberry Contention EP-14(C) alleges, in part, that the York County Plan is deficient in that it relies upon the York County Chamber of Commerce to notify and pass on general evacuation information to business and industry, when the Chamber lacks the resources and training to perform such functions. Under earlier versions of the York County Emergency Plan, the York Area Chamber of Commerce was relied upon for supplementary notification of business and industry through a telephone "fan-out" service using commercial telephones. Such supplementary notification support by the Chamber of Commerce was necessary only until a siren system meeting applicable criteria was in place. Adler and Bath (3/16/81), ff. Tr. 18,975, at 11-12; Adler and Bath (2/23/81), ff. Tr. 18,975, at 20. The revised York County Emergency Plan, while containing a letter of agreement from the Chamber of Commerce indicating the Chamber of Commerce's willingness to provide assistance in dissemination of emergency information (Board Ex. 5, at T-5), places no reliance on the Chamber of Commerce for alerting or notification. (See, e.g., Board Ex. 5, Annex B). To the extent that there may be factories with high noise levels and large populations that may have difficulty in hearing the signal from Licensee's sirens, Licensee will make provisions to assure alerting. Tr. 13,928-29 (Rogan). As result of our condition in Section IV.E.2 above, such needs will be *reported* by the Staff to the Commission based on the full scale siren testing required prior to restart. Consequently, the premise of EP-14(C) is incorrect in that the contention does not reflect the current planning. We therefore reject it.

1587. Aamodt Contention EP-1 alleges, in part, that Licensee has not provided for timely dissemination of information in the event of accidental releases of radioactivity, and contends that *Licensee* must make information available *to the public* to allow appropriate actions to be taken to protect persons and property. At the outset it should be noted that such a course of action would contravene the established concept of operations for public notification and instructions in the event of an accident at TMI.

1588. Further, with regard to Contention EP-1 (in part), we have previously found that the Licensee has made proper provisions for initial notification of, and transmission of information to, Commonwealth emergency response agencies and the emergency response agencies of the five counties in the plume EPZ for TMI in the event of an emergency. The Licensee does have the capability to promptly notify, and transmit information and protective action recommendations to, government emergency response organizations in accordance with the NRC's emergency planning rules. Chesnut, ff. Tr. 15,007, at 57.

1589. We have also determined that the Licensee is installing a prompt alerting system which, when completed, subject to testing, should be capable of alerting the public within the plume EPZ for TMI within about 15 minutes of the time at which the decision to alert the public is made. State and county emergency response organizations will be responsible for determining whether to activate the prompt alerting system and for actually activating it. Chesnut, ff. Tr. 15,007, at 54. By means of pre-distribution of the five county emergency information pamphlets, which the Licensee has committed to accomplish prior to restart (Tr. 22,878-79 (Chesnut)), members of the public within the plume EPZ will have been informed of the attention alert signal for an emergency at TMI and that, upon hearing that signal, they should turn to their county EBS station for information and instructions.¹⁸⁹ After sounding of the sirens, conventional radio and television will be used to transmit information and protective action recommendations to the public on EBS stations. Rogan, *et al.*, ff. Tr. 13,756, at 102-103. The Commonwealth has agreements with EBS stations to disseminate emergency information. Tr. 17,879-80 (Lamison).

1590. Though this extensive prearranged system of Licensee notification to governmental organizations, the prompt alerting system and the EBS, there is a mechanism for the timely dissemination of information and protective action instructions to the public in the event of an accident and significant radioactive releases at TMI. Therefore we find that provisions have been made for the timely dissemination of information to the public and that Aamodt Contention EP-1 is without merit.

(b) Emergency Broadcast System (EBS)

1591. Newberry Contention EP-14(FF) concerns the EBS, over which information and protective action instructions will be transmitted to the public in an emergency. This Contention states:

The York County Plan contains only one EBS station, that being WSBA in York, Pennsylvania, and lists no other secondary station in the event that WSBA loses power or in some other way is placed out of operation. It is Intervenor's contention that the Plan is deficient in that a secondary EBS station is not included in the Plan.

¹⁸⁹See, for example, the emergency information pamphlets for Lancaster (Commonwealth Ex. 4), York (Commonwealth Ex. 5) and Dauphin (Commonwealth Ex. 7) Counties, each of which defines the siren alert signal for a TMI accident and directs the reader to tune to the county EBS station.

1592. FEMA and the Commonwealth presented testimony on this contention. See Bath and Adler (2/23/81), ff. Tr. 18,975, at 23-24; Belser, *et al.*, ff. Tr. 20,787, at 6 (Curry). The role of the EBS station in public notification in the event of an emergency at TMI is described in Annex F of the York County Plan. Board Ex. 5. Cross-examination on the EBS system generally, and on this contention in particular, is reflected in the transcripts of March 10, April 6, 7, and 15, May 1 and 15, and July 7, 1981.

1593. Contrary to the assertion in Contention EP-14(FF), the evidence shows that there are three EBS stations for York County, one of which is within one city block of the York County EOC. Tr. 20,933-34 (Curry). Apart from this, there is no reason to believe that WSBA, which is the primary EBS station for York County, would be unavailable for service in a TMI emergency. The station itself is located outside the plume EPZ and likely would not need to be evacuated in the event of an emergency. Adler and Bath (2/23/81), ff. Tr. 18,975, at 23-24. In addition, the station has a backup emergency power source and can continue to operate if normal power is lost. *Id.* In the event that the county cannot reach WSBA through commercial telephone, the York EOC has, in place, a remote programming radio through which the EBS station can be reached and through which EBS messages can be remotely transmitted from the county EOC for broadcast by WSBA. Tr. 20,817-18 (Curry). In view of all of this and of the fact that there are alternate EBS stations for York County, Newberry Contention EP-14(FF) is wholly without merit.

(c) 911 Emergency Telephone System

1594. Two contentions (EP-14(P) (in part) and EP-16(Q)) generally question the capability of the "911" telephone systems in York and Dauphin Counties to handle the telephone calls which would be placed in the event of an emergency at TMI. These contentions state:

Newberry Contention EP-14(P) (in part):

Furthermore, Subsection VI of this particular section provides that the common carrier system within the Emergency Operations Center is the 911 system, of which 49 out of 79 emergency telephone trunk lines are committed. Furthermore, 6 of the lines are standby rumor-control lines, leaving 24 emergency telephone trunk lines for those areas not contained within the 911 system. The Newberry Township, Fairview Township, Goldsboro and Lewisberry areas are without 911 service. It is Intervenor's contention that, in the event of an incident at the TMI nuclear facility, the telephone grid system

would become so overloaded during such an incident that the making of a phone call to the remaining 24 committed lines at the Emergency Operations Center would be difficult if not impossible. Therefore, it is claimed that this part of the Plan also is deficient in that there are not enough emergency trunk lines available for all residents within the 20-mile radius zone of TMI with a special emphasis on those areas in York County which are closest to the nuclear power facility.

Newberry Contention EP-16(Q):

The Dauphin County Plan lists only two (2) 911 operators in place in the event of an evacuation. It is submitted that two operators is grossly insufficient when it is taken into consideration that the York County Plan incorporates forty-nine (49) 911 operators in order to deal with an evacuation. Until and unless there is a commitment for more 911 operators to be in place during an emergency, the Dauphin County Plan remains deficient.

1595. FEMA and the Commonwealth presented testimony on these contentions. See Adler and Bath (3/16/81), ff. Tr. 18,975, at 20-23, 26; Belser, *et al.*, ff. Tr. 20,787, at 9 (Wertz). The "911" system in York County is described at pages A-1, B-1 and C-1 of the York County Plan; the system in Dauphin County is described on pages A-1, B-1 and C-1 of the Dauphin County Plan. See Board Ex. 5-6. Oral examination on the "911" system generally, and on these contentions in particular, appears in the April 15-17 and 30, 1981 transcripts. Combined Intervenors proposed findings ¶¶ 154, 195-200 question the ability of the York County 911 system and the remaining phone lines to the York EOC to function adequately during an emergency situation because they had not been tested in the June 2, 1981 exercise. They cite Attachment 1 of FEMA's Interim Report on the June 2 Exercise to support this uncertainty. In addition, they raise the subject of the possibility of the need for additional operators for the 911 and rumor control lines.

1596. With regard to Contention EP-14(P) (in part), the Board does not see the necessity for the 911 system being designed to handle a very large number of emergency calls. In the event of an emergency at TMI the primary means of communicating information to the public is by EBS broadcasts. This should reduce substantially the need for use of the 911 system to contact the York County Emergency Management Agency to seek information. Adler and Bath (3/16/81), ff. Tr. 18,975, at 23. For example, the York County emergency information pamphlet specifically instructs that emergency information will be provided through local radio stations and that phone lines must be kept open for medical and other emergencies and should not be used. Commonwealth Ex. 5.

1597. Contrary to the assertion of the contention, the current York County Plan indicates that the "911" emergency telephone system services all of York County except for a small area of Lewisberry Borough and Fairview Township serviced by Commonwealth Telephone Company. The emergency telephone numbers in those areas tie into the County EOC through trunk lines. Board Ex. 5, at A-1.

1598. In addition, incoming calls from the public should not interfere with communications between and among emergency response organizations since, during an emergency, there are specific dedicated circuits between the York County EOC and between the state and the EOCs in the five risk counties (Adler and Bath (3/16/81), ff. Tr. 18,975, at 23) and there are radio networks for communications between the County and municipalities in the York County portion of the plume EPZ (Board Ex. 5, at C-1, §III.B).

1599. The evidence indicates that York County has 49 trunk lines and two operators serving its 911 system. Adler and Bath (3/16/81), ff. Tr. 18,975, at 22, 26. These should be sufficient during an emergency as calls exceeding the 911 system capacity will be transferred to six rumor-control lines that the county has established. Adler and Bath (3/16/81), ff. Tr. 18,975, at 26; Tr. 19,376-77 (Bath); Tr. 20,812 (Curry). In sum, the Board is reasonably assured that the 911 system, the rumor-control lines and EBS system provide an adequate combination of resources for informing the public or for providing emergency contact points for the public. In addition, we are assured that adequate communications exist among emergency response organizations on the specific dedicated lines. Further, there is no evidence in the record to indicate the need for additional telephone service for York County. Therefore, we find the assertions of Newberry Contention EP-14(P) (in part) to the contrary to be without merit.

1600. Newberry Contention EP-16(Q) is similar to EP-14(P) (in part) but is directed to alleged deficiencies in Dauphin County. Compared with York County's 49 telephone trunk lines and two operators, Dauphin County has 40 trunk lines and two operators. Curry, *et al.*, ff. Tr. 20,787, Wertz Testimony, at 3. As with York County, we find no basis for concluding that the Dauphin County 911 system will be used by members of the public simply as a source from which to obtain information. The Dauphin County pamphlet also contains instructions to the effect that, in the event of an emergency at TMI, information is to be obtained from the local radio stations and telephones are not to be used. Commonwealth Ex. 7. Dauphin County maintains an extensive radio communications network with the other four counties in the plume EPZ for TMI and with Dauphin County municipalities (Board Ex. 6, at B-2, §III.B) so that it need not rely on telephone communications for contact with other emergency response

organizations during a TMI emergency. Finally, the evidence indicates that the two 911 operators provided by Dauphin County will be adequate in an emergency as calls exceeding the 911 system capacity will be transferred to county rumor control lines for disposition. Adler and Bath (3/16/81), ff. Tr. 18,975, at 26. In sum, for similar reasons as for York County, we find that additional 911 system operators are not needed in Dauphin County for providing information to the public, for assuring adequate communications among emergency response organizations or for providing emergency services contact points for the public during an emergency. There is no evidence if record indicating a need for additional 911 system provisions for Dauphin County and, accordingly, we find the assertions of Newberry Contention EP-16(Q) to the contrary to be without merit.

(d) News Releases

1601. ECNP Contention EP-12, the final contention in the subject of Emergency Instructions to the Public, questions the Commonwealth's procedure for the issuance of news releases. This contention states:

ECNP Contention EP-12:

ECNP contends that the routing of all information through the Governor's Press Secretary to the public adds unnecessary complexities to the entire plan. For example, since the Press Secretary of the Governor can reasonably be expected to be a political appointee and not necessarily knowledgeable at all in the area of nuclear accidents and their consequences, or the nature of radiation injury, the designation of the Governor's Press Secretary as the official and sole spokesperson adds one more pathway for and perhaps impediment to information in the cumbersome and circuitous route between an event or accident at TMI and the public. There is no need for this extra step. In addition, this extra step offers one more opportunity for errors and omissions to be introduced into the information and only adds further delay. It is not expected that this extra step will result in the removal of errors from the messages. Furthermore, the possibility exists, with this extra, unnecessary step, for political pressure to be brought to bear to alter, delay, or even withhold crucial information from the public.

1602. Contention EP-12 alleges that the Commonwealth's routing of all information through the Governor's Press Secretary to the public will delay the flow of information, may introduce errors or omissions (given the Press

Secretary's lack of nuclear expertise), and presents a potential "for political pressure to be brought to bear to alter, delay, or even withhold crucial information from the public."

1603. Both the Commonwealth and FEMA presented direct testimony on the contention. See *Comey*, ff. Tr. 18,038; *Bath and Adler* (2/23/81), ff. Tr. 18,975, at 24-26. The Commonwealth's current public education and information program — including the role of the Governor's Press Secretary in that program — is described in Appendix 15 to the Commonwealth's Plan. See *Commonwealth Ex. 2.a*, at 15-1 to 15-5. Only the Licensee and Staff presented proposed findings on this contention.

1604. Under the Commonwealth's Emergency Plan, the Governor's Press Secretary is assigned the responsibility to establish policy and procedure for the state government public information program. The Governor's Press Secretary has delegated the responsibility of coordinating public information in an emergency and the role of state spokesperson in an emergency to PEMA. *Comey*, ff. Tr. 18,038; *Commonwealth Ex. 2.a*, at 15-1, §II.B, 15-4, §C. The evidence shows that for purposes of alerting the public and providing emergency instructions on protective actions, the Governor's Press Secretary (in actuality, his designee, the PEMA spokesperson) will not play a critical role because those functions are performed by other means. *Adler and Bath* (2/23/81), ff. Tr. 18,975, at 25; *Commonwealth Ex. 2.a*, at 15-3, §§V.A.1, 2.a.

1605. In any event, the PEMA spokesperson will be located at the media center adjacent to the state EOC. This is the best location for him to be briefed by knowledgeable state personnel, to be kept advised of all events, and to be informed of the status of state preparedness, of county preparedness and of the policy and concerns of the Governor. *Adler and Bath* (2/23/81), ff. Tr. 18,975, at 25-26; Tr. 18,054 (*Comey*). The Commonwealth's Emergency Plan provides that the PEMA spokesperson will exchange information on a regular basis with the spokespersons of all principal emergency response organizations (*Commonwealth Ex. 2.a*, at 15-4, §V.C.4) and provision has been made for coordination between the Licensee and the state to minimize the potential for conflicts in public information provided by the Licensee and the state. Tr. 18,057 (*Comey*).

1606. From the provisions outlined, we see no basis for concluding that designation of the PEMA spokesperson as the sole spokesperson for the state would be an impediment to providing information to the public. Such designation is in accordance with the guidance of NUREG-0654, Criterion G.4.a, which stipulates that the state is to designate a spokesperson who would have access to all necessary information. *Staff Ex. 7*, at 50. That access is provided by the location of the PEMA spokesperson adjacent to the state EOC and should assure that errors in information received and delay in the receipt of information are minimized. Finally, we find no

evidentiary support for the assertion in ECNP Contention EP-12 that the designated state spokesperson may be subject to political pressure to alter, delay or withhold crucial information from the public.

1607. In sum, we find the Commonwealth's provisions for the state spokesperson in an emergency to be adequate and to sufficient to allow the timely dissemination of accurate information to the public. Consequently, the Board rejects ECNP Contention EP-12.

F. Definition of Emergency Planning Zones

1608. With respect to the adequacy of the emergency planning zones (EPZs) adopted for use around TMI, subparagraph 1 of Sholly Contention EP-17(A) asserts, *inter alia*, that "a limited evacuation will lead to problems due to spontaneous evacuation of a much larger area." The Board notes that regardless of where a boundary is set there may be a spontaneous evacuation of a larger area or, on the other hand, there may be resistance to evacuation by a portion of the population within the boundary. Nevertheless, potential problems which could arise should a larger than anticipated evacuation occur were of great concern to the parties, and the issue of whether the affected population would overreact or underreact was litigated at length.

1609. Sholly Contention EP-17(A) states:

Licensee's acceptance, without formal analysis or evaluation, of a circular 10-mile radius for the Plume Exposure Emergency Planning Zone (as designated by the Pennsylvania Emergency Management Agency) does not discharge Licensee's responsibility to ensure that adequate emergency response plans exist to protect the public health and safety in the event of an emergency at TMI-1. Further, acceptance of or designation of a circular 10-mile radius Plume Exposure EPZ for TMI-1 is unjustified because such an EPZ fails to adequately consider local emergency response needs and capabilities as they are affected by demography and jurisdictional boundaries. These considerations, among others, are specified in NUREG-0396, NUREG-0654, and the new emergency planning rule published in the *Federal Register* on August 19, 1980. The following specific local conditions should be reflected in the Plume Exposure EPZ for TMI-1:

1. The proposed 10-mile radius circular EPZ includes within the EPZ portions of numerous jurisdictions at the township, city, borough, and town levels of government. Calling for an evacuation of only a portion of any political jurisdiction due to a hazard which affects a large geographic area and basing emergency plans

and response capabilities on such a limited evacuation will lead to problems due to spontaneous evacuation of a much larger area, with a concomitant increase in traffic and supply requirements at shelters. Therefore, the Plume Exposure EPZ for TMI-1 should include the entire geographic extent of all governmental jurisdictions at the township, city, borough, and town level which are bisected by the proposed circular 10-mile EPZ.

2. There are heavily populated areas in and near the cities of Harrisburg and York represented by the city proper and adjacent continuation of the urban areas into the suburbs. In the event that the wind is blowing toward either of these areas when a large release of radioactivity occurs, such areas would constitute a large percentage of the total population dose (in the case of the TMI-2 accident, for instance, Harrisburg contributed 25% of the total population dose despite the fact that most of the city is more than 10 miles distant from the plant). The urbanized areas in and around Harrisburg and York are concentrations of population for which preplanning for an evacuation is a necessity for successful implementation (for instance, preplanning would have to include evacuation routes, transportation needs, host area requirements, and problems posed by special populations such as prisons). Therefore, the urbanized areas around and including the cities of Harrisburg and York should be included within the Plume Exposure EPZ for TMI-1.
3. Numerous members of the Old Order Amish community reside in relatively close proximity (within 10 miles) of the outer boundary of the Licensee's Plume Exposure EPZ in Lancaster County. Because the Old Order Amish eschew the use of electricity, telephones, and automobiles, they present unique problems with respect to warning, communication of protective action advisories, and transportation. These unique problems warrant the special consideration the inclusion of Old Order Amish within the Plume Exposure EPZ would provide.
4. To the extent that the Licensee relies upon the decision of county officials in the Three Mile Island area to develop and maintain a 20-mile emergency response capability as a substitute for making a determination that the 10-mile circular EPZ is adequate, the adequacy of such a 20-mile capability must be established as a condition to the restart of TMI-1.

1610. Section 50.47(b)(10) of 10 CFR requires that a range of actions be developed to protect the public in an area surrounding nuclear power plants designated as the plume exposure pathway EPZ and, further, that protective actions appropriate to the locale be developed for an area surrounding plants designated as the ingestion exposure pathway EPZ with plans for the ingestion EPZ to focus on protecting the food ingestion pathway (10 CFR 50.54(s)(1)). The plume EPZ is to consist of an area about 10 miles in radius and the ingestion EPZ is to be about 50 miles in radius with the exact size and configuration of each EPZ determined based on local emergency response needs and capabilities as they are affected by demography, topography, land characteristics, access routes, and jurisdictional boundaries. 10 CFR 50.47(c)(2); 10 CFR 50.54(s)(1). Plume and ingestion EPZs have been developed and defined for TMI. Commonwealth Ex. 2.a, Appendix 1, at 1-1 to 1-3; Commonwealth Ex. 2.b.

1611. In the statement of considerations accompanying adoption of the new emergency planning regulations, the Commission identified the regulatory basis for the EPZ concept as a "decision to have a conservative emergency planning policy in addition to the conservatism inherent in the defense-in-depth philosophy." 45 Fed. Reg. 55402, 55406 (August 19, 1980). At that time the Commission also observed that "[t]he exact size and shape of each EPZ will be decided by emergency planning officials after they consider the specific conditions at each site. These distances are considered large enough to provide a response base that would support activity outside the planning zone should this ever be needed." *Id.* A further identification of the factors considered by the Commission and FEMA in defining the geographic extent of the EPZs is set forth in NUREG-0654. Staff Ex. 7, at 10-13.

1612. At the outset, we note that the plume EPZ designated by PEMA is not precisely an area enclosed by a circle 10 miles in radius, but one very roughly 10 miles in radius with irregular boundaries which in most instances extend beyond 10 miles from TMI, in some locations by a mile or more. Commonwealth Ex. 2.b.

1613. The Board's job with respect to definition of the EPZ is to determine whether there has been compliance with the Commission's regulation. We have no jurisdiction to challenge as a matter of policy whether the approximately 10- and 50-mile EPZs are too small or too large. The Board's major area of responsibility is determination of whether "local emergency response needs and capabilities as they are affected by such conditions as demography, topography, land characteristics, access routes, and jurisdictional boundaries" have been properly considered.

1614. The plume exposure pathway EPZ around TMI is shown in the Commonwealth's emergency response plan. Commonwealth Ex. 2.b. Testimony on the adequacy of this EPZ was presented by Licensee, the

Staff and FEMA. See Rogan, *et al.*, ff. Tr. 13,756, at 97-111; Chesnut, ff. Tr. 15,007, at 63-66; Adler and Bath (3/16/81), ff. Tr. 18,975, at 61-63; Chesnut and Bath, ff. Tr. 19,626, at 13-14. No other party to the proceeding presented direct testimony on this subject, and the intervenors' cross-examination in this area was limited for the most part to special provisions made for the Old Order Amish. See Tr. 14,143-57, 14,676-80, 17,575-82, 18,108-09, 18,111-13, 18,288-91, 18,292-94, and 19,661-68.

1615. PEMA determined the geographic extent of the plume exposure pathway EPZ for the TMI site. Initially a circle, with a radius of 10 miles, was inscribed around the TMI site. The boundaries of this circle were then moved to a close, recognizable marker by considering political boundaries, natural geographic features, roads, and other readily identifiable landmarks. The population included within the resulting plume exposure pathway EPZ is about 30 percent greater than the population included within a precise 10-mile circle around the TMI site. Rogan, *et al.*, ff. Tr. 13,756, at 98-99, 107-08; Chesnut, ff. Tr. 15,007, at 65-66. No party has brought to the Board's attention any particular boundary line which it believes is ambiguous, not well defined, or otherwise inappropriate. The Board therefore finds that, in defining the plume exposure pathway EPZ, PEMA gave appropriate consideration to such factors as demography, topography, land use characteristics, access routes, and jurisdictional boundaries.

1616. We next address each of the four specific concerns raised in Contention EP-17(A), noting that underlying this contention is an assumption that the plume exposure pathway EPZ around TMI is a uniform circle. While there may have been some confusion during the prehearing phase of the proceeding as to the shape of the EPZ, the record is now clear that PEMA has tailored the EPZ definition to local conditions. Rogan, *et al.*, ff. Tr. 13,756, at 108-09; Chesnut, ff. Tr. 15,007, at 65-66.

1617. Subparagraph 1 of the contention alleges that the EPZ boundary should include the entire geographic extent of all political subdivisions that are bisected by a 10-mile circle around TMI. The Board notes at the outset that such an extension is not required by Commission regulations.

1618. An examination of the plume EPZ boundaries for TMI reveals that those boundaries have been extended to include the whole of Derry, South Hanover, Fairview, and Conewago Townships, each of which is intersected by a 10-mile radius circle. Rogan, *et al.*, ff. Tr. 13,756, at 108; Commonwealth Ex. 2.b. The same examination also reveals that in every instance in which the EPZ boundary was not extended to include entire municipalities, the boundaries were established at roads or highways. Commonwealth Ex. 2.b. In this way, the plume EPZ boundary in any particular location is a clearly defined marker known to area residents. Rogan, *et al.*, ff. Tr. 13,756, at 108. The use of natural or jurisdictional boundaries for the plume EPZ boundary is important for planning pur-

poses because it will minimize confusion by persons who are unsure as to whether they are located in zones where protective actions have been ordered. Chesnut, ff. Tr. 15,007, at 65-66. While the designated plume EPZ boundaries do not include the whole of all municipalities intersected by a 10-mile radius circle, the evidence shows that the boundaries do coincide with jurisdictional boundaries, natural geographic features, roads, and other readily identifiable landmarks. Rogan, *et al.*, ff. Tr. 13,756, at 98-99; Chesnut, ff. Tr. 15,007, at 65-66. In addition, as Licensee's witnesses noted, extending the EPZ boundary further yet, to include all municipal areas bisected by the EPZ, would not be desirable since it would result in an EPZ boundary with long, nonuniform appendages. During an actual emergency this might result in confusion if protective actions were recommended for areas distant from TMI, while closer-in areas were not covered by the advisory. Rogan, *et al.*, ff. Tr. 13,756, at 108-09. Accordingly, the Board finds that the plume EPZ boundaries for TMI were established taking into consideration the topography, access routes and jurisdictional boundaries. Beyond this, we find no evidentiary basis for requiring that every political subdivision bisected by a circle of 10-mile radius from TMI be included within the plume EPZ for TMI. Thus, subparagraph 1 of Contention EP-17(A) is rejected.

1619. Subparagraph 2 of Contention EP-17(A) seeks to extend the EPZ boundary to include the cities of Harrisburg and York and the urbanized areas surrounding those cities. While the Board is aware that there are urbanized areas on the edges of the EPZ boundaries drawn by PEMA (*see* Board Physical Ex. A, D, and E), we cannot say on the basis of this record that the boundaries were drawn incorrectly. In Figure 6 accompanying the prefiled testimony of Rogan, *et al.*, ff. Tr. 13,756, Licensee has superimposed the PEMA-drawn EPZ boundary on Board Physical Ex. D. It is clear from Figure 6 that certain of the urbanized areas in and around Harrisburg and York have been included within the plume exposure pathway EPZ, *e.g.*, parts of Lower Paxton, Susquehanna, Harrisburg City, New Cumberland, and Springettsbury. We have no basis for finding that these boundary lines are inadequate.

1620. The Board notes the Commission's observation, 45 Fed. Reg. 55402, 55406 (August 19, 1980), that the about 10-mile radius of the EPZ is large enough to support emergency response outside the planning zone should such response be necessary. We note, further, that the plume EPZ for TMI was defined by PEMA. That agency, responsible for assuring emergency preparedness for the Commonwealth, judged that not all urbanized areas around Harrisburg and York need be included in the plume EPZ to assure an adequate emergency response capability. Rogan, *et al.*, ff. Tr. 13,756, at 109. We find no evidentiary basis for disagreeing with that judgment. The evidence indicates that in the case of adverse meteorol-

ogy, with stable dispersion characteristics and low wind speeds and, therefore, the potential for higher off-site doses, the Harrisburg and York areas not included within the plume EPZ will have from five to eight hours additional warning time relative to areas close-in to TMI. Given the substantial preplanning within the plume EPZ, this additional warning time should be adequate to allow residents in those areas of Harrisburg and York not included in the EPZ to take necessary protective actions. Rogan, *et al.*, ff. Tr. 13,756, at 109-10. Detailed planning within a plume EPZ will provide a substantial base for expanding response efforts beyond the plume EPZ if that proves to be necessary. Staff Ex. 7, at 12. On the other hand, if weather conditions are unstable and plume travel time is fast, the off-site dose is likely to be smaller and the need for protective actions less (Rogan, *et al.*, ff. Tr. 13,756, at 10), particularly in view of the distance of Harrisburg and York from TMI. There is no evidence that the urbanized areas around York and Harrisburg not now included in the TMI plume should be included. Accordingly, we reject subparagraph 2 of Contention EP-17(A).

1621. Subparagraph 3 contends that Old Order Amish residing within 10-20 miles from TMI should receive the same special consideration as if they lived within the "10-mile" EPZ. The Board recognizes that the Old Order Amish face unique problems in the event of an evacuation and on our own we inquired into this matter during the proceeding. The Board finds that the most feasible solution is to assure that adequate means are in place to protect the Old Order Amish in the event of an accident at TMI, rather than to extend the EPZ irregularly in order to enclose them within the EPZ boundary.

1622. Within the 10-mile plume exposure pathway EPZ there are eight families, consisting of 56 persons, that are due special consideration during an emergency at TMI. In this case "due special consideration" means that alternative means of notification would be provided to supplement the notification given the general public. Tr. 18,293-94 (Lothrop). Between 10 and 20 miles from TMI there are an additional 24 families, consisting of an additional 168 persons who are due special consideration. Tr. 18,288 (Lothrop). With respect to these people, PEMA has established procedures with the Mennonite Disaster Service (MDS) to assure that, in the event of an emergency at TMI, they are properly notified and advised of the protective actions they should take. Tr. 18,111-12, 18,289-91 (Lothrop); Adler and Bath (3/16/81), ff. Tr. 18,975, at 61-63. The MDS has its own system for providing emergency information to the Old Order Amish and a written outline, developed during the TMI-2 accident, describing MDS evacuation capabilities. Tr. 18,291 (Lothrop). PEMA has in the PEMA duty officer manual, work and home telephone contact points for key personnel and alternates in the MDS. Tr. 18,289-90 (Lothrop); Adler and

Bath (3/16/81), ff. Tr. 18,975, at 62. During an actual emergency, a representative of the MDs would be stationed in the EOC. Bath, ff. Tr. 22,350, Attachment 3, at 8. During the June 2, 1981 exercise PEMA contacted the Mennonite Disaster Service and the arrival of a representative from this service to the state EOC was simulated. *Id.*, at item 14. Thus, the Board finds that special provisions have been made for the Old Order Amish who might be affected by an emergency and that the relief sought in subparagraph 3 of Contention EP-17(A) has been provided.

1623. Subparagraph 4 contends that, if Licensee relies on the existence of 20-mile evacuation plans to overcome an inadequacy in the EPZ boundary drawn by PEMA, then the 20-mile plans must be demonstrated to be adequate. Neither Licensee nor PEMA relies on 20-mile evacuation plans as a substitute for making an informed judgment as to the extent of the plume exposure pathway EPZ. Rogan, *et al.*, ff. Tr. 13,756, at 111. PEMA or local jurisdictions are free to develop plans going beyond the requirements set forth in 10 CFR Part 50. As discussed above, however, the Board has no responsibility to either review any such plans or determine their adequacy. To the extent that any work has been done on 20-mile plans, that effort provides additional assurance that the planning within the plume exposure pathway EPZ is adequate. Chesnut and Bath, ff. Tr. 19,626, at 14.

1624. In summary, the Board finds that the plume exposure pathway EPZ as drawn by PEMA complies with the Commission's regulations and is adequate to provide reasonable assurance that the public health and safety will be protected.

1625. After consideration of the Board's certification on psychological distress issues (11 NRC 297 (1980)), the four-member Commission denied, in effect, authorization for the Board to admit psychological stress contentions (12 NRC 607 (1980)). (This decision was recently reconfirmed in CLI-81-20, September 17, 1981.) Consequently, there were no specific contentions relating directly to the impacts of psychological stress, either from the TMI-2 accident or from the restart and operation of TMI-1, on the response of the public to an emergency at TMI. On the other hand, we noted in our certification (11 NRC 297, at 308-309 (1980)) that

Even if the Commission does not permit the consideration of psychological stress issues as such, these issues may collaterally relate to other issues which must be considered in the proceeding. Community fears may be a factor in evaluating the effectiveness of the licensee's emergency response plan. The licensee's sensitivity to community fears and license's credibility may indirectly relate to its management capability to formulate and implement emergency response plans. Conversely, the effectiveness of plans may rest on the

public's education, its preparation to take action and its confidence in the plans. To the extent that psychological stress may be a factor in these other issues, we do not believe that additional authority from the Commission is required. We are seeking only the authority to address directly and to mitigate fears which may result from the proposed operation of the facility.

1626. Consequently, despite the fact that no contentions on the matter were accepted, questions regarding psychological stress effects on the public's response in an emergency surfaced on recurring basis and were the subject of late-filed testimony, characterized as "rebuttal testimony" by the sponsoring intervenors, which we admitted as a matter of discretion. Witnesses presented by Licensee, Staff (including FEMA personnel), and the Commonwealth of Pennsylvania also testified on this subject. The concerns raised by intervenors basically involve questions as to whether experiences from non-nuclear accidents or disasters are useful in predicting the reaction of the public in a radiological emergency and whether members of the public can be relied upon to follow the directions or requests of governmental authorities in an emergency, even though such governmental direction may be perceived to be contrary to the public's best interest.

1627. Both Licensee and intervenors presented as expert witnesses nationally known sociologists. Testifying on behalf of the Licensee was Dr. Russell R. Dynes, currently executive officer of the American Sociological Association, and previously Chairman of the Department of Sociology at Ohio State University and Co-Director of the Ohio State University Disaster Research Center. Dynes, ff. Tr. 17,120, professional qualifications statement. Testifying on behalf of ANGRY and other intervenors and in rebuttal to Dynes' testimony was Dr. Kai T. Erikson, Professor of Sociology and American Studies at Yale University. Dr. Erikson has chaired several committees of the American Sociological Association and previously chaired the American Studies Program at Yale. Erikson, ff. Tr. 21,686, professional qualifications statement.

1628. Intervenor ANGRY also offered the written testimony of Dr. Donald Zeigler, which was stipulated into evidence without cross-examination. Zeigler, ff. Tr. 21,818. Dr. Zeigler is an Assistant Professor of Geography at Old Dominion University, Norfolk, Virginia. His testimony consisted of an article which he co-authored in the January 1981 Geographical Review entitled, "Education from a Nuclear Technological Disaster."

1629. Dr. Dynes, testifying on behalf of the Licensee, stressed that while he had briefly reviewed the Commonwealth's and the five county

radiological emergency plans¹⁹⁰ and NUREG-0654/FEMA-REP-1, he had "limited acquaintance with this material" and that his purpose was "not to compare the plans against the criteria document and reach some conclusion as to adequacy based on that comparison" but rather to present "an overview of the emergency planning process by identifying those important principles which should guide any developer of emergency plans." (Emphasis in the original). Dynes, ff. Tr. 17,120, at 2; see Tr. 17,176-77 (Smith, Zahler).

1630. Dr. Dynes set forth eight principles for evaluating emergency planning: (1) planning is a process, rather than a product, *i.e.*, a continuous process without a definite end; (2) planning is partly an educational activity and should not be "seen only in the narrow sense of completing written plans"; (3) planning should focus on principles, not details, (4) planning attempts to reduce the unknowns in a problematical situation and "it is unwise to assume that *everything* can be anticipated or that *all* of the unknown can be accurately predicted"; (5) planning should be based on what is likely to happen, not on the worst scenario; (6) planning aims at evoking appropriate actions; (7) planning for emergencies should be based on the patterns of everyday routines; (8) planning must be based on knowledge. *Id.*, at 4-7.

1631. Dr. Dynes explained, in connection with principle (8), that "it is often incorrectly assumed that the immediate problems of emergencies include dealing with uncontrollable behavior and panic" whereas this has been demonstrated to be untrue "over a wide variety of emergency situations." *Id.*, at 7.

1632. On cross-examination Dr. Dynes reiterated that the word "panic" did not, in his opinion, describe what happens in emergencies (Tr. 17,140) and that "the major problem in most types of emergencies . . . is not . . . that people behave irrationally; it is to get them to do anything." Tr. 17,141; see also Tr. 17,150-151 (Dynes, Smith). In later cross-examination, he expressed his opinion that "emergencies are interesting times" (Tr. 17,204), that "it is sort of fun to get involved with something like this" (*id.*), and that any type of emergency situation "is an exhilarating experience." Tr. 17,205. However, Dr. Dynes did not know of any studies of the TMI area communities showing an increase in cohesion or morale at the time of the accident. Tr. 17,216-17; see also Tr. 17,205-07. During lengthy cross-examination Dr. Dynes reiterated his belief that even following an event such as the TMI-2 accident there would

¹⁹⁰At Tr. 17,174 he disclaimed reviewing the five county plans.

not be created in a significant part of the population a psychological condition which would tend to impede them from acting correctly in another emergency. Tr. 17,223 (Smith, Dynes).

1633. In Dr. Dynes' opinion, whether or not emergency workers will fail to carry out their emergency duties because of conflicts with family responsibilities "is a non-problem" and people work out such conflicts. Tr. 17,197 (Dynes). See in general Tr. 17,195-98. However, Dr. Dynes had no specific knowledge of the reactions of emergency workers during the TMI-2 accident. Tr. 17,201; 17,235-38 (Dynes).

1634. In Dr. Dynes' opinion, if sheltering were presented as a rational safety measure, along with the consequences of not observing an instruction to shelter, there would be "pretty high compliance" by the population. Tr. 17,139 (Dynes).

1635. On cross-examination Dr. Dynes indicated that he did not think it very useful to designate radiological emergencies as a class apart from all other emergencies. Tr. 17,128, 17,184 (Dynes). Further, he did not consider that the fact that radiation is an invisible threat, not readily perceived by the public, makes radiological events unique. Tr. 17,131-32 (Dynes). He further did not consider emergency planning for radiological events at nuclear facilities to be different from any other kind of emergency planning. As he put it, "my feeling is emergency planning is emergency planning is emergency planning." Tr. 17,171 (Dynes).

1636. Dr. Erikson, testifying on behalf of the intervenors, stated that it was his "opinion that planning for emergencies in human situations that involve the threat of radiation or some other form of contamination is *at least potentially* very different from other kinds of disaster," and that he used the term "potentially" "only because we have too little experience with events of this kind to say anything with real confidence." [emphasis in original]. However, he stated that his knowledge of sociology and psychiatry led him "to expect that nuclear accidents should be considered a class apart." Erikson, ff. Tr. 21,686, at 2-3.

1637. Dr. Erikson stressed three points that in his opinion might limit the usefulness of experience from nonradiological or noncontaminating emergencies in predicting reactions in, or planning for, radiological emergencies: (1) events involving contamination (such as radiation) constitute "an invisible threat . . . for an indeterminate amount of time" so "the incident is never quite over", (2) because of previous exposure to a traumatizing event (the TMI-2 accident), some of the population in the TMI area may respond to another event by overreacting or underreacting, and (3) "any emergency evacuation plans that (a) rely on people taking shelter when instructed to do so, or (b) rely on civilian emergency workers to remain at their posts under any circumstances run a high (and probably unacceptable) risk of failure." *Id.*, at 3-5.

1638. In regard to sheltering, Dr. Erikson considered that plans which rely on people to take shelter when so instructed and at the time to isolate themselves from contact with others by telephone (to avoid overburdening the telephone lines) are apt to fail. Tr. 21,758 (Erikson).

1639. Witnesses for the Commonwealth were cognizant of the limitations of the sheltering option but also cognizant that sheltering might be the only available option. General DeWitt Smith, director of PEMA, noted that for planning purposes PEMA does consider sheltering as a protective action because in the real world "there are some circumstances which would hardly leave you any alternatives." Tr. 17,734 (Smith). Bureau of Radiation Protection division chief Margaret A. Reilly recognized that the true basements and forced ventilation systems which would be ideal for sheltering are not universally available (Reilly, ff. Tr. 18,125, at 8) but also pointed out that in the case of sudden discharges projected to be in the PAG range evacuation would be impossible and that sheltering would be better than nothing, regardless of the isolation capability of the building. *Id.*, at 9.

1640. In careful review of the testimony of Dr. Dynes and Dr. Erikson, we noted many instances of basic agreement. For example, despite his thesis that nuclear events are very different from other types of emergencies, Dr. Erikson, in describing emergencies which pose invisible threats for indeterminate time periods, cited as examples not only "nuclear events" such as TMI and Hiroshima but also chemical contamination events at Minamata (Japan), Seveso (Italy), and Love Canal (New York). Erikson, ff. Tr. 21,686, at 3; Tr. 21,701-04 (Erikson). Dr. Dynes, whose opinion is that radiological emergencies are not a class apart, noted that other types of emergencies are also wholly or in part imperceptible to the senses and indeterminate in length, for example, epidemics; or also occur with lack of warning, for example, tornados and earthquakes. Tr. 17,128-31 (Dynes).

1641. In the Board's opinion, radiological emergencies cannot be deemed unique on the basis of susceptibility to detection by the unaided senses or on the basis of their lasting for some indeterminate time or on their potential for having effects (for example, carcinogenesis) at some time in the distant future. Whether or not the public at large *perceives* that radiological emergencies are unique in other ways is another question entirely. While this question cannot be lightly dismissed, it is not one which can be answered within the context of this proceeding. The evidence before us shows us that the only significant difference between radiological events and, for example, nonradiological chemical contamination events, is simply that in the former the potential contaminant is radioactive.

1642. As we noted in our certification on psychological stress issues, we had the jurisdiction and the responsibility to determine whether this public perception would impact on the ability or the desire of the public in the TMI area to undertake evacuation or other emergency measures in the event of another accident at TMI. The Board did not find the testimony of either witness to exert sufficient weight to discount the weight of the other. The Board, concerned about this very point, at the end of Dr. Erikson's testimony specifically asked Dr. Erikson whether in disagreeing with Dr. Dynes' testimony:

Are you confident that you know Dr. Dynes estimate of how people would react in this area in the event of another emergency at TMI is incorrect; or is it your opinion that he has insufficient information on which to make an accurate estimate of how people would react; or is it your opinion that you do not feel that anyone at the present time has the necessary information to make an accurate estimate?

Tr. 21,807 (Little).

1643. Dr. Erikson indicated that if he had to pick one of those three, his answer would be that "neither Dr. Dynes nor I have sufficient information about this area to speak confidently about the situation plans, that we are both speaking from the general experience, which is the way in which sociologists approach subjects like this. I have not seen information to make me feel that there are any studies which would be final on the subject of evacuation." Tr. 21,808 (Erikson).

1644. The Board agrees and finds that based on the evidence before us, we accord weight to those areas where there is agreement but we can place little or no weight on the testimony of either witness in the areas of disagreement.

1645. We noted above that the question of the public's perception of the severity of an emergency is quite distinct from the question of its actual severity. We think this distinction must be noted in weighing testimony of Dr. Erikson on the potential for "psychic numbing" in the TMI area. The Licensee (PF ¶ 235) would have us find that "psychic numbing" is not particularly relevant to the TMI area since the phenomenon "is characterized by a close relationship to death and the death encounter." See Tr. 21,711-20 (Erikson). Licensee's counsel quoted a passage from the work of Dr. Robert Lifton stating, in regard to psychic numbing, "What has been insufficiently noted, and what I wish to emphasize as basic to [the] process, is its relationship to the death encounter." Tr. 21,714 (Trowbridge). Dr. Erikson agreed with that definition. *Id.* (Erikson). We note the fact that no deaths occurred during the TMI-2 accident is not

equivalent to saying that there was no *perception* by some members of the public that they were in a death encounter. The ensuing cross-examination of Dr. Erikson in regard to the potential for psychic numbing in the population two or more years after the TMI-2 accident, and its potential for interfering with emergency plans, concluded with Dr. Erikson's admission that he did not know for a fact that psychic numbing existed in the area but that he was testifying that there was no information that it did not exist. Tr. 21,717-18 (Erikson).

1646. In later cross-examination Dr. Erikson explained that he did not consider "psychic numbing" to be the term of choice for describing possible residual effects in the TMI area and suggested the term "disaster syndrome" instead. Tr. 21,756 (Erikson). With this qualification he then stated that he believed that evidence suggests "that there is a high likelihood of the disaster syndrome occurring in any disaster" and that emergency plans should "take into account the likelihood that that response is likely to happen." *Id.* His opinion was that the "disaster syndrome" could cause a slow response to a subsequent emergency and that those having suffered once from the "disaster syndrome" would be sensitized so that they would be more likely to succumb a second time. However, he admitted that these were guesses as he knew of no occasion in which it could be or had been tested. Tr. 21,757 (Erikson).

1647. Dr. Erikson also believed that part of the population might exhibit the opposite response, *i.e.*, overreaction or hypervigilance. Erikson, ff. Tr. 21,686, at 4-5. His point is that the populace may over-react because of an alleged increase in their level of fear following the TMI-2 accident and because of a lower level of trust in the authorities who would be issuing instructions. Erikson, ff. Tr. 21,686, at 4. Dr. Erikson reviewed various studies that have been conducted since the TMI-2 accident. Tr. 21,705 (Erikson). This review included an evaluation of the studies to determine whether in any study the questions asked were unduly suggestive of the answer. It was Dr. Erikson's view that none of the studies he relied upon were disqualified on this ground, including a study done by Dr. Raymond Goldsteen. Tr. 21,707-08 (Erikson). Prior to Dr. Erikson's appearance, the Board itself had reason to review the Goldsteen study and, contrary to Dr. Erikson's view, we found that the questions asked were unduly suggestive. Tr. 20,991-93 (Smith). Therefore, the Board has reason to question the standards used by Dr. Erikson in concluding that the studies were not defective. We do not know how much weight Dr. Erikson placed on the Goldsteen study in drawing his conclusions. Moreover, in at least one of the studies relied on by Dr. Erikson, one measure of heightened stress levels (the so-called Langer scale) showed no difference between populations close to TMI and the control group beyond 40 miles. Tr. 21,723-25 (Erikson).

1648. However, as set forth in Staff's PF ¶ 206, there does appear to be some evidence to support Dr. Erikson's assertion that a substantial proportion of the population could overreact¹⁹¹ in the event of an emergency at TMI. In part this evidence consists of the testimony (stipulated into evidence) set forth in an article by Dr. Donald Zeigler in *The Geophysical Review*, ff. Tr. 21,818. During the TMI-2 accident, nearly 144,000 people within 15 miles of the site evacuated when only about 2500 persons (pregnant women and pre-school age children) had been advised to evacuate. Zeigler, ff. Tr. 21,818, at 7. The fact that the major part of the TMI-2 evacuation occurred on Friday night, March 30, 1979, when serious consideration by government authorities of a full evacuation became public and when the work week and school week constraints on relocating were removed (Zeigler, ff. Tr. 21,818, at 12), suggests that the voluntary evacuation was, to some extent, a matter of convenience to the evacuees. Nevertheless, that voluntary or spontaneous evacuation in the absence of explicit governmental recommendations to evacuate represents the type of overreaction which Dr. Erikson believes could occur in any future TMI emergency. Several potential problems with regard to implementing protective actions in an emergency could result from such overreaction. Persons advised to temporarily shelter could, instead, attempt to evacuate thereby putting themselves at greater risk. In addition, persons outside the plume EPZ could spontaneously evacuate in large numbers, thereby complicating a previously ordered evacuation within the plume EPZ itself and affecting the time it would take to evacuate the plume EPZ in the absence of traffic control provisions beyond the EPZ. Tr. 19,147-49 (Urbanik). Voluntary evacuation by persons within the plume EPZ prior to the time that an evacuation is ordered would reduce the number of vehicles on the road during a subsequent directed evacuation and would thus reduce evacuation times. Tr. 17,486-87 (Podwal).

1649. Dr. Erikson expressed his view that the degree of overreaction by the public in a TMI emergency could be reduced and the likelihood that the public will appropriately respond could be increased by improving the credibility of government and by providing accurate information to the public. Tr. 21,753-54; 21,773-75 (Erikson). This is consistent with the

¹⁹¹ Overreaction is not synonymous with panic. Extensive research covering a wide variety of emergencies indicates that uncontrollable behavior or panic is a very rare phenomenon and is, in essence, negligible for most types of emergencies. Dynes, ff. Tr. 17,120, at 7; Tr. 17,140 (Dynes); Tr. 17,638 (Podwal); Staff Ex. 18, at 1-1. The evidence indicates that panic generally occurs only under special circumstances in which individuals are faced with a highly visible and immediate threat to survival with escape routes cut off. Staff Ex. 18, at 101. Such circumstances should not obtain in a radiological emergency at TMI, as evidenced by the evacuation attendant to the TMI-2 accident. That evacuation was calm and orderly and did not involve hysterical flight. Zeigler, ff. Tr. 21,818, at 7; Staff Ex. 18, at 1-1.

views of other witnesses who have indicated that the most important elements in predicting behavior and eliciting appropriate public response in an emergency are public education and the communication of accurate information to the public. Staff Ex. 18, at 1-1. To be effective and credible in this regard, according to FEMA witnesses, the information and instructions given to the public must be complete and continuous (Tr. 22,718 (Jaske); Tr. 19,290 (Pawlowski)) and should come from a source that the public normally looks to for instructions rather than from multiple, unusual and unexpected sources not normally relied upon. Tr. 22,730-31 (Jaske). This is consistent with studies which showed that the reasons for the large scale spontaneous evacuation during the TMI-2 accident, apart from individuals' concerns for their own safety, were lack of knowledge and confusing and conflicting information from governmental sources and the Licensee. Tr. 21,775-76 (Erikson); Zeigler, ff. Tr. 21,818, at 5-6.

1650. Dr. Dynes was cross-examined extensively about his views on public information and instructions and on the effect of the credibility of the source of the instructions on the public's inclination to take action. See Tr. 17,146-54. Neither the intervenors nor the Board were able to elicit any definitive statements from Dr. Dynes on this topic. However, as best we can determine, Dr. Dynes does advocate providing information from multiple sources (Tr. 17,152) which is full and complete without being overburdening (Tr. 17,153) and which will give people sufficient material on which they can make decisions of what preventive action to take. *Id.*

1651. In this regard our conclusion is that appropriate public education reduces fear and mistrust in authority and increases the likelihood that people will do as instructed during an emergency. See, e.g., Tr. 17,189-92 (Dynes); Tr. 19,275-78, 19,290-91, 19,294, 19,297 (Pawlowski); Tr. 19,279-80, 19,285-86, 19,307-10 (Adler); Staff Ex. 19, at 3-1 (Jaske).

1652. We have discussed elsewhere, to some extent, the public education programs of the Commonwealth and the Licensee. Under the Commonwealth's Emergency Plan, the State will disseminate pre-emergency educational materials designed to provide to the public a basic understanding of the nature of radiation, of the hazards from radiation, and of measures which can provide some degree of protection from the hazards. Commonwealth Ex. 2.a, at 15-1, 15-2. Materials to be disseminated will provide information on State, county and municipal planning, how the public alert/notification procedures will be implemented, procedures for implementation of protective actions, including evacuation, and contacts for additional information. *Id.*, at 15-2. The Commonwealth's emergency public information program provides for disseminating, at the time of an accident through the emergency broadcast system (EBS), detailed instructions to the public in the plume EPZ on protective actions and the response of governmental agencies and the Licensee. *Id.*, at 15-3. The

Licensee's public information program entails meetings with government officials and citizens to acquaint them with the Licensee's siren alert system, general radiation education seminars, and the distribution of emergency information pamphlets. Staff Ex. 23, at II-5. By the Fall of 1981, Licensee will distribute throughout the plume EPZ the Commonwealth's emergency information pamphlet (Commonwealth Ex. 3) describing the nature and hazards of radiation, protective measures, and the manner in which the public will be informed of an emergency, along with the county emergency information pamphlets (e.g., Commonwealth Ex. 5) which provide instructions on sheltering and evacuation and specific evacuation routes and maps. Tr. 22,878-79, 22,917 (Chesnut). We find that these public education programs, when implemented, will provide substantial information to the public on the nature of radiation and its hazards, and on protective actions and their importance. In addition, we find that provision has been made for communication to the public, through the emergency broadcast system at the time of an emergency, continuous emergency information and instructions from authoritative governmental sources. These provisions for pre-emergency public education and for emergency information and instructions will, we believe, tend to reduce the tendency for overreaction and a refusal to follow instructions during an emergency.

1653. Beyond this, we have no evidence from which we could conclude that public overreaction and refusal to follow protective action instructions will occur to any substantial degree where clear instructions and directions on protective actions are provided. We reiterate our observation that the point made by Dr. Erikson in his testimony was that neither he nor Dr. Dynes (the witness whose testimony Dr. Erikson was to rebut) have sufficient information on the population in the TMI area to speak confidently on how that population will react in a radiological emergency. Tr. 21,808 (Erikson). PEMA's experience with emergencies in the Commonwealth is that the public displays an outward discipline in emergencies, awaiting instructions and heeding instructions when given. Tr. 17,850 (Lamison). Similarly, FEMA's experience and research indicates that most evacuees will respond to instructions when the bases for those instructions have been established. Staff Ex. 18, at 3-1; Tr. 19,276, 19,462-63 (Pawlowski); Tr. 19,277-78 (Bath); Tr. 19,278, 19,285-86 (Adler). We have no basis to find to the contrary for the TMI area. The Commonwealth is of the view that proper planning for evacuation flow has now been accomplished and that such planning will allow the spontaneous evacuation of persons outside the EPZ to be properly managed so that it will not impact evacuation of the EPZ itself. Tr. 17,718-20 (D. Smith); Tr. 17,853 (Lothrop). In this regard, both York and Dauphin Counties, the two counties most directly impacted by an emergency at TMI, have

pre-arranged for traffic control for areas outside the EPZ. Tr. 20,904 (Curry, Wertz). PEMA and the Pennsylvania State Police are in the process of upgrading the Commonwealth's traffic control plan and developing an access control plan for the plume EPZ. Bath, ff. Tr. 22,350, Attachment 3, at 7. With traffic control and access control at the plume EPZ periphery, spontaneous evacuation by persons beyond the plume EPZ should have little or no impact on the time it takes to evacuate the EPZ itself. Tr. 17,544-46 (Podwal).

1654. The impact of spontaneous evacuation beyond the EPZ on the need for post-evacuation support should not be significant. Research shows that spontaneous evacuees generally have planned their evacuation and have places to which they can relocate. Staff Ex. 18, at 3-1.

1655. Finally, we recognize that the extant public information is neither perfect nor final and that its revision and improvement should be an ongoing process. In the context of this proceeding numerous suggestions were made for improving the public information process. We believe it would be a gross misinterpretation of the intent of NUREG-0654 if any public information plan were to be considered beyond further improvement. We find that substantial efforts have been made by Licensee, the Commonwealth, and the counties to improve the public information process. We find that these efforts are adequate to support restart of TMI-1, but implicit in this finding is our expectation that the public information process will be an ongoing dynamic one.

G. Protective Action Decisionmaking

1656. Four major issues and an variety of subissues, relating generally to protective action decisionmaking, were litigated by the parties. We address each issue in turn. The first issue deals with the general criteria used by Licensee and the Commonwealth in the protective action decisionmaking process, including information needed to assist in that process and a mutually consistent set of criteria that will be used as a planning basis for protective action decisions. Next we review the adequacy of the evacuation time estimate prepared for Licensee to be used by all response groups as a planning and implementation tool. The third part of this section deals with the manner in which a range of contingencies will be handled, both in the protective action decisionmaking process and during an actual emergency. The final issue addressed in this section is an objection raised to a particular ingestion pathway protective action guide.

1657. Extensive testimony on these subjects was presented by Licensee, Staff, and the Commonwealth. Intervenors participated extensively in cross-examination. Licensee, Staff, and intervenors submitted proposed and

reply findings. Generally, Licensee and Staff expressed the same views, in sum, that the evidence did not support intervenors' assertions of inadequacies in these areas; the intervenors urged us to find to the contrary. In the formulation of our findings in this section we have relied heavily on the proposed findings of Licensee and Staff but in each case we also address the concerns of the intervenors.

1658. We note, in introduction to this section, that in the event of a radiological emergency posing a threat to members of the public, a number of protective actions may be taken in an attempt to avoid, reduce or minimize the consequences to the public. For persons on-site at TMI, the protective actions available and provided for are sheltering, respiratory protection, thyroid blocking through the use of radioprotective drugs, partial evacuation of the site, and control of access of the site. Tr. 15,152-53 (Chesnut). For persons off-site, protective actions available and provided for are sheltering, evacuation and access control in conjunction with evacuation, and thyroid blocking for emergency workers and institutionalized persons. Tr. 15,153-54 (Chesnut). For members of the public, the objective of protective actions is to avoid exposing persons to doses in excess of the Protective Action Guide (PAG) values. Tr. 13,827-28 (Rogan).

1659. Several contentions were raised which relate to protective action decisionmaking and factors that bear on that decisionmaking. These contentions deal with various aspects of the general criteria used in protective action decisionmaking, with evacuation time estimates to be used for determining whether evacuation is a viable protective action, with consideration of contingencies which affect protective action decisions, and with specific ingestion PAGs. The contentions in each of these areas are addressed below.

1. General Criteria

1660. Three contentions dealt with the general criteria used in the protective action decisionmaking process. We warn here that some of the contentions are overlapping, making an orderly discussion somewhat difficult. We further note the dynamic state of emergency planning regulations throughout the course of the proceeding. The Staff has indicated that those portions of Regulatory Guide 1.70 referred to in ANGRY Contention EP-4(H)(1) and which called for statements of accident as assessment time have been superseded by the requirements of the new emergency planning rules and by the guidance of NUREG-0654. Chesnut, ff. Tr. 15,007, at 46.

1661. ANGRY Contention EP-4(H) asserts:

RG 1.101 Sec. 6.4 requires the licensee to specify "criteria for implementing protective actions . . ." The licensee's EP fails to set forth the following mandatory items of information regarding the time required for protective action implementation:

1. Expected accident assessment time. RG 1.70, Sec. 13.3.1-2.
2. Time required to warn persons at risk. RG 1.101, Sec. 6.4.1-2(b); RG 1.70, Sec. 13.3.1-3, 4.
3. Time required for a general evacuation. RG 1.70, Sec. 13.3.1-5, 6; November 29, 1979 letter to "All Power Reactor Licensees" from Brian K. Grimes, Director, NRC Emergency Preparedness Task Group.
4. Time required to evacuate special facilities (e.g., hospitals). November 29, 1979 letter, *supra*.

See, N. 0654 J8.

1662. As to part 1 of this contention, there are no requirements in the new emergency planning regulations and no criteria in NUREG-0654 stipulating that accident assessment time be set forth in emergency plans or emergency procedures. The Licensee's Emergency Plan utilizes that accident classification scheme and accident assessment concept consistent with the guidance of NUREG-0654 and this provides for rapid accident assessment. The evidence shows that it is neither practical nor useful to predict and rely upon accident assessment times. Chesnut, ff. Tr. 15,007, at 46-47. Accordingly, we find that absence in the Licensee's Emergency Plan of time estimates for accident classification and assessment is not a deficiency.

1663. As to part 2 of Contention EP-4(H), the evidence indicates that the Licensee's Emergency Plan provisions for onshift staffing and notification assure prompt notification of off-site state and county emergency response agencies within about 15 minutes of declaration of an emergency. Chesnut, ff. Tr. 15,007, at 47-48. In addition, we have previously found that with completion, subject to testing, of the Licensee's siren alerting system, the capability should exist to alert essentially all members of the public within the plume EPZ for TMI within about 15 minutes of a decision by governmental authorities to activate the siren system. Thus, it will be theoretically possible to alert the public within about 30 minutes of the declaration of an emergency by the Licensee. However, it is obvious that the period of time from declaration of an emergency to alerting the public is dependent upon the period of time it will take for governmental

authorities to reach a decision to activate the prompt alerting system. Further, it is obvious that that period of time will depend upon the severity of the accident and the circumstances of the emergency. For a very severe accident, the decision to alert the public may be made by emergency response organizations at the time they are initially notified of the accident by the Licensee. For TMI incidents that never progress beyond the Unusual Event or Alert category, the decision may be made not to activate the prompt alerting system at all. Thus, it appears to be neither practical nor useful for the Licensee's Emergency Plan to contain an estimate of the time it will take from declaration of an emergency to alerting the public and the absence of such an estimate in the Licensee's plan would not be a deficiency.

1664. As to parts 3 and 4 of Contention EP-4(H), in March 1981, the Licensee, through its consultants Parsons, Brinckerhoff, Quade and Douglas, Inc., completed an extensive and detailed evacuation time estimate study for the TMI plume EPZ (hereinafter referred to as the Licensee's evacuation time estimates or the Parsons-Brinckerhoff study). This study, which is discussed in greater detail in Section 6.2 below, will be utilized by the Licensee as a basis for making protective action recommendations to the state. Tr. 22,920 (Chesnut). It will also be utilized by the state in making protective action decisions. Tr. 22,361-63 (Bath). This study provides evacuation time estimates, by evacuation sectors for each of three different scenarios, for a general evacuation and for the evacuation of special facilities. Licensee Ex. 52, Tables 24A, 24B, 24C. Consequently, the assertions in parts 3 and 4 of Contention EP-4(H) that Licensee has failed to provide time estimates for a general evacuation and for the evacuation of special facilities are erroneous.

1665. While current NRC Staff guidance does not expressly require a licensee to identify the estimated "time to onset of release", nonetheless, an estimate of such time obviously is important during any emergency. Licensee has developed an "Emergency Status Report" checklist which summarizes the key plant parameters and information necessary to assess the radiological impact of the emergency. The checklist contains information on the nature of the emergency, the status of emergency safeguards systems, and information on radiological releases (*i.e.*, source terms, meteorology, anticipated duration of releases and projected doses). The information on this checklist would be communicated to BRP during BRP's initial contact with the plant. Rogan, *et al.*, ff. Tr. 13,756, at 89; Chesnut and Bath, ff. Tr. 19,626, at 4. Although the Emergency Plan does not call for providing the estimated "time to onset of release" *per se*, the Board finds that the detailed information regarding plant conditions and radiological release characteristics provided to BRP is adequate to assure that all necessary information is available to BRP. Chesnut and Bath, ff.

Tr. 19,626, at 4-5. Margaret Reilly, BRP's Chief of the Division of Environmental Radiation, testified that BRP would ask for any information it believed necessary, and was confident that Licensee would satisfy these needs. Reilly, ff. Tr. 18,125, at 4. The in-place dedicated Radiological Line is adequate to ensure that such information can be communicated promptly between Licensee and BRP. *See* Rogan, *et al.*, ff. Tr. 13,756, at 60-61; *see also* Section D, *supra*.

1666. Similarly, while current emergency planning guidance also does not require that the "time required to warn persons at risk" be included in the Emergency Plan (Chesnut, ff. Tr. 15,007, at 47), the new emergency planning rule does require that licensees "have the capability to notify responsible state and local governmental agencies within 15 minutes after declaring an emergency". 10 CFR Part 50, Appendix E, §IV.D.3. The Board already has reviewed the adequacy of Licensee's initial notification capabilities and found them to be in compliance with the rule. *See* Section D, *supra*. The emergency planning rule also requires that:

By July 1, 1981, the nuclear power reactor licensee shall demonstrate that administrative and physical means have been established for alerting and providing prompt instructions to the public within the plume exposure pathway EPZ. The design objective shall be to have the capability to essentially complete the initial notification of the public within the plume exposure pathway EPZ within about 15 minutes.

10 CFR Part 50, Appendix E, §IV.D.3

1667. The Board has reviewed Licensee's compliance with this requirement and found it acceptable. *See* Section E.2, *supra*. With these capabilities in place, the Board concludes that all emergency response organizations have adequate knowledge as to the "time required to warn persons at risk".

1668. Another major issue raised by intervenors is the adequacy of the general criteria used by the Commonwealth in making protective action decisions, as asserted in ANGRY Contention EP-5(E):

There is no reasonable assurance that appropriate protective measures will be taken in the event of a nuclear accident with off-site radiological consequences for the following reasons:

1. The Commonwealth's criteria for appropriate protective action choice, as set forth in Sec. VIII of its BOPR plan, are inconsistent with those of the licensee (EP, p. 6-13). According to the licensee evacuation is the appropriate protective action if dose projections approach the lower limits of EPA PAGs. According to BOPR this

would not be the case unless the upper limits of the PAG's were approached. Although the licensee indicates that sheltering is the appropriate choice for atmospheric releases of short duration, the BORP plan proposes evacuation for "sudden severe accidents." The licensee would not recommend evacuation in the event of a continuous release if "evacuation cannot be well underway prior to plume arrival," while BORP would order an evacuation in such a case regardless of wind speed and warning time.

2. The BORP plan fails to quantify protective action selection criteria such as "time to onset of release . . . time required to effect relocation," and the definition of "puff release." Such quantification of criteria is a necessary ingredient in effective planning and is required by N. 0654 Sec. J10(m).
3. The Commonwealth does not comprehend the distinction between "core-melt" and "melt-through" accidents as those terms are employed in NUREG/CR-1131.
4. The Commonwealth declines to employ "state-of-the-art" calculational methodology, as set forth in EPA 520/1-78-001B, in turn referenced in N. 0654 at p. 55, n.1(3), in conjunction with hypothetical accident release characteristics to assist it in making appropriate protective action selection.
5. The Commonwealth's discussion of the sheltering option is inadequate in that it fails to emphasize the importance of the use of building basements (see NUREG/CR-1131) or of ventilating the shelter at the appropriate time (see WASH-1400, App. VI, Sec. 11.1.2) as means to maximize the effectiveness of this measure. This inadequacy is carried through to instructions to be provided the public as set forth in County plans.

1669. As to part 1 of this contention, a review of both the Licensee's Emergency Plan and that of BRP reveals that both plans use as a criterion for evacuation projected doses approaching one rem whole body or 5 rem to the infant thyroid. Commonwealth Ex. 2.a, Appendix 8, at VIII-1; Licensee Ex. 30, at 6-14. The criteria of the Licensee and BRP are thus consistent in this regard. Reilly, ff. Tr. 18,125, at 5; Adler and Bath (2/23/81), ff. Tr. 18,975, at 8. Sheltering will be considered by BRP when, among other things, "the combination of warning time, plume arrival time and release time is not long enough to effect evacuation". Commonwealth Ex. 2.a., Appendix 8, at VIII-2. In the Licensee's Plan, sheltering is a consideration if, "[e]vacuation could not be well under way

prior to expected plume arrival due to short warning time, high wind speeds and/or foul weather”, or the “[r]elease time is expected to be short”. Licensee Ex. 30, at 6-14. Although these criteria are phrased differently, they are consistent. Adler and Bath (2/23/81), ff Tr. 18,975, at 8-9. In short, the inconsistencies alleged in part 1 of Contention EP-5(E) do not exist.

1670. Part 2 of Contention EP-5(E) alleges that the BRP Plan is deficient because it fails to quantify parts of protective action selection criteria such as the “time to onset of release” and the “time to effect relocation” and because it lacks a definition of “puff release”. A review of the protective action selection criteria set forth in the revised BRP Plan reveals that, in fact BRP does not refer to “time to onset of release” or “puff release” in its criteria. Commonwealth Ex. 2.a, Appendix 8, at VIII-1 to VIII-3. Consequently, there is nothing in BRP’s criteria to quantify in this regard. Beyond this, BRP has defined its concept of “time to onset of release” and “puff release” indicating that for BRP’s purposes, these terms are adequately quantified (Reilly, ff. Tr. 18,125, at 6-7) and lack of further quantification in this regard should not affect BRP’s protective action decisions. Adler and Bath (2/23/81), ff. Tr. 18,975, at 9-10. As to the alleged lack of quantification of “time to effect relocation”, we have previously alluded to the Licensee’s evacuation time study which provides evacuation time estimates for various evacuation scenarios. The Commonwealth has accepted these time estimates after considerable evaluation of them and will utilize them in its protective action decision-making. Tr. 22,361-63 (Bath). Consequently, each of the allegations in part 2 of Contention EP-5(E) are without merit.

1671. Intervenors allege in part 3 of Contention EP-5(E) that the Commonwealth does not comprehend the distinction between the terms “core melt” and “melt through”. These terms are used in evacuation criterion A.1 of the BRP Plan wherein it is stated that “This option [evacuation] will be considered when: 1. A core melt accident is underway, which involves or is expected to involve a loss of containment integrity by melt through or by direct release to the atmosphere” Commonwealth Ex. 2.a, Appendix 8, at VIII-1. BRP has specifically defined “core melt” as an accident leading to a change of phase of core material from solid to liquid, and “melt through” as a core melt leading eventually to containment failure by penetration of the molten core through the reactor vessel and the floor of the containment. Reilly, ff. Tr. 18,125, at 7. These definitions seem to be reasonable and accurate and the evidence indicates that the Commonwealth’s usage of these terms in its emergency plan is proper. Adler and Bath (2/23/81), ff. Tr. 18,975, at 10-11. There is no reason to believe to the contrary and we find that part 3 of Contention EP-5(E) is unfounded.

1672. Part 4 of Contention EP-5(E) faults the Commonwealth for its failure to use EPA 520/1-78-001B, Protective Action Evaluation Part II, Evacuation and Sheltering as Protective Actions Against Nuclear Accidents Involving Gaseous Releases, in its protective action decisionmaking. This document is referenced in NUREG-0654 at one that "may" be used to determine the sheltering protection provided by residential units or other shelters. Staff Ex. 7, at 64. The document provides guidance but its use is not mandatory. Adler and Bath (2/23/81), ff. Tr. 18,975, at 11-12. The Commonwealth does not use the document directly because the techniques provided in it for determining shelter effectiveness involve a complicated process requiring the input of 13 parameters with a range of values for many of the parameters. This technique is simply not practical for use in a crisis. Reilly, ff. Tr. 18,125, at 7-8. In view of this and of the fact that use of this EPA guidance document is not mandatory, this Board does not fault the Commonwealth for eschewing the use of the EPA document. Thus, we reject part 4 of Contention EP-5(E).

1673. Part 5 of Contention EP-5(E), intervenors allege inadequacies in the Commonwealth's planning with regard to sheltering due to its failure to emphasize the importance of basements or of ventilating shelters. The Commonwealth views sheltering as a useful protective action option when dose projections are in the PAG range and the radioactive release occurs so quickly and is so brief that evacuation cannot be accomplished. The state has not emphasized the use of basements for sheltering because basements are not universally available in the TMI area. Similarly, the state has not emphasized ventilation of shelters because the proper time to ventilate depends on the availability in each shelter of some means of forced ventilation and on the proper ambient wind speed. Reilly, ff. Tr. 18,125, at 8. Further, it is recognized by the Commonwealth that sheltering is by no means an ideal response, but simply, if evacuation cannot be accomplished, a response which has "some protective value" and "is better than nothing regardless of the building". *Id.*, at 9; *See also*, Tr. 18,144-47 (Reilly). In these circumstances, it appears to be prudent to avoid emphasis on the use of basements for sheltering and on ventilation of shelters. The fact that neither the state nor the county emergency plans emphasize the use of basement sheltering and ventilation of shelters is of no moment. If, during an emergency at TMI, sheltering is in effect as a protective action and the state determines that basement sheltering would enhance protection or that ventilation of shelters is needed, instructions on either matter may be given to the public by means of EBS announcements. Adler and Bath (2/23/81), ff. Tr. 18,975, at 40-41. We find that the concerns addressed in part 5 of Contention EP-5(E) have been adequately addressed.

1674. In sum, for the reasons stated, we believe that the concerns voiced in ANGRY Contention EP-5(E) have been adequately resolved to an extent which would permit restart of TMI-1.

1675. ANGRY Contention EP-5(B) asserts that:

The Emergency Planning Review Guideline requires state/local plans to designate "protective action guides *and/or other criteria* for implementing *specific* protective actions . . ." (Sec. IV(b)(1); emphasis added) and "information needs" for implementing such protective actions (Sec. IV(B)(2)). The BORP Plan both fails to explicitly impose upon the licensee clear responsibility for fulfilling such information needs or, where required, to undertake to satisfy them at its own initiative.

1. Section VIII(A) of the BORP Plan indicates "time to onset of release" as a significant factor in determining the appropriateness of recommending evacuation. However, nowhere is the licensee given explicit responsibility for providing such information, or does the Plan contain an analysis of how variation of this factor will affect the choice of appropriate protective action. See, e.g., NUREG-0610, p. 13, par. 4(c).
2. A second factor listed is "time required to effect relocation." NUREG-75/111, Sec. J(6) requires an adequate state plan to include development of "bases and time frames for evacuation" resulting in "estimates of the time required to carry out evacuation procedures" that reflect consideration of such factors as "impaired mobility of parts of the population" (Sec. J(7)(c)) and "potential impediments to use of egress routes, such as rush hour traffic and inclement weather" (Sec. J(7)(f)). The availability of this and other information specified by the President's Commission is an essential prerequisite to adequate emergency planning and decision making whether or not in the context of an actual emergency situation. See too, N. 0654, Section j(10) (k; note requirement for specification of "contingency measures"), (l) & (m).

1676. As to part 1 of this contention, the evidence shows that the Licensee's Emergency Plan specifically lists followup information which will be provided to BRP. In addition, a direct "radiological line" between BRP and TMI will be opened in the event of an emergency. The communications links between BRP and the Licensee that are relied upon by BRP for obtaining information are currently in place and operational and are tested frequently. Tr. 18,243 (Reilly). The detailed information on plant conditions and radioactive release characteristics to be provided by

the Licensee, along with the use of the "radiological line", are adequate for providing information needed by BRP. Chesnut and Bath, ff. Tr. 19,626, at 4-5. BRP has clearly indicated that it will ask for any information it needs (Reilly, ff. Tr. 18,125, at 4) and that it has confidence that the Licensee will supply such information (Tr. 18,238 (Reilly)). In the event that the Licensee is unable to provide the "time to onset of release", BRP has, in its written procedures, accident assessment methods based on WASH-1400 fault tree analysis which it will utilize to estimate "time to onset of release" for purposes of protective action decisions. Reilly, ff. Tr. 18,125, at 4; Tr. 18,141-43 (Reilly). Thus, BRP has the capability, independent of Licensee, but using some of Licensee's data, to predict the time to onset of release and the release duration. Tr. 18,144-45 (Reilly). Accordingly, we find the assertions of part 1 of Contention EP-5(B) to be without merit.

1677. In part 2 of Contention EP-5(B), intervenors again raise the matter of the need for an evacuation time estimate asserting that such estimate must reflect such factors as improved mobility of parts of the population and impediments to the use of egress routes such as inclement weather. As previously discussed, the Licensee has provided a detailed evacuation time estimate for the TMI plume EPZ that will be used by the state in its protective action decisionmaking. The Licensee's evacuation time estimate study includes time estimates for an evacuation on a typical weekday, reflecting normal traffic, and for an adverse weather (snow) condition with roads temporarily impassible and road capacities reduced. Licensee Ex. 52, at 60. Thus, the Licensee's evacuation time estimates account for conditions in which impediments to the use of egress routes exist. Moreover, the Licensee's evacuation time estimates for each evacuation condition include estimates for the time to evacuate special facilities such as schools, colleges, long-term care facilities, hospitals and prisons, all requiring special evacuation techniques and vehicle transportation. Licensee Ex. 52, at 13, 29, Tables 24A, 24B, 24C. The time estimates also account for evacuation of persons without cars. *Id.*, at 52. In this way, the estimates reflect consideration of impaired mobility of parts of the population. Consequently, we find that the Licensee has provided the evacuation time estimate information sought in part 2 of Contention EP-5(B) and that this portion of the contention has been satisfied. We address evacuation time estimates in more detail in the next section.

2. Evacuation Time Estimates

1678. NUREG-0654, Criterion J.10.1 provides that state and local emergency response organizations are to implement protective measures for the

plume EPZ which include time estimates for evacuation of various sectors of the plume EPZ developed in accordance with Appendix 4 to NUREG-0654. Staff. Ex. 7, at 61, 63. As recognized by Staff and Licensee, the primary purpose of such time estimates is to provide a basis on which to determine whether evacuation is a viable protective action option in a particular situation. Tr. 13,820-21 (Rogan); Tr. 15,016 (Chesnut); Tr. 15,041 (Grimes); Urbanik, ff. Tr. 19,137, at 6.

1679. As pointed out by Combined Intervenors at proposed finding ¶ 210, the guidance for the preparation and presentation of evacuation time estimates contained in Appendix 4 of NUREG-0654, Rev. 1, is "intended to be illustrative of necessary considerations and provide for consistence in reporting". Staff Ex. 7, at 4-1. The Board interpreted this guidance to indicate that the general criteria set forth in Appendix 4 of NUREG-0654, Rev. 1, should be followed, but that, consistent with the philosophy used by the Commission in defining the areal extent of the plume exposure pathway EPZ (10 CFR 50.47(c)(2); 10 CFR Part 50, Appendix E, I, fn. 2) local conditions that might affect the evacuation time estimates should also be taken into account.

1680. In response to the guidance in NUREG-0654, the Licensee developed and supplied for the Commonwealth's use a detailed evacuation time estimate for three different evacuation scenarios: a best estimate condition involving an evacuation at night when families are together at home and special facilities have reduced staff; a normal condition reflective of a typical weekday when schools are in session, businesses are in operation, tourists and business travelers are dispersed throughout the area and special facilities are operating with normal staffs; and an adverse weather condition typical of a winter morning following an average snowfall with snow emergency conditions in effect and roads rendered temporarily impassible. Licensee Ex. 52, at 60. Based on detailed studies establishing permanent resident population, transient population, special facility and school populations and vehicle estimates (*id.*, at 4-44) and on evacuation route capacity determinations established from a physical inventory of evacuation routes and standard road capacity calculations (*id.*, at 55), lower and upper bound evacuation time estimates by sector for each of the three scenarios were produced. *Id.*, Tables 24A, 24B, 24C. For each scenario, the lower bound estimates represent a situation in which there is a high level of mobilization of emergency forces prior to evacuation such as might be the case for a slowly developing accident which provides a long lead time for prior mobilization. The upper bound estimates represent

a situation in which there is a poor state of readiness of emergency forces and resources due a sudden accident at TMI leading to a spontaneous order for evacuation. *Id.*, at 55.

1681. The Licensee's evacuation time estimate study was reviewed for the Staff by Staff consultant Thomas Urbanik who was one of the principal authors of NUREG-0654, Appendix 4 which sets forth the criteria for evacuation time estimates. Based on that review, Mr. Urbanik determined that the calculational method used was consistent with NUREG-0654, Appendix 4 criteria and that detailed population estimates for permanent residents, transients and special facilities were produced in accordance with NUREG-0654 guidance. Urbanik, ff. Tr. 19,137, at 4. Mr. Urbanik expressed his view that the range of scenarios evaluated was generally reflective of conditions that could exist in an actual evacuation, that the upper bound estimates provide reasonable estimates of increased evacuation times due to a poor state of readiness and will provide a usable mechanism for accounting for conditions existing at the time of evacuation, and that the Licensee's estimates are in compliance with NUREG-0654 criteria and provide reasonable estimates of the range of times required to evacuate the plume EPZ for TMI. *Id.*, at 5-6.

1682. Of necessity, the evacuation time study was based on certain assumptions. Tr. 19,179 (Urbanik). The litigation of this issue included extensive cross-examination on those assumptions. The Staff's consultant, who reviewed Licensee's study, concluded that the assumptions included in that study are reasonable. Tr. 19,150-51, 19,158-59, 19,179 (Urbanik). Testimony indicated that it is not necessary that the assumptions on which the evacuation time study is based be completely consistent with the actual provisions of the state and county plans. Tr. 19,174 (Urbanik); Tr. 19,331-32 (Adler). In fact, one purpose of an evacuation time study is to assess the need for additional traffic control points and evacuation routes. Tr. 15,040-41 (Chesnut); Urbanik, ff. Tr. 19,137, at 6; Tr. 19,188-89 (Urbanik); Tr. 19,451-52 (Adler); *see* Staff Ex. 7, at 4-5 and 4-10. However, there was expressed a need for state and local emergency management personnel to reconcile any significant differences between the plans and Licensee's evacuation time estimate study by accounting for those differences when making use of the study for protective action decisionmaking. Tr. 19,331-33 (Adler, Bath); Staff Ex. 23, at II-8.

1683. In proposed findings ¶¶ 232 and 233, Combined Intervenors claim that the Licensee's evacuation time estimate study does not comply with the guidance of NUREG-0654 because all assumptions were not stated in the study. NUREG-0654 specifies that assumptions used on such matters as automobile occupancy factors, methods of determining roadway capacities and methods of estimating populations are to be stated in evacuation time estimate studies. Staff Ex. 7, at 4-2. In point of fact, such assump-

tions are quite clearly stated in rather substantial detail in Licensee's evacuation time estimate study. Licensee Ex. 52, at 1, 2, 4-44, 46-56, 70-72, Appendices B, C, D. We find intervenors' assertions to the contrary to be without merit.

1684. Intervenors fault Licensee's evacuation time estimate study for its failure to choose evacuation sectors based on meteorological conditions, citing NUREG-0654 for the proposition that evacuation sectors used in time estimates should be weather dependent. Combined Intervenors PF ¶ 238. However, the guidance of NUREG-0654 indicates that evacuation sector selection should be weather dependent only in those instances in which meteorological conditions, such as dominant wind directions, warrant special consideration. Staff Ex. 7, at 4-4. Intervenors have cited no evidence indicating that meteorological conditions in the TMI area warrant the use of special weather dependent evacuation sectors in evacuation time estimates for the area and we know of none.

1685. Intervenors further allege that the Licensee's evacuation time estimate is inadequate because there was no sensitivity study to determine the most adverse weather conditions (Combined Intervenors PF ¶ 240), citing Staff consultant Urbanik's speculation that rain with a normal daytime population might possibly result in longer evacuation times than the snow scenario used for the average weather condition in the Licensee's study. Urbanik, ff. Tr. 19,137, at 6; Combined Intervenors PF ¶ 241. The evidence indicates that the condition of rain with a normal daytime population would not produce longer evacuation times than the snow scenario because rain, while it may reduce vehicle speeds slightly, does not reduce road capacity as does snow. Tr. 17,934 (Schaufler). The adverse weather condition to be used in evacuation time estimate analyses is not the total worst case scenario. Tr. 19,152-53 (Urbanik). It would be possible to postulate combinations of conditions that would make evacuation impossible for extended periods of time although the likelihood of such events may be remote. However, the objective is to postulate and analyze an adverse weather scenario that has some reasonable possibility of occurrence. Tr. 19,153 (Urbanik). There is no evidence which would indicate that the snow condition chosen for the TMI area is not the proper adverse weather condition to use. The Commonwealth concurs in the choice of the snow condition as the appropriate adverse weather scenario. Tr. 18,022-23 (Lothrop). Accordingly, we reject intervenors' assertions of inadequacies in the Licensee's evacuation time estimates in this regard.

1686. In Combined Intervenors PF ¶ 242, intervenors fault Licensee's evacuation time estimate study for not accounting for flooding on evacuation routes. The evidence indicates, however, that the primary evacuation routes used in the study are not subject to flooding. Tr. 17,622 (Schaufler). The potential for flooding of any of the evacuation routes is low and, in

the event there is flooding in localized areas, alternate local routes not utilized in Licensee's study are available and traffic could be diverted to such alternate routes. *Id.* Consequently, we find that failure to explicitly account for flooding of evacuation routes does not constitute a significant deficiency in Licensee's evacuation time estimate study.

1687. The Commonwealth reviewed Licensee's evacuation time estimate, and characterized it as "one of the best ever written" in the area. Tr. 17,846-47, 17,975 (Lothrop); *see also* Tr. 20,853-54 (Belsler). The Commonwealth's evaluation of the study determined that by virtue of its detail and assumptions it contains basically all the elements present in PEMA's initial evacuation planning. Tr. 17,999-18,000 (Lothrop). While there were at one point some differences to be resolved between the state and Licensee with respect to the evacuation time study (Tr. 17,975-76 (Lothrop)), PEMA has now adopted the upper time limits of Licensee's evacuation time study, and is using the study as an adjunct to its planning effort. Tr. 22,360-61 (Bath); Staff Ex. 21, item J; Bath, ff. Tr. 22,350, Attachment 3, items 2 and 13. In fact, PEMA used the upper bounds of Licensee's evacuation time study in making protective action decisions in the course of the June 2, 1981 exercise. Tr. 22,361 (Bath). FEMA believes that the Commonwealth's planned use of Licensee's evacuation time estimate study, with the state's evacuation planning, will provide the Commonwealth with an adequate basis for determining protective actions in an emergency. Tr. 22,362 (Bath).

1688. The Commonwealth intends to incorporate the time estimates and routing analysis of Licensee's evacuation time study into the county plans, where appropriate. Staff. Ex. 21, item J; Bath, ff. Tr. 22,350, Attachment 3, item 13. Since protective action decisionmaking is a Commonwealth function, and since county plans state that they will rely on the Commonwealth to provide protective action recommendations, FEMA reviewed the use made of Licensee's evacuation time study at the state level. Tr. 22,363-65, 22,370 (Bath). In the interim, while the county plans are being modified to incorporate appropriate parts of Licensee's evacuation time study (Tr. 18,023 (Lothrop)), the Commonwealth's use of the evacuation time study satisfies NUREG-0654 considerations for county level planning. *See generally* Tr. 22,369-70 (Bath); Bath, ff. Tr. 22,350, Attachment 3, item 2. In any event, the county emergency management coordinators have been provided with copies of Licensee's evacuation time study, and the study is acknowledged in the current county plans. Tr. 17,924 (Rogan); Board Ex. 5, at H-7; Board Ex. 6, at E-10; Board Ex. 7, at E-7; Board Ex. 8, at M-20; Board Ex. 9, at M-6.

1689. It should also be noted that in the event of an emergency at TMI, the Commonwealth will have available to it in the state EOC National Weather Service reports, response teams from the Pennsylvania Depart-

ment of Transportation and the Pennsylvania State Police and contacts with the counties. All of this will allow the State to quickly gather information on road conditions, road construction, weather conditions and the state of mobilization. Tr. 18,025 (Lamison); Chesnut and Bath, ff. Tr. 19,626, at 6. Thus, the Commonwealth will have the information that will be necessary to fully utilize the evacuation time estimates and select the estimate most appropriate for the conditions in existence at the time of an emergency. Adler and Bath (2/23/82), ff. Tr. 18,975, at 13-14.

1690. Intervenors proposed that the Board adopt findings reviewing the history of preparation of evacuation time estimates by Wilbur Smith and Associates (Combined Intervenors PF ¶¶ 211-212) and faulting the Parsons-Brinckerhoff evacuation study for failing to include estimates of time to effectuate sheltering or thyroid prophylaxis measures and for lack of coordination with municipal or school district emergency plans. Combined Intervenors PF ¶ 213-217. The Board finds that Licensee acted responsibly in having a new time estimate study prepared in accordance with the guidance in NUREG-0654, Rev. 1, Appendix 4. Further, we note, as was conceded at Combined Intervenors proposed finding ¶ 214, that the evacuation estimate study was not required to consider time for sheltering or prophylaxis. We do agree with intervenors as to the necessity for continued refinement of the estimates based on coordinated efforts by PEMA and the risk counties. As we indicated above, we find that the evacuation time study is consistent with NUREG-0654 guidelines, and serves as a sound basis for planning. Those time estimates can and will be used by the Commonwealth in determining whether evacuation is a viable protective action option in an emergency at TMI.

1691. Moving to the specific county level, a number of contentions admitted in the proceeding fault the York and Dauphin County Emergency Plans for alleged specific failings with regard to evacuation time estimates. At the outset, we must note that we do not deem the lack of evacuation time estimates in individual county emergency plans to be a deficiency. Under Pennsylvania's emergency planning, protective action decisionmaking is a function of the state. Tr. 22,364 (Bath). The county emergency plans clearly indicate that the counties will rely on the state for protective action decisions and there is, therefore, no need to look to the counties on how they are providing for that function. Tr. 22,365 (Bath). Thus, although NUREG-0654 indicates that counties ought to consider evacuation time estimates, that is not necessary in this instance since the counties rely on the Commonwealth for protective action recommendations. Tr. 22,369-70 (Bath); Adler and Bath (2/23/81), ff. Tr. 18,975, at 12. In addressing each of the contentions directed to evacuation time estimates for York and Dauphin Counties, we will look to the Licensee's evacuation time estimate study as appropriate. Since those evacuation time estimates

will be used by the state, which is the primary protective action decision-maker relied upon by the counties, we reject at the outset assertions in the following contentions that county plans are inadequate because of a total absence of evacuation time estimates.

1692. Turning to the specific allegations of the contentions on this general subject, Newberry Contention EP-14(KK) alleges, in part, that the York County Plan includes no evacuation time estimate, only an assumption that there would be adequate time to implement an evacuation. Newberry Contentions EP-14(HH) and EP-14(MM) further assert that the York County Plan is defective in that the population calculations used therein do not reflect daily fluctuations (due to transient employees) and seasonal fluctuations (due to vacationers). Newberry Contentions EP-14(DD) and EP-16(P) generally allege that the York and Dauphin County Plans, respectively, fail to reflect consideration of variables such as the time of day, season of the year, and weather at the time of an evacuation. These contentions are addressed *seriatim*.

1693. Newberry Contention EP-14(KK) asserts that:

The York County Plan contains no time sequence for the removal of the exposed at-risk population. There is only assumption that there would be adequate time in which to remove all individuals; however, there is no estimate as to the number of hours that would be required to effect a selective evacuation or a general evacuation. Moreover, there is attached to the York County Plan an estimate of the number of vehicles per hour that could be handled by various major arteries and access roads; however, there appears to be conflict in the estimates in that urban roads with parking are estimated to handle at least 1,700 cars per hour whereas major arteries could only handle 1,300 per hour and it is submitted that such a gross distortion renders the Plan deficient. Furthermore, there is absolutely no hard-core statistical data to back up the calculations relied upon in the York County Plan.

1694. First, we note that, in fact, the Licensee's evacuation time estimates contain estimates of the time required to evacuate by sector as well as for a general radial evacuation. Licensee Ex. 52, Tables 24A, 24B, and 24C. This is in accordance with Section IV of Appendix E to 10 CFR Part 50 which requires an analysis of the time it will take to evacuate various sectors and distances within the plume EPZ. Estimates of the time required to effect a selective evacuation (defined in the York County Plan as an evacuation involving only a select category of persons such as pregnant women and pre-school children, Board Ex. 5, at H-1) are not provided. However, we are unable to identify any requirement in the emergency

planning regulations or any guidance in NUREG-0654 calling for time estimates for selective evacuation as that term is defined in the York County Plan. In addition, there is no evidence indicating that time estimates for a "selective evacuation" are needed. Consequently, the Board finds no planning deficiency from the lack of an evacuation time estimate for a selective evacuation as that term is used in the York County Plan.

1695. As to the allegation that the York County Plan contained a reference to urban roads with parking having a capacity of 1,700 cars per hour but major arteries having a capacity of only 1,300 per hour, the alleged discrepancy is explainable by the fact that the "major arteries" were listed under rural roads with a 12-foot wide lane while the "Urban Roads" list a 30-foot wide, one way thoroughfare. It seems logical that the wider, one way road would carry more cars. Lothrop, ff. Tr. 17,996, at 5; Adler and Bath (3/16/81), ff. Tr. 18,975, at 7. Beyond this, capacities for evacuation routes used in the Licensee's evacuation time estimates were based, not on mere assumptions, but on actual physical inventories of the evacuation route network and on standard highway capacity calculations. Licensee Ex. 52, at 55. Consequently, the Board finds Newberry Contention EP-14(KK) to be without merit and we reject it.

1696. Newberry Contention EP-14(HH) asserts:

The York County Plan has no provision in its population calculations for periods of time during the day when most people are working and outside of the area, during the day when there may be an increase in population because of industries located within the areas, or during summer periods when many individuals may be on vacation or there would be an influx of individuals coming into the area to vacation. Without that type of population differential tables, it is Intervenor's contention that the Plan is deficient.

1697. In the same vein, Newberry Contention EP-14(MM) states:

The York County Plan does not state how many businesses are located in risk areas and what the population of those businesses are during working hours. Without this information, it would be impossible to determine the number of hours that would be required to effect a general evacuation in the event one was ordered. Therefore, it is Intervenor's position that the Plan remains defective.

1698. Contrary to the assertions in these contentions, Licensee's evacuation time estimate study contains specific and detailed calculations, by County and municipality, of permanent resident population (Licensee Ex. 52, at 4 and Table 3), day and night resident and non-resident employment population by counties and by "Emergency Response Planning

Areas" (*Id.*, at 11 and Table 6), and recreation/vacation/tourist and business traveler populations with seasonal variations by Emergency Response Planning Areas (*Id.*, at 4, 9, 11 and Table 5). The recreation/tourist and business traveler element of the population is the only one over which there is any uncertainty. However, this component accounts for only a small part of the total population of the TMI plume EPZ and, if the estimate for this segment of the population were low by a factor of two, it would have no significant effect on the evacuation time estimates. Tr. 17,909 (Schaufler). The evacuation time estimates are based upon these calculated populations, Consequently, the Board finds the assertions of Newberry Contentions EP-14(HH) and EP-14(MM) to be unfounded.

1699. Contention EP-14(DD) asserts:

The Evacuation Plan contained in the York County Plan does not contain any sensitivity analysis or differentiation between the time of day, the seasons of the year or weather conditions at the time of the evacuation. In light of these deficiencies, it is Intervenor's contention that the Plan is deficient.

1700. Similar assertions are made in Contention EP-16(P) which states:

The Dauphin County Plan as set forth does not provide for differentiation of time of day or seasons or weather conditions at the time of the evacuation. There is no sensitivity analysis as to these factors, and the Plan is based upon an assumption of best-case analysis. Therefore, it is Intervenor's position that without taking these factors into consideration, the Plan remains deficient as concerns the time needed to effect an evacuation.

1701. As previously indicated, the Licensee's evacuation time estimate study contains separate evacuation time estimates accounting for a range of conditions. These are: a best estimate with a night time population and population distribution in the plume EPZ; a normal condition with a typical weekday population and population distribution; and an adverse weather condition assuming an average snowfall, snow emergency conditions and temporarily impassable roads and reduced capacity evacuation routes. Licensee Ex. 52, at 60. This range of conditions is representative of conditions that may be encountered in an actual evacuation (Urbanik, ff. Tr. 19,137, at 5) and provides the type of sensitivity analysis, accounting for time of day, seasons of the year and weather conditions, which is claimed in Contentions EP-14(DD) and EP-16(P) to be missing. Con-

sequently, the Board finds the concerns stated in these contentions to have been resolved.

3. Consideration of Contingencies

1702. The Board next considers three Newberry contentions which allege that evacuation planning has failed to consider various specified contingencies:

Newberry Contention EP-14(NN):

As a general overall comment, evacuation routes as set forth are not wind-dependent, and therefore, in the event of an evacuation, wind direction is a factor that would be required to be taken into consideration in order to formulate an effective evacuation plan. The plan as set forth does not provide for this factor and, as such, persons evacuating the evacuation areas may be directed into a potentially more hazardous situation in the manner in which they are routed.

Newberry Contention EP-14(U):

Annex H of the York County Plan provides in its general concept of operations that evacuation routings would be inherently dependent upon climatic conditions, time factors involved, etc. The Plan also provides that residents would be evacuated on major interstates and state highways. There is no mention as to the condition of the access roads to these major arteries and it is submitted that evacuation generally is dependent upon climatic conditions and the conditions of the access roads within the individual townships and local communities. Access roads within Newberry Township vary from a 20 to a 26 foot width and it is Intervenor's contention that in the event of an evacuation, traffic flow on these access roads could quickly become terminated as a result of the vehicles running out of gas or being involved in auto accidents for which there would be no way in which to remedy the situation. Moreover, in ice and snow conditions, it is submitted that these access roads which are located in generally hilly areas would be generally impassable and, therefore, there would be no access to the evacuation routes. Until and unless the evacuation plan provides for a means to assure that access roads will be passable during a general evacuation, it is submitted that the Plan is deficient.

Newberry Contention EP-16(N):

The Dauphin County Plan does not specifically state how the following occurrences would be dealt with in the event of an evacuation:

- (1) Accidents on the highways;
- (2) Cars running out of gas;
- (3) Generally disabled vehicles; and
- (4) Individuals who need ambulance service for removal from accidents.

The Plan does not state whether gas stations will be mandatorily required to be open in order to meet the demands of the evacuating public.

Finally, the Plan seems to assume that the best of all atmospheric and weather conditions would exist at the time of the evacuation. What would take place in the event of a snowstorm and how would that affect the evacuation? What would be done in order to clear the roads? These are all questions that have to be considered and are necessary to be considered in a total evacuation plan and the location and placement of staging areas.

1703. In regard to Contention EP-14(NN), wind direction will be considered by the state (Commonwealth Ex. 2.a, Appendix B, at VI-4, VI-5, VII-2, VIII-1) in choosing appropriate protective actions. Adler and Bath (3/16/81), ff. Tr. 18,975, at 8. However, by design, in the Commonwealth's planning evacuation routes are not dependent on wind direction. If an evacuation is chosen, the state will call for a 360° evacuation since the TMI-2 accident showed wind shifts of 180° in short periods of time. Lothrop, ff. Tr. 17,996, at 5. With significant shifts in wind direction always a possibility during the course of any evacuation, it would seem impractical and possibly imprudent to preselect evacuation routes based on potential wind direction. The Commonwealth has indicated that it will concentrate its effort and resources during an emergency in the direction at greatest risk. *Id.*, at 5. We find that this is sufficient, that a preselection of evacuation routes based on some sort of estimate as to the potential wind direction during an emergency is impractical, and that Contention EP-14(NN) is without merit. Further, we do not understand why intervenors still find that the Commonwealth's policy of 360° evacuation does not satisfy their concern about wind direction and evacuation routes. Combined Intervenors proposed finding ¶ 238.

1704. Turning to Contention EP-14(U), the York County Emergency Plan does implicitly assume that access roads to major evacuation routes will be usable during an evacuation. Adler and Bath (3/16/81), ff. Tr. 18,975, at 55. However, the revised York County Plan also specifically provides for the coordination of state and municipal police in routing evacuees. Board Ex. 5, at H-4. Local police forces deal with traffic control and traffic flow within their jurisdictions on a daily basis (Tr. 20,905 (Curry)) and should be aware of potential traffic flow problem areas where their efforts may need to be concentrated. In the same vein, municipal resources normally applied for clearing access routes for car accidents and stalled or disabled vehicles will be applied in an evacuation with the state augmenting such resources as needed. Adler and Bath (3/16/81), ff. Tr. 18,975, at 61.

1705. As to the impact of snow or ice conditions on the passability of access roads, we find that such conditions will be accounted for in the Commonwealth's initial determination as to whether an evacuation should be ordered. One factor in that determination will be the time required to effect evacuation if that protective action is chosen and the basis for determining evacuation times will be the Licensee's evacuation time estimate study. The evacuation times for snow conditions in that study accounted for reduced capacity of all evacuation routes, including access roads to major evacuation routes, caused by snow. Licensee Ex. 52, at 55 and Appendix D. Thus, if snow or ice conditions would be a significant impediment to evacuation, that fact will be accounted for in the Commonwealth's decision as to whether an evacuation should be ordered. We note here that for purposes of evacuation time estimates, an ice condition is similar to the snow scenario explicitly considered in the Licensee's evacuation time estimates (Tr. 17,915 (Schaufler)) and that load capacities for the snow condition were calculated conservatively. Tr. 17,617-18 (Podwal); Tr. 17,620 (Schaufler).

1706. In sum, the Board finds that while the usability of access roads to major evacuation routes in York County is a concern, adequate provision has been made for accounting for the conditions of such access roads in determining whether to order an evacuation and for assuring that ordered. Consequently, we find that the concerns of Newberry Contention EP-14(U) have been adequately addressed.

1707. In reference to Contention EP-16(N), the evidence shows that the local resources normally applied for accidents on highways, disabled vehicles, and persons in need of ambulance service because of accidents will be applied in an evacuation. Adler and Bath (3/16/81), ff. Tr. 18,975, at 61. If available local resources for these purposes are insufficient, provision has been made for the state to augment local resources and the state will provide such augmenting resources as are needed. *Id.*; Tr. 18,016

(Lothrop). The evidence indicates that such matters as accidents and cars running out of gas or otherwise becoming disabled have not caused particular problems in other emergencies in Pennsylvania (Tr. 18,016 (Lothrop)) or elsewhere (Tr. 19,159 (Urbanik)) and there is no basis in the record for finding that the situation would differ in the event of an evacuation because of an emergency at TMI.

1708. Contrary to the assertion in Contention EP-16(N) that the Dauphin County Emergency Plan assumes that the "best of all atmospheric and weather conditions would exist at the time of the evacuation", no such assumption appears or is implied in the Dauphin County Plan. The Dauphin County Plan explicitly provides that the "decision to require an evacuation will be based on the circumstances surrounding the incident". Board Ex. 6, at E-2. The determination as to whether evacuation is a viable option during inclement weather will be made by PEMA based, in part, on evacuation time estimates which account for, among other things, the effects of adverse weather conditions on evacuation. Moreover, the Commonwealth's Emergency Plan specifically assigns responsibility for clearing impediments (such as snow or wrecked or stalled vehicles) to evacuation traffic flow to the Pennsylvania Department of Transportation. Commonwealth Ex. 2.a, at 25. Thus, planning provisions have been made for clearing roadways, contrary to the assertions in Contention EP-16(N). In sum, we find the assertions of these specific planning inadequacies in Newberry Contention EP-16(N) have been addressed and appropriately resolved.

1709. We do not agree with the assertion that the Dauphin County Emergency Plan is deficient because no provision has been made requiring gasoline stations to remain open in an evacuation. The state can influence gasoline allocation through the Governor's Energy Council Tr. 18,024 (Lamison)) which will provide emergency fuel allocations to assure adequate fuel supplies to support an evacuation, as was done during the TMI-2 accidents. Adler and Bath (3/16/81), ff. Tr. 18,975, at 61. In this manner, the Commonwealth can supply gasoline tank trucks along evacuation routes for refueling as needed. Tr. 18,024 (Lamison). Further, the actual need for provisions for refueling evacuating vehicles within the plume EPZ has not been established. It is not unreasonable to expect that gasoline stations outside the evacuated area would remain open in the event of an evacuation of the plume EPZ. It is further reasonable to expect that a significant proportion of evacuating vehicles would have sufficient fuel to allow evacuation of the plume EPZ, which is, at most, 10 to 12 miles in radius, without the need to refuel before exiting the plume EPZ. Such expectations are generally supported by FEMA's experience that cars running out of fuel have not precluded successful evacuations. Tr. 19,396 (Adler).

1710. As to the allegation that the Dauphin County Plan fails to provide for ambulance service for individuals injured in traffic accidents, Annex K, "Medical Support", to the Dauphin County Plan provides that, in an evacuation, Dauphin County ambulance services within the plume exposure pathway EPZ will maintain service to their normal service areas for emergencies (such as traffic accidents). Only those ambulances not necessary for emergency coverage would assist in the evacuation of hospitals, nursing homes, and non-ambulatory and ambulatory persons requiring medical attention. *See* Board Ex. 6, at K-2, K-16. Consequently, we reject Newberry Contention EP-16(N)(4).

1711. Based on the above, the Board finds that the concerns of intervenors related to consideration of the various specified contingencies have been adequately addressed and resolved.

4. Ingestion PAGs

1712. Contention EP-11 alleges that the PAG of 1.5 rem to the infant thyroid as the dose to be avoided from milk ingestion fails to account for the fetus, whose sensitivity is asserted to be greater than the infant, and also fails to take into account exposure from the inhalation pathway. In support of this contention intervenor ECNP presented direct testimony by Dr. Bruce Molholt, ff. Tr. 19,690. The Contention is as follows:

ECNP Contention EP-11:

The BRP plan (Appendix 8) relies on the infant thyroid dose (1.5 rem) as the dose from milk ingestion to be avoided (p. IX-4). This does not take into account the fetus, whose sensitivity may greatly exceed that of the infant. In addition, the value of 1.5 rem to the thyroid from milk ingestion does not take into account the inhalation exposure.

Portions of Dr. Molholt's testimony and the discussion on EP-11 are applicable to ECNP Contention EP-7 on accident classification. *See* Section IV.C.1.

1713. Intervenor ECNP submitted no proposed findings on this contention based on any of the testimony of their witness. Pursuant to the Board's Orders of May 22, 1980 and April 22, 1981, ECNP is in default on this issue. PID ¶ 35. Therefore, we comment on Contention EP-11 only briefly in order to clarify its thrust, which became apparent only from the testimony, and to give the bases for its rejection. During two days of testimony and cross-examination, Dr. Molholt addressed many areas, including effects of iodine-131 (I-131) on the health of the fetus and infant;

environmental transport and monitoring of I-131; and the quantity of radiation released during the TMI-2 accident and which could potentially be released from TMI-1. For the most part, the Board found his arguments to be lucid and well presented. As we indicate below, however, we found the presentation was flawed technically. In its proposed findings §§ 285-313, Licensee set forth in detail these technical flaws. The Board and Staff are in nearly complete agreement with the Licensee on these matters. In our findings, therefore, we have relied heavily on proposed findings of the Staff and Licensee.

1714. In testimony intervenor ECNP asserts that the projected thyroid dose used by the Commonwealth to trigger protective actions may be an order of magnitude too high if the sensitivity of the fetus to iodine-131 is considered, that the sampling medium (milk) used by the Commonwealth to project doses for protective action determinations is inadequate, and that the Commonwealth considers only the ingestion pathway and ignores the inhalation pathway in making protective action determinations. Thus, according to intervenors, the Commonwealth's planning must be modified prior to restart in order to properly protect the public. Molholt, ff. Tr. 19,690, at 15-16.

1715. At the outset, the Board finds that the intervenor's assertion that the Commonwealth does not consider or account for inhalation exposure is patently erroneous. Although the PAGs that are challenged in this contention account for only those exposures projected to result from the ingestion pathway, the Commonwealth's Emergency Plan utilizes separate and distinct PAGs for projected thyroid doses from the inhalation pathway. Reilly, ff. Tr. 18,125, at 10-11; Peterson, ff. Tr. 20,500, at 4; Commonwealth Ex. 2.a, Appendix 8, at VIII-1, VIII-2. Thus, the Commonwealth does account for the inhalation pathway and we reject intervenor's assertions to the contrary.

1716. BRP uses a protective action guide 1.5 rem to the infant from fresh fluid milk as the criterion on which protective actions are based. Reilly, ff. Tr. 18,125, at 10; Peterson, ff. Tr. 20,500, at 2; Commonwealth Ex. 2.a, Appendix 8, at IX-4. Determinations of whether to take protective actions based on this criterion will be based, among other things, on milk sampling at local farms. Tr. 18,226 (Reilly). Intervenors assert that milk samples are not as sensitive an indicator of radioiodine in the environment as are the thyroids of small rodents naturally present in the TMI area. Specifically, intervenors claim that field voles provide a more sensitive monitor for radioiodine and that the Commonwealth should be required to utilize field voles rather than milk sampling for this purpose. Molholt, ff. Tr. 19,690, at 15; Tr. 20,033 (Molholt).

1717. Although the testimony indicates that vole thyroids may be more sensitive than milk for detecting the presence of radioiodine in the environment (Tr. 18,193-94 (Reilly)), measurements of radioiodine in milk are more reliable than measurements from the thyroids of field animals. Tr. 18,191-92 (Reilly). More importantly, the testimony indicates that milk sampling for radioiodine is more meaningful and more accurate for evaluating doses to man than measuring animal thyroids. Tr. 18,191-93 (Reilly). In addition, the vole is not part of an exposure pathway to man as is cow's milk, and the transfer factors of I-131 from air to the vole thyroid and from vole forage to the vole thyroid are unknown. Tr. 19,946; 19,841; 19,847 (Molholt); Tr. 18,241-42 (Reilly). Lacking this information, the dose conversion from vole thyroid to human thyroid is not possible. Thus, the Board sees no benefit in using vole thyroids for projecting human doses from radioiodine.

1718. The Commonwealth's use of a PAG of 1.5 rem to the infant thyroid through the milk pathway is based on guidance set forth by the Food and Drug Administration in 43 Fed. Reg. 58798 on December 15, 1978. Commonwealth Ex. 2.a, Appendix 8, Section IX.D at IX-4.¹⁹² The critical population for thyroid dose in this regard was determined by the FDA to be the infant, rather than the fetus, based on studies indicating that the infant exhibits the highest uptake of iodine-131 per gram of thyroid tissue. Peterson, ff. Tr. 20,500, at 2-3; Reilly, ff. Tr. 18,125, at 10. Studies further indicate that the dose per unit of radioiodine uptake ranges from 2 to 20 times higher for the infant than for the fetus. Peterson, ff. Tr. 20,500, at 3-4.

1719. Intervenors assert that evidence of the acute sensitivity of the fetus to radioiodine is provided by alleged substantial increases in the number of cases of neonatal hypothyroidism and infant mortality downstream and downwind of TMI following the TMI-2 accident. The allegation of increased instances of neonatal hypothyroidism and infant mortality is based on a comparison of the incidence of such cases prior to and following the TMI-2 accident. Molholt, ff. Tr. 19,690, at 13. We find this evidence to be unconvincing. For one thing, the alleged increased rates of neonatal hypo-

¹⁹² These FDA PAGs for contaminated foodstuffs do not constitute regulatory requirements. On the other hand, 10 CFR 50.47(b)(10) requires the use of guidelines for the choice of protective actions in an emergency consistent with federal guidelines and Section 50.47(b) specifically references (at footnote 1) NUREG-0654 as guidance setting forth criteria addressing each of the planning standards in 10 CFR 50.47(b). NUREG-0654, Criterion J.9 indicates that State and local emergency response organizations should establish a capability for implementing protective actions based specifically upon criteria that are consistent with these FDA PAGs, among others. Staff Ex. 7, at 61, Criterion J.9. Thus, these FDA PAGs, among others, appear to have been given significance by the Commission and we deem them to be entitled to be given weight.

thyroidism are not spatially distributed in a manner which would be expected if they resulted from radioiodine releases from the TMI-2 accident. There were no cases of neonatal hypothyroidism in Dauphin County in the nine months following the TMI-2 accident, yet that is the county closest to TMI in the direction in which the wind prevailed for two weeks following the accident. Tr. 19,875 (Molholt). Increased incidents of neonatal hypothyroidism after the accident, for the most part, occurred in areas distant from TMI (Molholt, ff. Tr. 19,690, at Figure 4) yet sampling data relied upon by intervenor indicates that iodine-131 concentrations in the environment decreased with distance from TMI, inconsistent with the increased instances of neonatal hypothyroidism. Tr. 20,037-38 (Molholt). For the one month period following the TMI-2 accident, the wind was multidirectional, on the average, with the wind blowing in each quadrant about equally. Tr. 19,929 (Molholt). This appears to be inconsistent with the clustering of cases of neonatal hypothyroidism in specific areas following the TMI-2 accident.

1720. The alleged increases in neonatal hypothyroidism and infant mortality following the TMI-2 accident are not consistent with the levels of radioiodine found in the environment after the accident. Despite substantial monitoring and milk and water sampling using sensitive equipment, only low levels of radioiodine were found. Tr. 18,154, 18,189-90, 18,194-95 (Reilly). While intervenor's witness asserted that as much as 5100 to 64000 curies of I-131 were released in the TMI-2 accident (Molholt, ff. Tr. 19,690, at 13), he admitted that part of the data on which that estimate is based was high by a factor of 1000 in radioiodine releases. Tr. 19,926 (Molholt). That estimate was based on an extrapolation from the ratio of noble gas to iodine released on April 20, 1979 (Molholt, ff. Tr. 19,690, at Table 5), using the assumption that the ratio, adjusted for half-life differences, remained constant with time. Intervenor's witness admitted that that was not a reasonable assumption. Tr. 19,848-49 (Molholt). In actuality, the ratio of noble gas to iodine approaches one as the mix gets older with more noble gas present in the mix early in time. Tr. 18,283 (Reilly). The erroneous assumption of a constant noble gas to radioiodine ratio with time would thus result in an overprediction of the radioiodine released. The Ad Hoc Interagency Dose Assessment Group, the Kemeny Commission, and a study performed for the Licensee all indicated low levels of iodine-131 releases, ranging from 14 to 26 curies, from the TMI-2 accident. Tr. 19,926 (Molholt). Intervenor's have presented no evidence that would bring those estimates into doubt.

1721. Finally, the Commonwealth has presented evidence establishing that the increased incidents of neonatal hypothyroidism cannot be directly linked to the TMI-2 accident. The major portion of the period prior to the accident used by the intervenors to establish a baseline for allegedly

normal hypothyroid cases in Pennsylvania exhibited an abnormally low number of incidents of hypothyroidism (Tr. 20,107 (Molholt)), and the data for that period cannot and should not be used for comparison purposes because the Commonwealth's screening program for thyroid abnormalities had just started and screening procedures were not yet fully developed. Tokuhata, ff. Tr. 20,097, at 2. Apart from this, a Hypothyroidism Epidemiological Investigative Committee, formed by the Commonwealth to investigate alleged increases in hypothyroidism following the TMI-2 accident, concluded that there was no relationship between reported cases of hypothyroidism and the TMI-2 accident. In part, the Committee concluded that all but two cases of hypothyroidism in Lancaster County, the area with the greatest increases in hypothyroidism following the TMI-2 accident, were caused by factors unrelated to the accident (Tokuhata, ff. Tr. 20,097, at 2-3) and that the remaining two cases in Lancaster County were well within the range of incidents of hypothyroidism that would normally be expected (Tr. 20,118-19 (Tokuhata)). The rate of neonatal hypothyroidism in Lancaster County remained high in the first nine months of 1980, long after radioiodine releases from the TMI-2 accident should have ceased, further suggesting that the increased rates in Lancaster County after the TMI-2 accident were not a result of that accident. Tr. 20,018-19 (Molholt). Similarly, a Pennsylvania Department of Health study of infant mortality concluded that there was no relationship between the TMI-2 accident and changes in infant mortality in the TMI area. Tokuhata, ff. Tr. 20,097, at 6-7.

1722. Of particular note is the expertise with which Dr. Molholt cross examined the Commonwealth's witness, Dr. George Tokuhata. Dr. Tokuhata is Director, Division of Epidemiological Research, Pennsylvania Department of Health, and Professor of Epidemiology and Biostatistics (Adjunct), Graduate School of Public Health, University of Pittsburgh. He holds a Ph.D. in Behavioral Sciences and a Doctor of Public Health in Epidemiology and Public Health from the State University of Iowa and the Johns Hopkins University, respectively. Dr. Tokuhata presented testimony on fetal and infant radiation health effects and possibility that these effects were detectably increased in the counties surrounding TMI-2 following the accident. Tokuhata, ff. Tr. 20,097. We mention this here because the Board was not convinced as to Dr. Tokuhata's radiobiological expertise and understanding of genetics on which his conclusions regarding health effects were based. In particular, Dr. Tokuhata was unclear about how the fetal thyroid could be irradiated (Tr. 20,108), how radiation from I-131 might lead to dishormonogenesis (Tr. 20,114-17) and the conditions by which radiation might be implicated in fetal mortality incidence in the Harrisburg black population. Tr. 20,131-32. The Board is more secure in the validity of Dr. Tokuhata's epidemiology expertise and his role as a

member of the previously mentioned eleven member Hypothyroidism Epidemiological Investigative Committee, formed by the Pennsylvania Health Department, to review 34 cases of fetal hypothyroidism in 1979, 26 of which were reported in the 9-month period following the TMI-2 accident. Tokuhata, ff. Tr. 20,097 at 1-2.

1723. Based on the record made in this proceeding, we find no basis to conclude that alleged increases in neonatal hypothyroidism and infant mortality following the TMI-2 accident were caused by that accident or to conclude that the existing protective actions are insufficient to protect the fetus or to require the use of different and lower protective action criteria by the Commonwealth.¹⁹³ Consequently, the Board finds ECNP Contention EP-11 to be without merit.

H. Implementation of Protective Actions

1. Unmet Needs and Letters of Agreement

1724. Contentions EP-14(W), EP-6(D) and EP-4(B) address in slightly differing ways the issue of resource availability during an emergency situation:

Newberry Contention EP-14(W):

Annex L of the York County Plan provides for resource requirements which, it is assumed, would set forth what would be required to set the whole evacuation plan of York County into operation with regard to manpower, equipment and other resources. The Plan as of this date remains under development in this area and until and unless the Plan is completely finalized, it is Intervenor's contention that the Plan is deficient.

ANGRY Contention EP-6(D):

¹⁹³ While the sensitivity of the fetal thyroid to radiation has not been clearly established, the evidence indicates that, based on the Marshallese experience with accidental doses to children, a dose of 1000 to 1500 rem to the thyroid will induce hypothyroidism. Tr. 20,511, 20,503 (Peterson). Assuming, *arguendo*, that that is a hypothyroid-inducing dose range for an adult, as argued by intervenors (intervenors assert that a fetus is 200 times as sensitive to thyroid doses as an adult), the hypothyroid-inducing dose for the fetus would be in the range of 5 to 7.5 rem to the thyroid. This is somewhat greater than the 1.5 rem to the infant thyroid which would trigger protective action under the Commonwealth's Emergency Plan. Since the dose per unit of radioiodine uptake is substantially greater for the infant than for the fetus (Peterson, ff. Tr. 20,500, at 3-4), protective actions, such as the embargo of milk and foodstuffs, taken upon reaching a PAG of 1.5 rem to the infant thyroid, should provide adequate protection for the fetus.

There are numerous assignments of responsibility to persons and organizations that are not documented by written agreements demonstrating knowledge of and ability to perform assigned roles as required by N. 0654 Sec. A3. The most important of such delegations are:

1. American Red Cross (operation of relocation centers; Annex I).
2. Maryland Dept. of Health (provision of ambulances and helicopters for hospital evacuations; Annex J).
3. Amateur radio operators (communications with local governmental units and school districts; Annex D § VE).
4. "State C.D." (50-2 passenger ambulances for evacuation of nursing homes; Annex J; App. 2).
5. School Districts (transportation of school children to relocation centers and provision of facilities for such centers; Annex O).
6. York Area Transit Authority (evacuation of nursing home patients; Annex K).
7. State of Maryland (overflow mass care capacity; Annex I Sec. IVD).
8. Adams County (relocation center; Annex I).
9. York Chamber of Commerce (notification of business and industry; Sec. VIA(7)(a)).
10. York County USDA Disaster/Emergency Board (monitoring crop and animal surveillance; Annex R).

ANGRY Contention EP-4(B):

The perfunctory form letters found in Appendix C to licensee's EP provide no indication, let alone assurance, of the existence of "mutually acceptable criteria" for implementation of emergency measures as required by Emergency Planning Review Guideline No. One, Revision One (EPRG) IV(A)(1). Also N. 0654 A3.

1725. The Licensee and the Staff submitted detailed proposed findings on each of these contentions. The Combined Intervenors submitted proposed findings for only EP-14(W), and even this consisted of little more than copies of the contentions themselves. Because of this, the Board relied primarily on the proposed findings of the Licensee and Staff. Further, the Board notes that the Combined Intervenors are in default on those issues

for which findings were not submitted. (See the Board's Memoranda and Orders of May 22, 1980 and April 22, 1981 which stated grounds for default on issues, and the PID, at ¶ 35, 10 CFR 2.754(b).)

1726. Since not every emergency response organization has a full complement of all resources necessary to effectuate its response plans, the plans specify the means that will be employed to satisfy the "short-fall". For example, in the TMI area each level of government has identified to some extent its unmet needs and the means to ensure that these needs will be satisfied in a timely fashion. Where the provider of resources to satisfy an unmet need is another level of government, a mutual recognition by both parties in their respective response plans is used to assure the availability of the resource. Where the provider of resources is a private entity, a letter of agreement acknowledging the conditions under which assistance may be requested is used to assure the availability of the resource. In carrying out these planning functions the goal is to determine how *existing* community resources, both private and governmental, can be utilized most effectively in responding to the emergency. Dynes, ff. Tr. 17,120, at 7-8.

1727. Contention EP-14(W) challenges the adequacy of York County's preparedness in specifying its unmet needs and arranging for their availability in the event of an emergency. Under Pennsylvania law, locally available resources must be fully committed prior to seeking resource assistance from a higher level of government. See 35 Pa. Cons. Stat. §7504(b).¹⁹⁴ This approach is consistent with the legislative directive that "[i]n order to avoid duplication of services and facilities", PEMA in carrying out its overall emergency response functions is to utilize the already existing services and facilities at all levels of government. See 35 Pa. Cons. Stat. §7314. Thus, under this statutorily mandated concept of operations, each level of government, starting at the municipal level, is expected to commit all resources at its disposal before the next higher level of government is called upon to provide additional resources. See Knopf, *et al.*, ff. Tr. 21,816, at 11; Lamison (Command and Control), ff. Tr. 17,818, at 1.¹⁹⁵

1728. Combined Intervenors' proposed findings ¶¶ 289-293 pointed to evidence on deficiencies in the York County Plan in regard to identification of transportation resources (Bath and Adler, ff. Tr. 18,975, at 34), funding for completion of municipal plans (Tr. 20,798-99 (Curry)),

¹⁹⁴ The Board officially noticed the Pennsylvania Emergency Management Services Code (chapters 71, 73, 75, and 77, part V, title 35 of the Pennsylvania Consolidated Statutes) and copies were provided to the Board and parties for their convenience. Tr. 22,957-58.

¹⁹⁵ Commonwealth of Pennsylvania's Testimony of Kenneth R. Lamison Pertaining to Command and Control (Contentions EP-5(C), EP-6(B), EP-14(C), EP-14(H), EP-14(J), EP-14(R) and EP-14(X).

funding for preparing and distributing information brochures (*id.*), lack of notification to PEMA of resource shortfalls (Tr. 20,935 (Curry)), and currently non-operational status of municipal EOCs (Tr. 20,936 (Curry)).

1729. Annex L to the revised York County Emergency Plan, rather than setting forth specific resource requirements for implementation of protective actions, assigns responsibilities for identifying unmet resource needs and establishes the concept of operations through which unmet resource needs of municipalities will be fulfilled, where possible, by the county or reported to PEMA. Board Ex. 5, Annex L, §§II, III.

1730. Specific unmet resource needs for each municipality are, in fact, identified in those municipal plans which have been completed for York County. Board Ex. 13, York Haven Emergency Plan; Newberry Township Emergency Operations Plan, Appendix 9; Manchester Township Emergency Operations Plan, Appendix 9; Lewisberry Borough Emergency Operations Plan, Appendix 9; Goldsboro Borough Emergency Operations Plan, Appendix 6. The unmet needs identified in these municipal plans include items such as sets of raingear and traffic control cones as well as more significant items such as ambulances. Board Ex. 13, Manchester Township Emergency Operations Plan, Appendix 9. Such resource needs will likely change frequently as particular items are supplied by the county and as municipal equipment is retired. Detailed information on resources is not normally listed in a county emergency plan because of the amount of detail involved and the requirement for updating. Instead, such information is contained in the resource file in the York County EOC. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 4. It simply does not appear to be reasonable or practical to the Board to list each unmet need existing within the county in the county emergency plan. Rather, what is important is that the county establish a mechanism for identifying unmet needs and for fulfilling such needs. That mechanism is provided in the York County Emergency Response Plan. Board Ex. 5, Annex L. Specifically, the plan provides that municipalities are to maintain lists of available local resources and requirements for additional personnel and equipment. Where possible, the unmet needs of municipalities will be fulfilled at the county level. Unmet needs at the county level are reported to PEMA and will be met, if possible, at the state level. Board Ex. 5, at §§V.B., VI.B.5, VI.B.10, VI.C.4, VI.C.9, VI.C.10, CI.C.13, and Annex L, pp. 6-8 and L-1. If an unmet need cannot be satisfied at the state level, it will be provided from federal resources. Commonwealth Ex. 2.a, at §V.B.2. The municipal plans include a tabulation of resource requirements at the local level, generally in Appendix 9 of the model plan. *See, e.g.*, Board Ex. 13 (Lewisberry, Manchester and Newberry plans). FEMA has reviewed the adequacy of these provisions and found them acceptable. Adler and Bath, (3/16/81) ff. Tr. 18,975, at 36.

1731. In our discussion of Contention EP-15(E) in Section IV.H.14 the Board discusses the listing of unmet municipal needs by municipalities. The Board concludes from the record that although there are areas where more detailed lists are needed, they need not be completed prior to restart. In addition, we find that the mechanism for identifying unmet needs is provided satisfactorily in the York County Emergency Response Plan. Therefore, we reject Newberry Contention EP-14(W). We further note that plans must be dynamic and under continuing revision and improvement and that no plan can ever be "completely finalized."

1732. Contention EP-6(d) challenges the arrangements made by York County with various response groups that might provide assistance to York County during a radiological emergency at TMI. In particular, the contention asserts that necessary letters of agreement with these groups have not been obtained.

1733. In addition, by their reference to Section A.3 of NUREG-0654, intervenors refer not only to the existence of letters of agreement but also to the level of detail of the agreements. This includes the emergency measures to be supplied, mutually acceptable criteria for their implementation, and arrangements for exchange of information.

1734. The revised York County Emergency Plan does contain letters of agreement documenting the agreement of a number of entities listed in this contention to supply support services to York County. The Maryland Department of Health and Mental Hygiene, although not referenced in the revised county plan as supplying support services, has provided a letter of agreement that is included in the revised plan. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 1; Board Ex. 5, at T-4. Two school districts with mass care responsibilities, the Spring Grove Area School District and the South Eastern School District, also provided letters of agreement that are included in the revised plan. Bath, ff. Tr. 22,350, Attachment 3, at 2; Board Ex. 5, at T-2, T-3. A letter of agreement by the York Area Chamber of Commerce documenting that organization's agreement to assist in disseminating emergency information to York County industrial and commercial entities is included in the revised York Plan as is a statement of understanding from the York Area Transportation Authority. Board Ex. 5, at T-5, T-6.

1735. Although not included in Annex T to the revised York County Emergency Plan, a Red Cross Standard Agreement has been ratified by the York Chapter of the American Red Cross and by the York County Commissioners. Similarly, a letter of agreement has been provided by the York County agricultural agent but it is not included in the revised emergency plan. Tr. 20,786-87 (Curry). While there are no letters of agreement from the State CD (Civil Defense) or the York County USDA Disaster/Emergency Board, both of these entities are governmental or-

ganizations with specific emergency responsibilities assigned under the State Emergency Plan. Because of this, letters of agreement from these organizations are not necessary. Adler and Bath (3/16/81), ff. Tr. 18,975, at 29-30. The State of Maryland is not relied upon for emergency support in the revised York County Plan and a letter of agreement from Maryland is also unnecessary. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 2.

1736. Letters of agreement have been obtained from three of the four intercounty amateur radio clubs in York County. Tr. 20,922-23 (Curry). However, while all letters of agreement from the amateur radio operators have not been completed, York County has on file an operational amateur radio plan signed by all four of the amateur radio clubs relied upon. Bath, ff. Tr. 23,350, Attachment 3, at 2; Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 1. Accordingly, while additional letters of agreement might be desirable, their absence at this time is not a serious defect.

1737. Although the revised York County Emergency Plan does not call for the evacuation of nursing home patients, a letter of agreement with the York Area Transit Authority has been obtained. Board Ex. 5, at T-6; Belser, *et al.*, ff. Tr. 20,787, at 2 (Curry, York County Plan EP-6); Attachment 3 to FEMA's Interim Findings and Determinations, ff. Tr. 22,350, at item 4. The Board in its consideration of Contention EP-15(E) has made specific recommendations on making detailed lists of names and pick-up points of handicapped and similar persons by the local municipalities.

1738. Adams County is specifically relied upon in the revised York County Emergency Plan for mass care support. Board Ex. 5, at I-5. Although a letter of agreement apparently does not yet exist, Adams County has agreed informally to provide a relocation center and will execute a letter of agreement in that regard. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 2. FEMA has queried Adams County and has ascertained that it is aware of its host responsibilities as specified in the York County Plan and is willing to provide the specified support. Bath, ff. Tr. 22,350, Attachment 3, at 3. The lack of a letter of agreement at this time does not mean that Adams County will not respond in an emergency (Tr. 19,434-35 (Adler, Bath)) and we do not view it as a deficiency in planning.

1739. Although FEMA has expressed its view that letters of agreement should be provided by the Southern, Southwestern, Hanover, Red Lion and Dallastown School Districts, each of which has mass care responsibilities, FEMA has indicated that it is satisfied that each of these school districts has full knowledge of its mass care emergency responsibilities under the York County Plan and will provide the designated support services if needed, even in the absence of letters of agreement. Bath, ff. Tr. 22,350, Attachment 3, at 3. The lack of letters of agreement from these school

districts does not render the York Plan inadequate. Tr. 22,467 (Bath). However, the Board suggests that these school districts prepare some written plans setting forth their mass care emergency responsibilities.

1740. In sum, although the Board would derive more assurance if there were letters of agreement or written plans from all agencies and organizations with emergency responsibilities, we find that the letters of agreement asserted to be necessary in ANGRY Contention EP-6(D) have either been provided or will be obtained or are unnecessary and that the lack of letters of agreement from certain of the listed organizations does not constitute a fatal inadequacy in planning or otherwise indicate that support services relied upon will not be provided. In addition, upon examining the extant letters of agreement, the Board finds most of them to be in sufficient detail to set out emergency responsibilities. Although some of the agreements from school districts await votes by the respective Boards of Education, we believe that commitment of facilities is made. Accordingly, we reject ANGRY Contention EP-6(D).

1741. Contention EP-4(B) is a broad attack on the adequacy of the letters of agreement obtained by Licensee. Appendix C to Licensee's Emergency Plan contains a number of letters of agreement that appear to be form letters. These can be categorized into three groups: agreements with fire and rescue services; agreements with county emergency management agencies (Chesnut, ff. Tr. 15,007, at 70); and agreements with local physicians. In the first category, each fire company or rescue service indicates that upon notification it will respond with emergency workers and equipment and specialized services specified in the letter of agreement. These letters of agreement, provided by organizations which respond to emergencies on a daily basis, state the nature of the services equipment and personnel they agree to provide and the basis upon which support will be provided (*i.e.*, "upon notification" by the Licensee). The letters clearly document the agreement of the organizations to provide identified services to the Licensee based on mutually acceptable criteria. Chesnut, ff. Tr. 15,007, at 70. Thus, we find no fault with this category of "form" letters of agreement.

1742. The second category of "form" letters of agreement are from the emergency management agencies for Lebanon, Dauphin, York and Lancaster Counties. Since each of these counties has developed its own emergency plan for radiological emergencies at TMI detailing the counties' responses, detailed letters of agreement are not required. In fact, the county emergency management agencies are legally recognized agencies responsible for directing and providing emergency services, and letters of agreement are not even required under the NRC's emergency planning

rules or NUREG-0654 guidance. Chesnut, ff. Tr. 15,007, at 71. In these circumstances, we find this second category of "form" letters of agreement to be acceptable.

1743. The third category of "form" letters contains letters of agreement from two physicians, Miles Newman and William Albright. An examination of these letters in Appendix C to the Licensee's Emergency Plan reveals that, although they are, indeed, form letters, they explicitly set forth the criteria under which the physicians' services will be provided ("in the event of an accident at Three Mile Island . . . involving radiation exposure of personnel . . ." and the type of services ("medical assistance") to be supplied. While they are "form" letters of agreement, we find that they do document the physicians' understanding of what services they are to provide and when they will provide them and the physicians' agreement to provide such services. Thus, the Board finds these and the other "form" letters of agreement in Licensee's Emergency Plan to be acceptable and we reject ANGRY Contention EP-4(B).

2. Communications

1744. A number of contentions relating to communications are at issue. These contentions concern (1) the operability of county and local government communication links, (2) the effectiveness and operability of both police-fire and amateur radio communication links, and (3) the communications arrangements at the alternate York and Dauphin County EOCs.

1745. The Combined Intervenors, the Commonwealth, the Licensee and the Staff all submitted proposed findings on communications issues. Those of the Commonwealth were limited to comments on the establishment of periodic state communications drills. PF ¶¶ 115-118. The remaining parties addressed substantially all of the issues with the Staff (PF ¶¶ 222-232) and Licensee (PF ¶¶ 324-332) proposed findings being more detailed than those of the Combined Intervenors (PF ¶¶ 461-489).

1746. We shall first address contentions EP-6(C), EP-14(N) and EP-14(D), which state:

ANGRY Contention EP-6(C)

There is no assurance of the operability of county-local government communications links on a 24-hour basis as required by N. 0654 Sec. Fl(a) and Pa. DOP Sec. IXB (1)(f).

Newberry Contention EP-14(N)

Annex B of the York County Plan indicates that the order of notification from York County is to executive group members and then to local coordinators within the risk area with priority to those nearest the facility, then to school superintendents and then to Emergency Operations Center staff. Nowhere in the Plan is it indicated how these people would be notified of the impending emergency. Intervenor again raise the issue that in the event of an incident at TMI, members of these organizations should be able to be reached without dependence upon telephone communications. Until and unless it is indicated that these individuals can be contacted without dependence upon telephone communications, the plan is deficient.

Newberry Contention EP-14(D)

Section VI, Subsection (d)(1) provides that, upon notification from PEMA, the County Director will assemble and consult with appropriate members of the county staff and elected officials. There does not seem to be included in the Plan any means in which to contact the local elected officials unless it is the assumption that these officials would be contacted by telephone. It is Intervenor's contention that, in the event of an emergency situation at Three Mile Island, once the public has any notice or indication that something has occurred at TMI, that the telephone lines will become overloaded and that incoming calls to local officials will not be able to be effected. Moreover, the Plan does not indicate where local officials will assemble, how they will know where to assemble and when to assemble and thus the Plan is still deemed to be deficient.

1747. With regard to Contention EP-6(C), the Combined Intervenor do no more than state the evidence which supports the establishment of the 24-hour communications network in the five risk counties (PF ¶¶ 461-465) and incorrectly state that the record is devoid of evidence supporting the existence of a 24-hour county-local government communications link. PF ¶ 466.

1748. To the contrary of Contention EP-6(C), the evidence indicates that the county EOCs for each of the five risk counties including the York County EOC, have communication links which are manned 24 hours a day. Adler and Bath (3/16/81), ff. Tr. 18,975, at 18-19; Board Ex. 5-9. Virtually all municipalities in York County have, as a minimum, a fire department, a police department, or an ambulance service with the capability to communicate by radio with the York County EOC. Tr.

20,921-22 (Curry).¹⁹⁶ The County EOC itself has approximately ten dispatchers on duty at all times, 24 hours a day, to handle such emergency communications within the County. Tr. 20,871 (Curry). In addition, York County has an amateur radio plan and a permanently installed amateur radio capability in the York County EOC that can be used at all times. Tr. 20,811 (Curry). The amateur radio plan assigns radio operators for each municipality. In the event of need during an emergency, these operators will be dispatched, along with mobile radio equipment, to assigned municipal EOCs, thereby providing additional capabilities for county-municipal communications. Tr. 20,992 (Curry). These fire/police/ amateur radio services provide additional and redundant county-municipal communications capabilities beyond those provided by existing telephone services. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 1. From the evidence presented on these county-municipal communications capabilities, we find that there is reasonable assurance of the operability of county-municipal communications links and that Contention EP-6(C) is without merit.

1749. Contentions EP-14(N) and EP-14(D) allege that the York County Plan is deficient because it fails to indicate how emergency response personnel will be notified of an emergency and because it relies on contacting emergency response personnel by telephone.

1750. The Combined Intervenors (PF ¶¶ 467-473) cite FEMA's Interim Findings, Attachment 1, pp. 6, 33, on several incorrect telephone numbers and the FEMA estimate that the current phone system would be overloaded in an emergency situation to support the allegation that the telephone contacting system is inadequate. They also mention that York County did not participate in the June 2, 1981 exercise. They state that the record does not support the fact that the York plan and facilities for telephone communications are adequate and can assure that all officials and emergency response personnel can and will be contacted.

1751. The Commonwealth (PF ¶¶ 115-118) also cites FEMA's Interim Findings on the problems in the ability of state, county, and municipal emergency response organizations to communicate adequately (Staff Ex. 21, at 11); various problems in message misinterpretation (Staff Ex. 20, at 3, Tr. 22,778 (Adler)); and failure to relay complete or any information (Staff Ex. 20, at 5, 11). The Commonwealth cites FEMA's recommendation that the communication and coordination weaknesses identified in the exercise be improved "without delay". Tr. 22,755 (Adler). The Commonwealth recommends, as one method of improving communication and

¹⁹⁶ The County has four separate police radio networks, each of which has two frequencies. Tr. 20,824 (Curry).

coordination skills, additional drills testing communications among all levels of government (PF ¶ 118). It would have the Board require such a specialized drill prior to restart. The Commonwealth intends to conduct at least one communications drill prior to restart. *Id.*

1752. Both the Licensee and the Staff deny the allegations of the Combined Intervenors on these two contentions based on the following evidence. The York County emergency response plan provides for a "cascading" call-out system. *See* Board Ex. 5, Annex B, Appendix 2, at B-5. After the County Commissioners, the County Emergency Management Coordinator and the Public Information Officer are notified, two communication clerks, and the fire, police, and medical dispatchers are responsible for notifying the remaining parts of the emergency response organization. In particular, the county fire dispatcher will notify municipal emergency organizations which include the municipal fire department via a fire encoder (Plectron) radio. Thus, although commercial telephone service is a part of the "cascading" call-out system, it is not the sole means of contacting municipal organizations. Each municipal fire department will notify its municipal emergency management coordinator, who is responsible for notifying the local elected officials. Board Ex. 5, Annex B, Appendix 1, at B-4. School superintendents will be notified by the county police dispatcher. *Id.*, at B-5. This concept of operations represents an improvement over the system previously used in York County and is consistent with recommendations made by the FEMA witnesses in this proceeding. *See* Bath and Adler-(2/23/81), ff. Tr. 18,975, at 5-7.

1753. Under NUREG-0654 guidelines, notification of key emergency response organization personnel can be by telephone and/or radio as a minimum. Adler and Bath (2/23/81), ff. 18,975, at 6. The provisions of the York County Plan for notification of key personnel and staff are consistent with these guidelines.

1754. Although it is true, as asserted in Contention EP-14(D), that the York County Emergency Plan does not specifically indicate where emergency staff and local officials are to assemble, these personnel are designated members of county and local emergency response organizations with prearranged assignments as to where to assemble in the event of an emergency. Adler and Bath (3/16/81), ff. Tr. 18,975, at 20. There is simply no need to designate emergency staff assembly points in the county emergency plan and failure of the plan to do so is of no moment.

1755. The Board finds the emergency plan notification procedures to be adequate and therefore we reject the corresponding portions of Contentions EP-14(N) and EP-14(D). However, the Board is persuaded by FEMA's evaluation and the Commonwealth's arguments that the communication

system must be tested and exercised on the county and municipal levels prior to restart. The Combined Intervenors (PF ¶¶ 482) would support such a drill.

1756. In order to have reasonable assurance that the emergency communications problems noted in the June 2, 1981 exercise will be minimized in the future, the Board conditions any restart upon the holding of at least one communications drill similar to that suggested by the Commonwealth (PF ¶ 118). The drill should include, ideally, communication between: Licensee and PEMA, PEMA and each risk county emergency management coordinator (EMC), each risk county and its key officials and each municipality and its key officials. Such a drill should be structured to test telephone service and the various radio systems. If possible, stress should be placed on the communications systems to test the possible effects of an emergency overload situation.

1757. The NRC shall, presumably with FEMA's assistance, report to the Commission on whether the results of the drill provide reasonable assurance that the defects noted in the June 2, 1981 exercise have been adequately corrected.

1758. Next we turn to Contentions EP-16(C) and EP-16(F) which raise similar issues concerning radio communications in Dauphin County. These Contentions state:

Newberry Contention EP-16(C):

Appendix 3, Annex E of the Dauphin County Plan indicates that approximately 65 people will be notified in the event of an emergency. It indicates that notification of these people will be by radio whenever possible and then by telephone. Nowhere in the Plan is it indicated that the individuals listed have radios which are compatible with that of the County E.O.C. Moreover, there's no indication that the frequencies to be used for communicating with these individuals would be free of any outside disturbance. Therefore, until and unless it is indicated in the County Plan that these individuals have compatible radio equipment and that frequencies are being used that are relatively free from any other type of traffic, it is Intervenor's position that the Plan remains defective.

Newberry Contention EP-16(F):

Appendix 6 of Annex E of the Dauphin County Plan provides that the American Red Cross, military unit assignments, fire and ambulance units, and police units will be assigned various frequencies for radio operations and will have various radio equipment at their disposal. Nowhere in the Plan is it indicated that there is an existence

presently of the equipment necessary to operate on the indicated frequencies or that if the equipment is presently available, that it is being maintained. Moreover, the Plan as written indicated that the police only have two frequencies on which to operate in the event of an emergency. Furthermore, fire, ambulance, Red Cross and military units will all share the same frequency and it is submitted that in the event of an emergency, the traffic on those frequencies will cancel effective communication among all of the groups. Therefore, until and unless it is stated that each of these units has its own frequency for operation and that there are sufficient number of frequencies in order to ensure effective operations, the Plan is deficient. Moreover, until and unless the Plan indicates that there is an existence of compatible equipment in order to effect this part of the Plan and that there is a responsibility for maintenance of the equipment, it is Intervenor's position that the Plan remains inadequate.

1759. The Combined Intervenor's note that the June 2, 1981 exercise does not address the question of whether radio communications are interfered with by having too many users. (PF ¶ 476). They cite testimony by the League of Women Voters as support for such an interference problem. (Hilliard, ff. Tr. 21,508, at 7). Further they state that the record does not show a present ability to effectuate radio communications in an emergency.

1760. With regard to Contention EP-16(C), the Dauphin County Emergency Management Coordinator testified that initial notification of key county emergency response personnel will be by radio, when possible, using the radio networks listed in Annex B of the revised Dauphin County Emergency Plan. Curry, *et al.*, ff. Tr. 20,787, Wertz Testimony, at 1. Included in the Dauphin County radio network is a specific radio network/frequency for county emergency management communications. Board Ex. 6, at B-5. This separate administrative frequency is for the sole purpose of direction and control of county emergency management personnel with distribution of a portable radio to each of the three county commissioners; portable, mobile and remote radios to the county Civil Defense Director, Assistant Civil Defense Director, Communications Officer and Deputy County Director; portable and mobile radios to the amateur radio officer, the situation analysis officer, the medical officer and all local emergency management agency directors; a mobile radio to the transportation officer, the police representative, and the fire representative; and a portable and a remote radio to the county engineer. Adler and Bath (3/16/81), ff. Tr. 18,975, at 25. This radio equipment was procured by the county specifically for use with the county emergency management communications network and there is frequency compatibility for all such equipment. The county emergency management communications network

uses an assigned, dedicated local government radio frequency not available under Federal Communications Commission regulations for other use and, therefore, outside disturbance on the frequency should not occur. Adler and Bath (3/16/81), ff. Tr. 18,975, at 23-24.

1761. It has thus been established that key emergency response officials and personnel in Dauphin County have been provided with the appropriate radio communications equipment which will allow for their notification in accordance with Dauphin County planning. Consequently, the Board finds Contention EP-16(C) to be without merit.

1762. With regard to Contention EP-16(F), the emergency management communications system is a radio network separate and apart from other emergency radio networks in the county and it provides emergency communications capability for approximately 56 emergency response personnel. Adler and Bath (3/16/81), ff. Tr. 18,975, at 25. In addition to the emergency management communications system, Dauphin County maintains and utilizes a police communications network with five frequencies and direct communications with all municipal police departments, a fire communications network with four frequencies and direct communications with all municipal fire departments, and an emergency medical communications network with five frequencies and direct communications with all municipal ambulance services. Board Ex. 6, at B-5; Adler and Bath (3/16/81), ff. Tr. 18,975, at 25. Thus, there are 15 separate frequencies available in the county for police, fire, ambulance and other emergency communications use. The radio communications equipment for each of the county communications networks is in routine use by the county emergency service organizations and is maintained as part of the regularly utilized emergency services. Assurance of the availability and operability of this equipment is provided by its routine use and by communications drills called for in the State Emergency Plan. Adler and Bath (3/16/81), ff. Tr. 18,975 at 26.

1763. Although the evidence indicates that additional frequencies would enhance communications capabilities for Dauphin County (and, indeed, the county is currently upgrading its existing communications system to add more frequencies (Curry, *et al.*, ff. Tr. 20,787, Wertz Testimony, at 1)), the evidence also indicates that multiple use of particular frequencies by different emergency response groups will not cancel the effectiveness of the existing radio communications and that additional frequencies are not required. The county dispatchers in the EOC (five of whom are on duty at all times (Tr. 20,872 (Wertz))) maintain net control on all frequencies assigned in the Dauphin County Plan, thus providing for the proper use of communications frequencies. Adler and Bath (3/16/81), ff. Tr. 18,975, at 24-25; Tr. 19,123-24 (Bath). Consequently, the Board finds Contention EP-16(F) to be without merit and we reject it.

1764. We now address Contentions EP-14(E), EP-14(C) (in part), EP-14(P) (in part) and EP-16(D) which challenge the adequacy of arrangements made with respect to alternate EOCs. Further, Contention EP-14(P) (in part) questions the adequacy of relying on amateur radio operators to augment York County communications capabilities during an emergency. These contentions state:

Newberry Contention EP-14(E):

Annex A of the York County Plan provides that the alternate EOC site will be the new Hanover Borough Building in Hanover, Pennsylvania. Intervenors again raise the contention that there still is no indication at this time that trunk lines have been laid for the transfer of the Emergency Operations Center to the Hanover location, and, as such, it renders the Plan inadequate.

Newberry Contention EP-16(D):

Appendix 4 of Annex E of the Dauphin County Plan provides that the alternate E.O.C. office will be located in the Millersburg Borough building. Nowhere in the Plan is it indicated that the Millersburg Borough Building is presently in an emergency readiness condition. In short, the Plan does not indicate whether, as a matter of fact, the Millersburg Borough Building can accommodate the requirements of the E.O.C. with regard to telephone trunk lines, radio communications, and other E.O.C. requirements. Until and unless this information can be verified, it is Intervenor's position that the Plan is inadequate and deficient.

Newberry Contention EP-14(P) (in part):

Annex D, Section V, provides that the concept of operation will be effected by the regular communications staff augmented by "qualified volunteers" as required. The Plan also indicated that amateur radio will be relied upon in the event of an incident at TMI nuclear facility. There is no assurance that any amateur radio operators have agreed to participate in such an operation or that each school district has had an operator assigned to it to coordinate the utilization of school buses. Moreover, there is no definition of who is a qualified volunteer in the event that volunteers are required to be used by the communications staff.

1765. The Combined Intervenors proposed findings §§ 479-489 cover these contentions. They also introduce some issues not present in the contentions as stated. The issue that there was no letter of agreement

between the Radio Amateur Civil Emergency Service (RACES) and the county (PF ¶ 481) is discussed by the Board in the previous section on letters of agreement. Letters of agreement from three of the four inter-county amateur radio clubs in York County have been obtained (Tr. 20,922-23 (Curry)) and a radio plan has been signed by all four. Bath, ff. Tr. 23,350, Attachment 3, at 2; Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 1.

1766. Under the York County Emergency Plan, RACES is a part of the county's 24 hour per day Public Safety Communications Network with a RACES officer appointed to support and coordinate communications operations. Board Ex. 5, at C-1. The revised York County Emergency Plan specifically provides that, during an emergency, the amateur radio network will operate from the county Communications Center and will be activated to serve as a secondary system for intercounty communications. If an evacuation is ordered, assigned amateur radio operators will establish radio communications at reception centers and mass care centers¹⁹⁷ Board Ex. 5, at C-2. Records maintained by the county identify the amateur radio volunteers who will be notified and assigned communications responsibilities during an emergency. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 1. Qualified volunteer operators will provide their own communications equipment for use during an emergency. Adler and Bath (3/16/81), ff. Tr. 18,975, at 21. We find that the York County Plan's specific assignment of an amateur radio officer as a member of the county emergency management organization and the amateur radio operations plan, signed by the York County amateur radio organizations, provide assurance that qualified volunteer amateur operators will be available to fulfill those communications functions relied upon in the revised York County Plan. Accordingly, the Board finds that portion of Contention EP-14(P) directed to York County's reliance on amateur radio operators to be without merit.

1767. With regard to alternate EOCs, both York and Dauphin Counties do, in fact, provide for an alternate EOC and Dauphin County provides for an alternate Communications Center. Board Ex. 5, at A-1; Board Ex. 6, at A-1, B-1. However, while NUREG-0654 stipulates that each county should establish an EOC for use in directing and controlling emergency response functions (Staff Ex. 7, at 52, Criterion H.3), under the planning guidance and criteria an alternate EOC is neither required nor necessary. In these circumstances, the fact that communications for the alternate EOC may not have been installed and that the alternate EOCs may not currently be

¹⁹⁷ The revised York County Emergency Plan does not assign amateur radio operators to schools to coordinate the utilization of school buses.

in an "immediate" ready condition cannot be viewed as a planning deficiency. Adler and Bath (2/23/81), ff. Tr. 18,975, at 27-28; Adler and Bath (3/16/81), ff. Tr. 18,975, at 22.

1768. We also note that the primary EOC for York County is in the City of York, outside the plume EPZ for TMI (Adler and Bath (2/23/81), ff. Tr. 18,975, at 27) and that Dauphin County's primary EOC is more than 10 miles from the TMI site (Tr. 20,946 (Wertz)). Although they have designated alternate EOCs, neither the York County Emergency Management Agency nor the Dauphin County Emergency Management Agency anticipates evacuating the primary EOC and relocating to the alternate EOC in an emergency. Board Ex. 5, at A-1; Curry, *et al.*, ff. Tr. 20,787, Wertz Testimony, at 1. Thus, there is no particular need to fully mobilize the alternate EOCs prior to an emergency. Curry, *et al.*, ff. Tr. 20,787, Wertz Testimony, at 1.

1769. From the evidence of record, we find that there is neither a requirement nor a need to install communication equipment in the alternate EOCs for York and Dauphin Counties or to place those alternate EOCs in an "immediate ready condition" prior to an emergency. Consequently, the Board finds the assertions to the contrary in Contentions EP-14(E) and EP-16(D) and in parts of Contention EP-14(C) to be without merit and we reject those contentions.

3. Chain of Command

1770. Contentions EP-14(H), EP-14(R) and EP-16(I) raise concerns about the potential for confusion and lack of coordination in the chain of command among the various state, county and local police forces and the National Guard. These contentions state:

Newberry Contention EP-14(H):

Appendix 2, Section III, of the York County Plan provides that the Assistant Director of Police Operations is responsible for the overall management of law and order, traffic control and security. In the event the National Guard is ordered to assist local communities, it is questionable whether the Assistant Director of Police Operations would be in a position to direct orders to a military organization as is assumed he would be in the York County Plan. There seems to be no coordination between the National Guard chain of command and the chain of command in the operations group in Annex 2, Section III, and therefore, it is Intervenor's position that the Plan is deficient in that there is no stated area of responsibility concerning police operations, vis-a-vis the National Guard.

Newberry Contention EP-14(R):

Annex F, Section II, of the Plan is inconsistent with Appendix 2, Subsection III, Subsection A in that the Assistant Director of Police Operations is stated to be responsible for all management of law and order, traffic control and security, whereas Annex F provides that the Pennsylvania State Police is responsible for coordinating law enforcement and traffic control and the Pennsylvania National Guard is responsible for providing security for the evacuated areas. Intervenor is of the position that until and unless the order of command is sufficiently, adequately and clearly stated, there lies the possibility in the Plan for mass chaos and confusion with regard to who is responsible for police services. The Plan is deficient until it states in a succinct and clear manner who will be responsible for giving direct orders to the Pennsylvania State Police, the sheriff in local police departments, and the Pennsylvania National Guard in the event there is an incident at the Three Mile Island nuclear facility.

Newberry Contention EP-16(I):

Appendix 9 of the Dauphin County Plan regarding police policy and procedures during relocation indicates that when evacuation is ordered, units will proceed to predesignated stations. The Plan does not indicate where the predesignated stations are located and how the chain of command will operate in the event of relocation of local police departments and their interaction with National Guard units arriving to provide additional manpower to local departments. Until and unless a definite chain of command is stated and the relationship between civil police departments and the National Guard regarding chain of command is documented, it is Intervenor's position that the Plan is deficient.

1771. The Combined Intervenors in proposed findings ¶¶ 294-300 allege that state and local governments have not demonstrated sufficient knowledge of their plans and management roles to demonstrate a present ability to respond to an emergency. They use portions of FEMA Interim Findings to support the view that emergency plans are deficient because local governments as yet are not completely familiar with their management roles (Staff Ex. 18, at 2), lack of knowledge of the local emergency plan by the Londonderry Township Fire Company (Interim Findings, Attachment 1, at 30), and the FEMA statement that coordination appeared to be the weak link in the exercise and coordination between the various levels of government were very poor. *Id.*, at 11.

Nowhere in their proposed findings do Combined Intervenors mention the adequacy of the chain of command for Police and National Guard forces as established in state, county, and local emergency plans.

1772. The Licensee in proposed findings ¶¶ 333-336 suggests that because these contentions were drafted prior to the final versions of the county emergency response plans, they no longer relate to the current plans. Therefore, the Licensee would only show that a workable chain of command has been established. The Licensee proposed findings do not address the FEMA Interim Report in the context of this issue.

1773. The Staff, along with addressing the issues raised in these contentions, also would show that a workable chain of command has been established. The Staff also does not address FEMA's Interim Report.

1774. The Commonwealth proposed finding ¶ 119 notes that an annex on military support has been added to each of the county plans and will be incorporated into the state plan prior to submission to FEMA for formal review. The annex will identify which National Guard battalions have been assigned to support each risk county and the time element which should be allowed for complete mobilization. The Board is persuaded by the Staff, Licensee and Commonwealth that there are provisions established for an effective chain of command in the emergency plans of the state, risk counties and local governments. Further, there is reasonable assurance that this chain of command will operate effectively in an emergency.

1775. The revised York County Emergency Plan provides for a "Police Services Officer", a position filled by the County Sheriff, who is responsible for assisting in coordinating police services for traffic control and security in an emergency. Board Ex. 5, at 18, D-1. Neither the Police Services Officer nor another individual in the York County emergency response organization has overall command of law enforcement services in the county during an emergency. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony at 3; Tr. 20,929-30 (Curry).

1776. Further, both the Pennsylvania State Police and the National Guard will provide support to risk counties during an emergency. Lamison (Command and Control), ff. Tr. 17,818, at 1. Under Pennsylvania law, such support forces provided by the state remain under the operational control of the state department, agency or organization which furnishes the support force. Adler and Bath (3/16/81), ff. Tr. 18,975, at 47; Lamison (Command and Control), ff. Tr. 17,818, at 1. On the arrival of the State Police and National Guard forces, the county emergency management coordinator will inform the force commander as to what assistance is needed from the support forces, and the force commander, in turn, will direct his forces to perform the assigned tasks. Tr. 17,823-24, 17,882 (Lamison). Use of the support forces is at the discretion of the county emergency management coordinator, in coordination with the force com-

mander under whose direct control the support forces remain. Lamison (Command and Control), ff. Tr. 17,818, at 1. In the event of problems with the support force in the assignment or the performance of tasks, the county emergency coordinator deals first with the force commander and, if the problems persist, with PEMA. Tr. 17,882 (Lamison). In past emergencies, the Commonwealth has not experienced difficulties with this chain of command (Tr. 17,869 (Lamison) and there is no evidence of conflict in the chains of command among State Police, National Guard and local police forces. Adler and Bath (3/16/81), ff. Tr. 18,975, at 48.

1777. We find that the chain of command for emergency support forces has been clearly stated. Moreover, areas of responsibility for police operations regarding the State Police, the National Guard, and county and municipal police organizations are specifically delineated in the revised York County Plan as are provisions for coordination of police services. Board Ex. 5, at D-1 to D-3. We find no conflicts in chain of command and lack of force coordination, as alleged in Contentions EP-14(H) and EP-14(R), and we find that the concerns expressed in these contentions have been adequately resolved.

1778. Contrary to the assertion in Contention EP-16(I), relocation points for Dauphin County police units have, in fact, been predetermined and are specifically listed in the revised Dauphin County Emergency Plan. Board Ex. 6, at J-6; Curry, *et al.*, ff. Tr. 20,787, Wertz Testimony, at 2; Adler and Bath (3/16/81), ff. Tr. 18,975, at 46. The evidence shows that relocated police units will remain under the command of the police chief or ranking officer of the respective police units. Curry, *et al.*, ff. Tr. 20,787, Wertz Testimony at 2; Adler and Bath (3/16/81), ff. Tr. 18,975, at 46.

1779. The various emergency responsibilities and functions of Dauphin County municipal police forces, the County Sheriff's Office, and augmenting State Police and National Guard forces are delineated in the revised Dauphin County Emergency Plan (Board Ex. 6, at 6, J-1 to J-3), and the county emergency management agency staff includes a Police Services Coordinator and provides for a National Guard Liaison Officer for coordination of police and National Guard emergency services. Board Ex. 6, at 6, 12. We have previously addressed the chain of command structure for support forces, such as the State Police and the National Guard, supplied by the state to the counties. Such support forces will remain under the operational control of the organization supplying the support force with emergency duties and tasks assigned to the support force directly by the force commander at the request of the county emergency management coordinator. Again, we find that the chain of command for emergency support forces has been clearly stated, that the conflicts in chain of

command and lack of force coordination alleged in Contention EP-16(I) do not exist, and that, consequently, the concerns expressed in this contention have been resolved.

1780. We now turn to the issues on coordination, familiarity of local government with management roles, and knowledge of local emergency plans raised in the Combined Intervenor proposed finding. With respect to the management familiarity issue, we find the Combined Intervenor's cited support to be misleading. (Almost the identical defect in the Combined Intervenors' findings is discussed in more detail in the next section on Police, Fire and National Guard Support.) The citation from the FEMA report on the exercise (Staff Ex. 18, at 2) refers not to chain of command but to notification and alerting, communications and public information.

1781. As to the issues on coordination and knowledge of local plans, the Board agrees with FEMA that "The exercise provided a demonstration of an adequate state/local preparedness capability. It did, however, reveal deficiencies which can be regarded as relatively minor and correctable with a program of training, drills and exercises." Staff Ex. 18, at 2. The Board finds that there is ample evidence that the various emergency plans provide for adequate chains of command, and the Board agrees with FEMA's view that the contemplated periodic exercises and refinements in emergency plans will lead to improved coordination. The current level of coordination capability and the machinery in place to improve this capability provide reasonable assurance of proper operation of the National Guard, state, county, and local police forces in an emergency. *See also* the next section on Police, Fire and National Guard Support.

4. Police, Fire and National Guard Support

1782. Contentions EP-14(X), EP-14(00), EP-14(J), EP-14(L), and EP-14(S) (in part) concern police-type support services which include (1) mobilization of the National Guard, (2) assignment of the Pennsylvania State Police, and (3) ability to alert and warn the general population. These contentions state:

Newberry Contention EP-14(X):

Annex M of the York County Plan providing for military support states that the Pennsylvania National Guard will enter into active duty upon an order of the Governor. Moreover, they will respond to any individual local political subdivision's needs upon request of the local political subdivision for aid. The Plan does not state with any specificity whether the Guardsmen will be protected by radiation-proof equipment, under whose orders and directions they will remain during

their encampment in a local political subdivision, and when they will arrive in the local political subdivision after requested to do so. Until and unless these deficiencies are rectified, it is Intervenor's contention that the Emergency Plan is deficient.

Newberry Contention EP-14(00)

Because of the experiences of the past, even the limited evacuation of pregnant women and children under five years of age left many of the areas surrounding the Three Mile Island Nuclear Power Station deserted and open to looting without proper security. The assumption that the National Guard would, in the event of an evacuation, be called up by the Governor, is one that is a void in the evacuation plan and the National Guard is not called up or does not respond to the Governor's request because its members are busily evacuating their own families.

Newberry Contention EP-14(J):

Appendix 2, Section III, Subsection (i) provides that it will be anticipated that the Pennsylvania State Police would be prepared to support York County disaster operations in the event of an incident at the TMI nuclear facility. Moreover, it indicates that the Pennsylvania State Police would coordinate with the Pennsylvania Department of Transportation for the placement of temporary signs in support of evacuation area security. It is important to note that there is no formulated and stated plan for the involvement of the Pennsylvania State Police in the event of an incident at TMI. It is also anticipated in the Plan that there would be the placement of some sort of temporary signs to support the evacuation of the area; however, there is no statement that such temporary signs presently exist or that they would be existing at a time of need. It is therefore contended that the York County Plan is deficient because it does not state the exact assignment of the Pennsylvania State Police in connection with all other support groups in York County.

Newberry Contention EP-14(L):

Appendix 3, Annex A, providing for police operations in a selective evacuation and a general evacuation provides that the police would support and assist in notification and, on request, that police operations provide fire and police support for traffic control and security. It is submitted that support and assist in notification and support for traffic control and security are mutually exclusive operations. It is Intervenor's contention that police in local communities

cannot be asked to both support traffic control and security and, at the same time, support and assist in the notification of area residents of the impending dangers and evacuation notification in the event of an incident at TMI.

Newberry Contention EP-14(S): (in part)

Annex G of the York County Plan is deficient in that it assumes that local fire companies will have sufficient manpower to effect emergency operations procedures as outlined in the Plan. As has previously been pointed out by the Intervenor, there is usually insufficient staffing of the individual fire companies to assure that all residents in rural areas would be notified of an incident at the TMI nuclear facilities because of the number of miles of road located in each township.

1783. The proposed findings of the Combined Intervenors address a portion of the allegations whereas the Staff and the Licensee have addressed all of the issues. Therefore, the board has relied heavily on the proposed findings of the Staff and the Licensee. The Combined Intervenors introduced some additional concerns in their proposed findings regarding coordination of police and National Guard deployment and the lack of familiarity of local governments with their management roles. Commonwealth proposed finding ¶ 119 addresses the role of the National Guard. The Board must decide whether there would be adequate coordination between the State Police and National Guard, and among the State Police, county police, local police and other agencies to provide deployment and necessary services in the event of an emergency at TMI.

1784. The Combined Intervenors assert (PF ¶¶ 301-315) that the results of the June 2, 1981 exercise demonstrate once more a lack of ability by the various levels of government to coordinate effective deployment of the State Police and the National Guard. They cite FEMA's interim report (Staff Ex. 18, at 2) on uneven coordination among state agencies, especially between state and counties, among the counties and within the counties, and the lack of familiarity of local governments with their management roles. In addition they cite FEMA's criticism (Staff Ex. 20, at 23) of the lack of coordination among the county EOC, the Pennsylvania State Police in the county, the PENNDOT county yard and the PENNDOT and the State Police staffs at the state EOC. They fault state and local plans for not including preplanning for the deployment of the State Police and National Guard, and cite this as a failure to meet the guidelines of NUREG-0654 ((A)(2)(C), p. 32) which provides for specification of the functions and responsibilities of major elements and key individuals. They imply possible problems with the notification func-

tions of the local police and fire departments because their role in notification is secondary to the siren system, the assumption in the testimony that adequately trained manpower is available and, because the siren system has not been tested, the uncertainty in the manpower requirements necessary to notify the public in case of an emergency.

1785. They imply that the FEMA testimony on the capability of the police to cope with looting (Bath and Adler, ff. Tr. 18,975, at 4) is questionable pointing out that there has been no demonstration that the police forces would be adequate since they would be occupied with other duties such as traffic control and secondary notification of the public.

1786. With regard to Contention EP-14(X), the Board is persuaded by the evidence that the use of specific radiation-proof equipment by the members of the National Guard is unnecessary. We are assured that the military clothing and masks provided to National Guard personnel are sufficient to provide skin and respiratory protection. Lamison (Command and Control), ff. Tr. 17,818, at 2. We also note that, contrary to the intervenor's assertion, the Revised York County Emergency Plan does list the average time (6 hours) after activation that will be required for National Guard personnel to arrive in local jurisdictions. Board Ex. 5, at N-2. PEMA estimates 7-8 hours. Tr. 20,828 (Belser). Also, the Revised Plan states that the operational control of the National Guard units will remain under the Adjutant General or the National Guard force commander designated by the Adjutant General. Board Ex. 5, at N-2. Thus, the Board finds Contention EP-14(X) to be without merit.

1787. With regard to Contention EP-14(00) the Board notes that FEMA has indicated that, in its experience with mass evacuations, looting in the evacuated areas has not been a problem. Adler and Bath (3/16/81), ff. Tr. 28,975, at 41. Looting is limited in this regard by a highly visible law enforcement presence during the evacuation and in the evacuated area. Tr. 19,254 (Adler). The York County Emergency Plan makes provisions for just such a presence. Pursuant to the York County Plan, Pennsylvania State Police Troop H in York will coordinate police activities in the county and provide security for risk areas. Board Ex. 5, at D-1. The State Police will provide law enforcement along major evacuation routes and the County Sheriff's Office and municipal police departments in the plume EPZ will continue to carry out their normal law enforcement responsibilities during an emergency. *Id.*; Adler and Bath (3/16/81), ff. Tr. 18,975, at 41.

1788. To ensure police protection for municipalities throughout the York County plume EPZ, police departments in that area have agreed to remain in their respective municipalities as long as radiation levels permit. Board Ex. 5, at D-1. If radiation levels require police departments to move outside the plume EPZ, police protection will be provided by task forces going back into the evacuated area. *Id.*, at D-3. Provision has been made

to augment security in the risk area, as needed and required, through call-up of the National Guard. Board Ex. 5, at D-1, M-1, M-2; Commonwealth Ex. 2.a, at 20. Although it is true that the National Guard may be activated for emergency support services only by order of the Governor (Board Ex. 5, at M-1, §II.A), we have been given no reason to believe that the Governor would refuse to issue such an order in the face of *bona fide* requests from the risk counties for National Guard support in a serious emergency. If called up, those Guard forces would not be from the immediate TMI area but would be forces brought in from peripheral areas. Tr. 20,828 (Belser). That being the case, there should not be problems with National Guardsmen having to evacuate their own families from the risk area. In short, the evidence establishes that provision has been made for sufficient law enforcement personnel, including National Guard forces, in the plume EPZ for York County to ensure the maintenance of law and order in evacuated areas. Accordingly, we find Contention EP-14(00) to be without merit.

1789. The testimony indicates that, contrary to the allegations of Contention EP-14(J), there is a plan for the involvement of the Pennsylvania State Police in the event of an emergency at TMI. Both the Commonwealth and five risk county emergency response plans contain a coordinated concept of operation for use and deployment of the State Police. Commonwealth Ex. 2.a, §VII.B.18, at 23-24; *see, e.g.*, Board Ex. 5, at Annexes D and E. In addition, both the Commonwealth and five risk county emergency response plans call for State Police representatives at the state EOC and the county EOCs. In this manner the State Police will be able to coordinate its resources with the needs of the counties and assure a timely deployment of personnel. Tr. at 18,978-79 (Bath). The Revised York County Plan also specifically identifies major evacuation route and access route control points in York County to be manned by Pennsylvania State Police and designates the number of State Police personnel to be provided for each control point. The State Police has confirmed that it will provide the designated number of personnel at the identified control points. Board Ex. 5, at 14, E-1, E-2, E-3. The Board finds that State Police responsibilities for traffic control are well defined and that there are no deficiencies in the York County Plan in this regard.

1790. Contention EP-14(J) erroneously assumes that the plan contemplates the procurement of temporary signs solely for an evacuation of the TMI plume exposure pathway EPZ. In fact, what was contemplated was the use of available traffic signs and barriers that might assist both in traffic control during an evacuation and security of evacuated areas. Such material is readily available from Department of Transportation maintenance sheds. Tr. 18,980 (Bath); Tr. 20,930 (Curry). The Board finds

that, as an aid in traffic control and security, the use of existing traffic signs and barriers is adequate. Thus the Board finds Contention EP-14(J) to be without merit.

1791. The Board finds that the allegations made in contentions EP-14(L) and EP-14(S) (in part) that local police and fire departments do not have sufficient personnel to provide for traffic control, security and fire protection on the one hand, and assist in the warning and notification of the public on the other hand, are without merit. The testimony indicates that, contrary to the assertion in Contention EP-14(L), municipal police forces in the York County plume EPZ are not assigned the dual responsibility of providing both traffic control/security *and* assisting in notification of area residents of an emergency. Rather, the revised York County Emergency Plan imposes upon municipal police only the duties of providing local traffic control and security (law enforcement). Board Ex. 5, at D-1 to D-3. The responsibility for supplemental notification of residents has been assigned to, and accepted by, municipal fire and rescue organizations in York County. Board Ex. 5, at G-1 to G-3.

1792. The actual need for large numbers of persons, whether they be fire and rescue personnel or even police personnel, to provide supplemental alerting to residents in an emergency has not been established. We have already made a finding on the siren alerting system (see the sections entitled Warning and Coordination), and we believe, as reflected in FEMA's testimony (Adler and Bath (3/16/81)), ff. Tr. 18,975, at 32, 33), that if the siren system operates as designed, the need for police and firemen for use in secondary notification would be minimized, and there would not be a need for extensive manpower for secondary notification. Thus the Board finds contention EP-14(S) (in part) without merit.

1793. We now turn to the question of the adequacy of police and National Guard deployment. The Combined Intervenors (PF ¶ 306) cited FEMA's interim report on the June 2, 1981 exercise (Staff Ex. 18, at 2) to support their allegation that there was uneven coordination among state agencies in the area of deployment. They neglected to note that the report states: "This weakness was demonstrated in several areas such as notification and alerting, emergency communications, and especially public information." Police and National Guard deployment were not indicated as being inadequate.

1794. The Combined Intervenors' citation on the unfamiliarity by local governments of the management roles (PF ¶ 307) misleads the reader into assuming that this also relates to Police and National Guard deployment. However, the statement in Staff Ex. 18, at 2 refers to the same areas of notification and alerting, emergency communications and public information, not Police and National Guard deployment.

1795. FEMA in Staff Ex. 20, at 23 is cited by Combined Intervenors (PF ¶ 308) regarding a serious lack of coordination between the county EOC, the Pennsylvania State Police Liaison officer in the county, the PENNDOT county yard, and the PENNDOT and Pennsylvania State Police staffs at the State EOC in regard to access control. However, FEMA stated in Staff Ex. 18, at 2, "The exercise provided a demonstration of an adequate State/local preparedness capability. It revealed, however, deficiencies which can be regarded as relatively minor and correctable with a program of training, drills and exercises." The Board believes that there is reasonable assurance that the National Guard and Police will be adequately deployed based on the evidence as discussed above. In addition, with regard to coordination, the Board believes that in light of periodic exercises to be conducted and the refinement of the Emergency Plans of the state, county, and local governmental entities that coordination will improve. The Board believes that the current coordination ability and the mechanisms in place to improve this capability provide sufficient assurance that there will be adequate Police and National Guard coverage in the event of an emergency.

5. Wrecking and Fuel Service Support

1796. ANGRY Contention EP-6(B), Newberry Contention EP-14(CC) and Newberry Contention EP-14(C) concern the availability of sufficient numbers of emergency tow trucks, the sufficiency of fuel and the accessibility of affected areas to towing and fuel trucks. These Contentions state:

ANGRY Contention EP-6(B):

Although the Pa. DOP, Sec. IXB(1)(p), delegates the responsibility for arranging for emergency wrecker and fuel services to risk counties, the York County plan assigns this responsibility to the Pa. National Guard (Sec. VIA(7)(c)).

Newberry Contention EP-14(CC):

Nowhere in the York County Plan does there exist a catalog of the tow trucks available for use in York County. Until and unless a catalog of the tow trucks available for use is attached to the Plan, the Plan remains deficient.

Newberry Contention EP-14(C)(in part):

The Plan is also defective in that it is anticipated that the Pennsylvania National Guard will provide tow trucks and gasoline along evacuation routes; however, nowhere in the Plan does it indicate that the Pennsylvania National Guard has the necessary tow trucks and fuel trucks to effect such a plan. Finally, it's noted that there is no reaction time indicated in the Plan in order to assure that such tow trucks and fuel trucks could even arrive within the evacuation area due to traffic flow on the interstate and access highways.

1797. The Combined Intervenors, the Licensee and the Staff all submitted proposed findings on these issues.

1798. The Board must decide whether or not the arrangements among state and local jurisdictions provide reasonable assurance that fuel and towing services will be available during an emergency at TMI. The Combined Intervenors in their proposed findings (¶¶ 316-322) claim that in spite of the state plan to augment the existing supply of tow trucks and fuel, the record shows that the Commonwealth does not have sufficient numbers of tow trucks or wreckers to carry out the augmentation plan nor can it identify whether it has sufficient resources to meet such needs. In addition, the intervenors' findings take the position that local and county plans have not identified resource shortfalls for the purpose of coordination with PEMA. Without identification of shortfalls the state and local plan cannot demonstrate a capability to provide fuel and tow trucks for an emergency.

1799. The Licensee (proposed findings ¶¶ 343-345) and Staff (proposed findings ¶¶ 246-250), on the other hand, summarize the provisions of the State and York County plans from the testimony. In addition, they agree that the plans, along with the experience gained by the police, the National Guard and the Department of Transportation, are sufficient to assure the availability of necessary services during an emergency.

1800. The Board is persuaded by the testimony that the provisions in the Commonwealth's emergency plan for clearance of obstacles on main evacuation routes by the Department of Transportation, augmented by the National Guard (Commonwealth Ex. 2.a, VII.A.21.c, at 25, VII.A.16.h, at 20); the plans for establishment of fuel distribution points along major evacuation routes by the National Guard (*Id.*, VII.A.21.d, at 25, VII.A.16.h., at 20), and the provision for TMI area fuel supply by the Governor's Energy Council (*Id.*, VII.A.12.a, at 17) are sufficient to assure the availability of towing services and necessary fuel.

1801. The responsibility for emergency fuel and road service along feeder evacuation routes is assigned to the risk counties. Commonwealth Ex. 2.a, at VII.B.1.q, at 27. The role of the National Guard in establishing fuel depots on major evacuation routes is mentioned above. In addition, the

testimony indicates that the York County Revised Emergency Plan delegates that services to municipalities to be included in their operational plans, contrary to Contention EP-6(B) (Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 1)¹⁹⁸ and that certain municipalities have specifically designated wrecker and fuel supply services in their own emergency plans. Board Ex. 13, at 5. The Board finds no evidence to support the contention that feeder evacuation routes will not be supplied with sufficient fuel and wrecker services. Thus the Board rejects ANGRY Contention EP-6(B).

1802. The Board restates that, as in its decision on municipal plans (see Section IV.H.14) and in agreeing with testimony on state and county emergency plans (Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 4), these plans cannot be expected to contain all resources available in explicit detail. Thus the Board does not find emergency plans to be wanting if lists of emergency vehicles and supplies are not included. The testimony states that local state law enforcement agencies use tow trucks for accidents on a daily basis, and contact points and lists for such services are available for emergencies. Adler and Bath (3/16/81), ff. Tr. 18,975, at 38; Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 1. This evidence and the previously mentioned specific municipal wrecker and fuel supply services in the Board's judgment reinforces our confidence that lists are not necessary.

1803. Contention EP-14(C) (in part) also asserts that tow trucks and fuel trucks might not be able to enter the evacuation area due to traffic flow on the evacuation routes. This claim ignores the Commonwealth's operational strategy that evacuation routes will be operated with normal two-way traffic patterns. This not only allows emergency vehicles easy access to disabled cars, but also would permit evacuating vehicles to temporarily use the open lane(s) in the event of a traffic accident so as to preclude the total blockage of an evacuation route. Licensee Ex. 52, at 46. With the assurance derived from this evidence, the Board rejects Newberry Contentions EP-14(CC) and EP-14(C) (in part).

6. Transportation - General

1804. Intervenors representing groups in the near vicinity of Three Mile Island raised several contentions directed to planning for transportation during an evacuation. The two intervenor groups who participated in this subject were ANGRY, the Anti-Nuclear Group Representing York, and Newberry Township TMI Steering Committee, also of York County.

¹⁹⁸ For example, the York County Emergency Plan provides that police groups will coordinate with the Department of Transportation in the use of equipment and personnel to assist disabled motorists. Board Ex. 5, Annex D, A.IV.C.2 and IV.D.9, and Annex E, III at D-2, D-3 and E-1.

Consequently, much of the testimony on the subject focused on the York County Plan. Our consideration of transportation planning is divided into the following topics: general planning, transportation of school children, transportation of individuals lacking private transportation, and transportation and care of invalids and homebounds.

1805. In this section we consider transportation planning in general. Contentions raised were:

Newberry Contention EP-14(V):

Annex K of the York County Plan provides for the transportation of various individuals out of the evacuation area. Intervenor's contention in this area is that there is no direct stated coordination of plans between YATA, local school districts, the Baltimore Transit System, and the Pennsylvania and Maryland Railroad Company. The Plan as set forth in the concept of operation indicates that total coordination of the system will be left to the county Transportation Coordinator who will establish a system, but it doesn't identify when he will establish a system to identify priority use of transportation resources. Moreover, it states that any buses without missions would report to the Vo-Tech school located in York and be dispatched from that point. There is no provision for the refueling for any of the buses in any particular area and there is no guarantee that school buses driven by volunteer drivers would be willing to return to a risk area. Furthermore, the transportation area of the York County Plan has totally disregarded the initial five hour plan which had been included in the initial evacuation plan. Nowhere in this Plan does it appear that transportation could be effected in any set time period and, therefore, this section again, by implication, contains the realistic admission that, regardless of whether school was in session, the evacuation plan would be inoperable and unrealistic. Until and unless the Plan shows exact designation of buses, commitment by bus companies to react within set stated times and letters of agreement between the surrounding school districts and the York County Commissioners with regard to assurances of delivery of local school buses, the Plan will remain deficient.

Newberry Contention EP-14(AA):

Annex O of the Emergency Plan is deficient in that the concept of operations division does not require mandatory preparation of local plans for emergency notification of bus drivers and the organization of mobilization of transportation necessary to meet the needs of evacuating their student populations. Moreover, the Plan does not include any

direction or plan to the local school superintendents as to rerouting their buses for general evacuation of local residents. For example, in an emergency, is a principal of Fishing Creek Elementary School to send a bus to the Vo-Tech School for rerouting while area residents wait for transportation? Until and unless there is some type of generalized plan for each school district as to the rerouting of school vehicles not in use for removal of school population, the Plan will remain deficient.

Newberry Contention EP-16(T):

Moreover, the plan does not envision the method of notifying school and CAT bus drivers and assumes that all drivers will respond in an emergency situation. Moreover, it doesn't indicate anywhere that the CAT bus drivers will know what is expected of them in an emergency situation and know where they are going and how to get to the appointed emergency staging areas. This is a contingency that can be planned for in advance, should be specifically set out in a plan, and thus, the absence of such specificity in the plan renders the plan inadequate.

1806. Newberry Contention EP-14(V) asserts a lack of coordination between the transportation section of the York County Plan and the plans of the York Area Transportation Authority (YATA), the Baltimore Transit System, and the Pennsylvania and Maryland Railroad Company, and asserts further that the York County Plan does not identify when the county transportation coordinator will establish a system for prioritizing use of transportation resources. Newberry also expresses concern about the availability of fuel for buses and about the willingness of bus drivers who have left the risk area to return to the risk area to further assist in evacuation. Newberry further alleges that the York County Plan is deficient in that it must include exact designations of buses, commitments by bus companies to react within stated times, and letters of agreement with surrounding school districts to assure delivery of local school buses.

1807. During the time which elapsed since admission of EP-14(V) and the testimony on this contention, the York County Plan was revised, making it difficult to address the contention directly. The revised plan (Board Ex. 5) addresses transportation provisions for three groups in York County: invalids in private residences requiring medical type transportation (Annex J), school children (Annex O), and persons without automobiles (Annex K). The revised plan makes more detailed provision for the former two groups than for the latter. For example, Annex J sets forth provisions for evacuating homebounds and invalids by ambulance services and fire companies and explicitly lists the available ambulances. Similarly, Annex

O provides for transportation of approximately 6500 school children from the plume EPZ, such evacuation to be implemented according to school district evacuation plans which are currently under development. (See School Children Transportation, Section IV.H.7, *infra*.)

1808. Annex K of the plan is brief but further information on resources for persons without private transportation was developed during oral testimony and cross-examination.

1809. The York County Emergency Management Coordinator is responsible for providing transportation support to the people of York County. A county transportation coordinator, with a supporting staff, has been appointed to develop and coordinate transportation procedures and requirements in York County. Board Ex. 5, at K-1. The York Area Transportation Authority (YATA) Statement of Understanding, included in the York County Plan, states that, in an emergency:

Direction and coordination of these resources [the vehicular and manpower resources of YATA] will come under operational control of the York County Commissioners through the designated Emergency Staff Transportation Coordinator. The Transportation Coordinator will establish specific prioritization for the use of resources in response to the situation at hand and as specified in the appropriate County operations plan.

Board Ex. 5, at T-6; Attachment 3 to FEMA's Interim Findings and Determinations, ff. Tr. 22,350, item 8.

1810. Annexes J, K and O to the York County Plan indicate some degree of implicit prioritization of resources. For example, Annex J provides that, in an evacuation, ambulance services in risk areas will continue to provide their normal service to the public, while assisting in the evacuation of non-ambulatory persons to the extent that normal duties permit. See Board Ex. 5, at J-1. Similarly, it is clear that the buses normally used to transport students to and from school are first to be used for the evacuation of those students, as necessary, before being used to evacuate members of the general public lacking private transportation. See Board Ex. 5, Annex O. See *generally* Staff Ex. 23, at III-21 to III-22. Moreover, while specific bus assignments might clarify operational priorities, actual emergency conditions would still probably require an *ad hoc* distribution of transportation assets to meet the specific circumstances. Adler and Bath-2, ff. Tr. 18,975, at 35. Thus, the current York County Plan shows evidence of coordination in transportation planning with YATA and describes in a general way the timing and means of prioritization of transportation resources.

1811. In addition, York County now maintains a Resource Manual (separate from the county plan) in the York County EOC. This manual includes telephone listings of many transportation resources (besides YATA and the school districts with which the county has letters of agreement) that York County can call upon if necessary. Board Ex. 5, Annex U; Bath, ff. Tr. 22,350, Attachment 3, at 4-5. As a result, the York County Plan itself no longer refers to either the Baltimore Transit System or the Pennsylvania and Maryland Railroad Company. See Board Ex. 5, Annex K.

1812. Contrary to the assertion of Contention EP-14(V) that no provision is made for the refueling of buses, it is expected that local fuel facilities, *i.e.*, county fuel pumps and local gas stations, would be utilized during initial refueling operations. Adler and Bath (3/16/81), ff. Tr. 18,975, at 35. For extended operations, the county transportation coordinator could request fuel support from the state and National Guard resources, if necessary. *Id.*, at 35. See generally Commonwealth Ex. 2.a, at 25; Staff Ex. 23, at III-22; Tr. 19,202-04 (Adler, Bath). FEMA does not believe that there is a need for explicit written procedures governing distribution of gasoline. Tr. 19,444 (Adler).

1813. With respect to Newberry's concern about the willingness of bus drivers who have left the risk area to return to further assist in evacuation, the FEMA witnesses testified that bus drivers can be expected to return to the risk area, as needed, to accomplish their assigned missions. Adler and Bath (3/16/81), ff. Tr. 18,975, at 35. The Statements of Understanding which York County has with YATA and the South Eastern School District specifically state that employees will be solicited to perform their duties pursuant to those agreements. See Board Ex. 5, at T-3, T-6. The experience of FEMA over the years is that people assigned responsibility for carrying out emergency missions do in fact carry out their missions. Tr. 19,212-13, 19,243 (Adler, Pawlowski).

1814. Intervenors (PF ¶¶ 328-329) questioned FEMA's testimony on the willingness of school bus drivers to return to the risk area and urged the Board to find this assumption to be "not borne out by any actual experience" and far in excess of "any realistic expectations of performances." In support of their proposed finding they cited the rebuttal testimony of Dr. Erikson that ". . . in the last analysis, I think they (bus drivers, usually housewives) would regard their real job as tending for their families." Erikson, ff. Tr. 21,686, at 8. The Board here observes that underlying the issue of willingness to perform assigned missions in an emergency is the unresolved question of whether a population will react to a radiological emergency in the same way as to other types of emergencies. (See our discussion in Section F.)

1815. Based on our detailed review of the evidence before us, we find no reason to believe that the majority of the emergency workers in the area surrounding Three Mile Island will do other than to perform their assigned duties in the event of an emergency, nuclear or otherwise. Therefore, while we understand the concern of the intervenors we reject the contention that there is no assurance that school bus drivers will perform as assigned. In doing so, we recognize that school bus drivers are not necessarily as likely as emergency workers in general to be available during an emergency, in that some or even many school bus drivers are homemakers who may have conflicting family responsibilities. However, given the void in the evidence on this particular point, and the general evidence of availability of emergency workers in other emergencies, in our subjective judgment we do not believe that so many school bus drivers will fail to perform their duties that the evacuation of schools will be disrupted. Given proper procedures in place to provide the buses, we believe it is highly unlikely that back-up drivers, such as school teachers or police personnel, cannot be quickly utilized to make up any deficit of expected school bus drivers. While it may be arguably prudent to provide now for back-up drivers, it will always be arguably prudent to provide more in planning for an emergency. In this instance, we believe that planning is not required for a specific list of back-up drivers, as there are many sources of such drivers available on short notice, *e.g.*, through the school's own resources (teachers), police personnel, and through the County Transportation Coordinator.

1816. FEMA did identify areas of the York County transportation plan that could be improved, including specific identification of the numbers and sources of available vehicles and how those vehicles will be utilized, with reference to the points established by municipalities for the pick-up of individuals without private transportation. Nevertheless, FEMA concluded that an adequate basis for transportation coordination currently exists in York County. It is FEMA's opinion that York County can utilize its existing Resource Manual, supporting municipal plans, and Licensee's evacuation time study to effectively evacuate persons without private transportation in an emergency even with the present transportation plan, Annex K. Bath, ff. Tr. 22,350, Attachment 3, at 4-5. In regard to transportation for persons without cars, the County has at its disposal the resources of the York Area Transit Authority which, during an emergency, will come under the direction and control of the York County Commissioners through the designated Emergency Staff Transportation Coordinator. Board Ex. 5, at T-6; Bath, ff. Tr. 22,350, Attachment 3, at 4. The County also maintains a resource manual listing many other available transportation resources for use in an emergency. *Id.*, at 4-5; Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 4; Tr. 20,857 (Curry). Although FEMA has expressed its view that York County transportation planning

should be enhanced by completion of the transportation plan matching these resources to needs (Tr. 22,392 (Bath); Bath, ff. Tr. 22,350, Attachment 3, at 5), FEMA has also indicated that these transportation resources appear to be adequate. Tr. 22,392 (Bath). Utilizing these transportation resources, supporting municipal planning, and information from the Parsons-Brinckerhoff evacuation time study on the number of persons without cars, the County can effectively evacuate such persons with the present state of planning. Bath, ff. Tr. 22,350, Attachment 3, at 5. FEMA will continue to monitor York County's progress in this area, and will provide assistance where possible. Bath, ff. Tr. 22,350, Attachment 3, at 4-5. Based on the evidence presented, and on the expectation of continued FEMA monitoring, we find that the state of evacuation transportation planning for York County, while not perfect or complete, is sufficiently developed to provide reasonable assurance that, with the exception of school children, evacuation of those persons without their own means of transportation, can be effected. Accordingly, we reject Newberry Contention EP-14(V). The special case of school children we consider in the following section.

1817. Newberry Contention EP-14(AA) asserts that Annex O of the York County Plan is deficient in that it does not include plans for the notification or mobilization of bus drivers necessary to evacuate students and further that the plan is deficient in that it does not include "a generalized plan for each school as to the rerouting of school vehicles not in use for removal of school population," but rather provides for the staging of buses at the York Vo-Tech School. We address plans for evacuation of school children in *Section IV.H.7, infra*. Here we address rerouting of buses.

1818. In reference to that part of EP-14(AA) which deals with rerouting of school buses after they have served their initial function of evacuating school children to provide for transportation of persons without private transportation, we agree with FEMA that additional planning on bus rerouting should be included in the County Plan. Adler and Bath (3/16/81), ff. Tr. 18,975, at 57. It is true that the York County Plan does not set forth directions to school superintendents on rerouting school buses for use in evacuating those members of the general population who do not have their own means of transportation. The basic reason for this is that the responsibility for evacuating persons without transportation other than school students has not been imposed upon the school districts. See Board Ex. 5, Annex O, for responsibilities of school districts. Rather, provision of such transportation is addressed in Annex K of the revised York County Plan (Board Ex. 5, at K-1, §III) wherein the County Transportation Coordinator and his staff are to develop the necessary transportation planning. We have previously addressed the status of planning and the

capabilities of existing planning in this regard in relation to contention EP-14(V). In any event, based on the responsibilities assigned to the school districts, the lack of direction to school districts to provide for rerouting of school buses to pick up persons without transportation is not a plan deficiency. Rerouting of buses and the reallocation of transportation resources after they have performed their initial mission appears to be better left to the County Transportation Coordinator who will have a better knowledge of the overall transportation needs during the emergency.

1819. The Board agrees that there is a need for additional planning in this area and that the primary responsibility for this planning and for the attendant coordination with the schools should probably rest with the County Transportation Coordinator. While we recognize that there is a deficiency at present we do not consider it sufficiently serious to tie its correction to restart of TMI-1.

7. School Children Transportation

1820. As indicated in Section 6, Newberry Contention EP-14(AA) asserts that the York County Plan is deficient in that it does not include plans for notification or mobilization of bus drivers necessary to evacuate students.

1821. Two other contentions were raised which dealt with specific details of the evacuation of school children in York and Dauphin Counties:

Newberry Contention EP-14(B)(in part):

Furthermore, this section of the York County Plan anticipates parents and/or families evacuating the area will be able to pick up children at schools. This again would lead to confusion within the Plan in that if a selected evacuation was ordered and pre-school children were to be removed from the area, the Plan anticipates that action would be taken by school superintendents in the evacuation of the children from schools and that there may be interference or lack of effective execution of the Emergency Plan set forth for the school systems.

Newberry Contention EP-16(J):

Appendix 12 of Annex E of the Dauphin County Plan provides that during school hours, upon receipt of a condition yellow alert, school districts shall begin returning school students to their homes. Moreover, the Plan continues, that in the event parents are not home, children shall be returned to one pickup point as listed in the Appendix. There is an exception to this rule indicated in the Plan. It is

Intervenor's contention that the Plan is deficient because it first of all allows the busing of the children during a condition yellow situation. It is Intervenor's contention that a much more sensible approach to this problem would be to bus all the children to a pre-designated area outside of the 20-mile EPZ and allow parents in an orderly fashion to pick their children up if a condition yellow alert does not change. There is a potential, as the Plan is now written, that in the middle of busing children home during a condition yellow situation that the situation could degrade to a condition red situation and there would be no means of notifying the bus drivers of the change in situation and the change in the school policy plan under a condition red emergency situation.

Finally, Section J of this part of the Plan indicates that evacuation plans of the various school districts will be on file with the county Emergency Preparedness Agency. It is Intervenor's contention that the plans of the school districts should mandatorily be on file and reviewed periodically by the County Emergency Preparedness Agency. Until or unless this deficiency is corrected, it is Intervenor's position that the Plan is defective.

These contentions are addressed below. First, however, we address the testimony presented by the League of Women Voters of York County on York County school evacuation in particular and on York County and municipal planning in general.

(a) League of Women Voter's Testimony

1822. Testimony was presented by a panel of witnesses from the York County League of Women Voters (League), sponsored by Intervenor ANGRY. This testimony was based on two survey reports that were issued on November 19, 1980 and April 17, 1981. Tr. 21,518 (Ryscavage). The reports, which deal with school evacuation planning and municipal planning in York County, were based on a series of phone or in-person interviews, initiated formally in September 1980 with, among others, school superintendents within 20 miles of TMI and the emergency management coordinators or officials from each of the 15 municipalities within the York County plume EPZ. Ryscavage, *et al.*, ff. Tr. 21,508, at 3. While the November 19 study apparently was not prepared specifically for this proceeding, the timing of the April 17 study indicates that it was, in essence, prepared for submittal in this proceeding. The reports are basically

compendia of statements made to the League's interviewers, along with extensive commentary and conclusions prepared by the League on its views of the status of school and municipal planning in York County.

1823. The Board was impressed with the level of effort and the degree of interest demonstrated by the League in its studies of local emergency planning. On the other hand, the methodology utilized in the surveys can be best characterized as naive and unsophisticated to such a degree as to render the product of questionable probative value. Our own observations and those detailed in Licensee and Staff proposed findings substantiate this characterization. For example, some of the interviews were conducted prior to development of a question format (Tr. 21,519-20 (Ryscavage)), and some of those interviewed early were not re-interviewed in line with the format. Tr. 21,521 (Ryscavage). Not all interviewees were asked the same questions. Tr. 21,627 (Ryscavage). In at least one instance, the interviewees did not understand the terminology being used by the interviewers and so gave responses indicating that they could not perform a particular function, though in fact they were able to do that task. *See* Tr. 21,572-74 (Wentzel); Tr. 21,649-51 (Hilliard, Miller).

1824. Further, the Board notes that the interview process itself was somewhat amorphous, more in the nature of an open-ended discussion rather than a neutral interview conducted in a professional and business-like manner. In one instance, the League witness did not know who had raised a particular issue in the conversation — the interviewee or the interviewer. Tr. 21,553 (Hilliard). In other cases the questions were unduly suggestive — *e.g.*, “[w]hat other communication problems do you see” and “[w]hat problems do you see in drawing up a workable plan.” Tr. 21,557 (Miller). Not all information which the interviewer deemed significant was recorded in the notes, forcing the interviewers to recall from memory the substance of their numerous interviews. Tr. 21,549, 21,553-55 (Hilliard). There was no specific format for the interview notes (Tr. 21,529 (Ryscavage)), even though a number of individuals actually did the interviewing. As a result, some interviewers did not note the date of the interview in their notes, and could only estimate when the interviews occurred. Tr. 21,524-27 (Ryscavage, Hilliard). We note this last fact not to be overly critical of the League but only as evidence that the interviews were not conducted as rigorously as might be the case for a trained interviewer. In at least one instance, the person preparing the study report was working from “interview” notes of her conversation with another League individual who actually did the interview. Tr. 21,527 (Ryscavage). In another case, the interview notes included material both from the interviewee and from another League interviewer who had spoken with the interviewee earlier. Tr. 21,555-57 (Miller).

1825. Finally, the Board questions the methodology used by the League in selecting the raw information from their interview notes to prepare the study report. Apparently no established criteria were applied in deciding what information to extract from their notes for inclusion in the study report. Tr. 21,529, 21,531 (Ryscavage); Tr. 21,531 (Hilliard). It became clear during cross-examination that there was extensive information in the interview notes, indicating a favorable or adequate state of emergency preparedness, that was not included in the study report, *inter alia*, information about the overall adequacy of particular municipal and school evacuation plans (Tr. 21,557 (Miller); Tr. 21,583-85 (Ryscavage)); arrangements made for the transportation of invalids and homebounds (Tr. 21,577 (Ryscavage)); and information indicating that bus drivers could be expected to perform their duties during an emergency at TMI. Tr. 21,540, 21,544, 21,562-63 (Miller).

1826. In some cases, the formless approach used by the League resulted in omission of potentially pertinent information garnered from interviews or in somewhat misleading characterization of information. For example, though the League's report states that, according to school district superintendents, many school teachers are not aware of their responsibilities to accompany students on evacuation buses, the superintendents of the West Shore (Tr. 21,544-45 (Hilliard)), Central York and Northern School districts had told interviewers that their teachers were, indeed, aware of their responsibility (Tr. 21,545-46, (Miller)) and the Northeastern School District Superintendent will inform his teachers of that responsibility (Tr. 21,549 (Hilliard)): None of this was reflected in the League's report. Similarly, while the Red Lion Bus Company representative informed the League interviewer that 108 of the Company's 110 bus drivers reported for duty during the TMI-2 accident and that he was sure the drivers could be relied upon in a future emergency (Tr. 21,540 (Miller)), this was not reported in the League's report or written testimony (*Id.*; Tr. 21,541 (Ryscavage)), which instead reports on the concerns of some municipal coordinators over the availability of buses in an emergency (Ryscavage, *et al.*, ff. Tr. 21,508, Study Update, at 7).¹⁹⁹ In addition, those League members who prepared the League's report/testimony were sometimes unsure of the meaning or interpretation of responses recorded in interview notes, yet they proceeded to report those responses according to their own interpretation. Tr. 21,649-51 (Hilliard, Miller); Tr. 21,575-76 (Hilliard).

¹⁹⁹ Other examples of the incomplete reporting of interviewer responses not reflected in the League's report involve resources in tow trucks and radiological monitoring equipment available to municipalities (Tr. 21,563-65, 21,576-77 (Ryscavage); Tr. 21,566 (Hilliard)) and substantial emergency preparedness and radiological monitoring training that was provided to municipal emergency personnel (Tr. 21,565-66, 21,577, 21,585-86 (Ryscavage); Tr. 21,584-85 (Hilliard)).

Some of the information in the League's report is simply outdated or misleading. For example, the League's statement in its November study that some school districts were planning to relocate students to places other than those designated in the York County Emergency Plan is no longer true (Tr. 21,550 (Miller)), yet this is not reflected in the League's report. The statement in the League's report to the effect that no provision is made to inform parents as to where school students have been relocated (Ryscavage, *et al.*, ff. Tr. 21,508, at 13) was written without the awareness on the part of the witnesses that the revised York County Plan explicitly provides for the dissemination of such information through pre-prepared EBS announcements. Tr. 21,630-33 (Miller).²⁰⁰ The League's report indicates that there are major problems with the evacuation of private schools (Ryscavage, *et al.*, ff. Tr. 21,508, School Followup, at 14), yet there is only one private school within the York County portion of the plume EPZ (Tr. 21,568 (Miller); Licensee Ex. 52, Table 8, at 23) and the public school district within which that private school lies recognizes its responsibility to evacuate that private school. Tr. 21,558-59 (Miller). Confirmation that the League's report is outdated was provided by the York County Emergency Management Coordinator who testified that the report does not accurately portray the level of preparedness in the county and that the general conclusions in the summary of the report are based on earlier versions of the county plan. Tr. 20,959-60 (Curry).

1827. Finally, much of the League's report is based on confused and sometimes third-hand information.²⁰¹ From cross-examination it is clear that sometimes the witnesses had no knowledge of the basis for statements made to them in interviews yet they reported such statements in testimony as statements of fact.²⁰²

1828. In summary, the Board finds that the League's testimony served to familiarize us with the League's perception of emergency planning status in the York area but that because of its questionable probative

²⁰⁰ Similarly, the statement in the report to the effect that "Thyroid prophylaxis agents may not be distributed on a timely basis" (Ryscavage, *et al.*, ff. Tr. 21,508, Study Update, at 12) was addressed to the distribution of potassium iodide (KI) to the general public and does not reflect the more recent planning to distribute KI to emergency workers and institutionalized persons only. Tr. 21,644-45 (Ryscavage).

²⁰¹ For example, League witness Miller indicated that in writing up interview notes which formed a part of the basis for the League's report she relied on comments from another interviewer who actually conducted the interview with a school superintendent. Tr. 21,555-57 (Miller).

²⁰² An example is the statement in the League's report that "Some bus drivers evacuated early during the last crisis." Ryscavage, *et al.*, ff. Tr. 21,508, Study Update, at 16. Cross-examination revealed that this was a comment made by one school superintendent. The "comment" was not probed by the interviewer who had no concept of the basis or scope of the statement. Tr. 21,647-49 (Miller).

value, as demonstrated in both pre-filed testimony and in cross-examination, we cannot ascribe evidentiary weight to it.

(b) Contentions

1829. We next address those contentions dealing exclusively with transportation of school children in the event of an emergency at TMI. We address first three specific contentions relating to transportation and then a larger issue of concern to this Board — the need for written school plans. Newberry Contention EP-14(B) contends, in part, that confusion may result during a selective evacuation because the York County Plan provides both for the evacuation of school children as a group and for the pickup of children at school by evacuating parents. This contention was evidently based on an early version of the York County Plan. Under the revised York County Emergency Plan, no provision is made for parents to pick up school children at the schools, but rather in the event of an evacuation school children will be bussed as a group to designated host schools or relocation centers outside the plume EPZ. Board Ex. 5, at 0-2, §IV.D.3., at 0-4. By means of prepared EBS statements, parents will be informed that school children have been evacuated to specific relocation centers and that they are to meet their children there. Board Ex. 5, at F-13, F-14. *See also*, in general, Board Ex. 5, at 8-12 (Concept of Operations), F-7 to F-8 (EBS announcement for selective evacuation), Annex H (Evacuation), and Annex O (School Services). We believe that Newberry's concern has been obviated by the revised plan and consequently we reject this contention.

1830. With regard to other schools in the plume EPZ we note that with the exception of the Dauphin County Plan, the current county plans include complete listings of schools to be evacuated in the event of an incident at TMI. *See* Board Ex. 5, at 0-4; Board Ex. 7, at L-4; Board Ex. 8, at G-4; Board Ex. 9, at G-4. The Dauphin County Plan lists affected school districts. *See* Board Ex. 6, at L-5. Further, Licensee's evacuation time estimate study, provided to the five risk county emergency management coordinators and referenced in all five plans, contains a complete list of all schools in the TMI plume exposure pathway EPZ. *See* Licensee Ex. 52, at 16-24; Tr. 17,924 (Rogan).

1831. The first part of Newberry Contention EP-16(J) asserts that the Dauphin County Plan is deficient because in a "condition yellow" (Alert) school children will be bussed home. Newberry contends that a more sensible approach would be to bus all the students to a pre-designated area outside the risk area and to allow parents to pick up the children there. Newberry is particularly concerned that, in the middle of bussing children home in a "condition yellow", a "condition red" might be declared, and

there would be no means of notifying the bus drivers of the change in the situation and the attendant change in school policy. We summarily reject Newberry's assertion that the children should be bussed "outside of the 20-mile EPZ", for reasons explained in Section F.

1832. Under the revised Dauphin County Emergency Plan, dated April 7, 1981, evacuation of school children will be on a group basis with students bussed to specified relocation centers unless, under the circumstances, an evacuation has been ordered with time permitting the schools to be closed and students released to parents under normal transportation procedures. Board Ex. 6, at L-3. FEMA has testified that this has now been revised to delete any suggestion that students would be returned home during the early stages of an accident. Rather, students will be relocated to predesignated host areas outside the plume EPZ on routes consistent with the predesignated major evacuation routes to facilitate the pickup of students by their parents. Bath, ff. Tr. 22,350, Attachment 3, at 6; Tr. 20,916-17 (Wertz). Subject to the Staff's certification to the Commission prior to restart that the change in the Dauphin County Plan in fact has been made, the concerns raised in the contention with regard to rerouting school evacuation buses during the course of transporting students to their homes have been satisfied with the revised school evacuation planning. Current planning for Dauphin County is consistent with that advocated by the intervenor in this contention.

1833. The second part of Newberry Contention EP-16(J) asserts that school district plans should be on file with and reviewed periodically by the Dauphin County Emergency Management Agency. As to this assertion, the evidence indicates that individual school plans are not required for compliance with emergency planning criteria. Tr. 22,401 (Bath). The evidence further indicates that Dauphin County will, nevertheless, require that school plans be on file. Thus, what is sought by the intervenor in Contention EP-16(J) will eventually be provided. Adler and Bath (2/23/81), ff. Tr. 18,975, at 55-56. As indicated below, the Board believes that the lack of written school plans at the district level should be promptly corrected.

1834. The current Dauphin County Plan includes a general description of planning for the evacuation of schools. Bath and Adler (2/23/81), ff. Tr. 18,975, at 55; Board Ex. 6, Annex L. Two school district plans already are on file with the Dauphin County Emergency Management Agency (Tr. 20,969 (Wertz)), including the Lower Dauphin School District plan (*see* Board Ex. 6, at U-1) which is being used as a "model school district plan" throughout the Commonwealth. Knopf, *et al.*, ff. Tr. 21,816, at 8-9. The Steelton-Highspire School District also has adopted an emergency plan. *Id.*, at 9. Other school district evacuation plans are being developed currently. Bath and Adler (2/23/81), ff. Tr. 18,975, at 55; Tr. 20,855,

20,969 (Wertz). Thus, while the coordination of school evacuation is covered at the county level, some implementation plans (*i.e.*, district and individual school plans) are still under development. Staff Ex. 23, at III-22.

1835. The Commission's emergency planning regulations provide that responsibilities for plan development and review and for distribution of emergency plans are to be established. The guidance set forth in NUREG-0654 suggests that each emergency response organization shall update its plan as needed, certify it to be current on an annual basis, and forward approved changes to organizations and individuals with responsibility for plan implementation. In addition, each plan is to include a detailed listing of supporting plans and their sources. While NUREG-0654 does not specify that implementing procedures (such as school evacuation plans) need be maintained on file by the county, it does recommend that a listing of such procedures be maintained and that the response organizations (*i.e.*, the school districts) be charged with that responsibility. Bath and Adler (2/23/81), ff. Tr. 18,975, at 55-56.

1836. In response to this guidance, Annex U of the Dauphin County Plan is a listing of "Supporting Plans and Implementing Procedures", which already includes one school district plan as on file at the Dauphin County EOC, and which apparently will list other school district plans as they are adopted. See Board Ex. 6, at U-1. In this respect, Dauphin County exceeds NUREG-0654 guidance by actually keeping the school plans on file in the county EOC rather than merely listing them in the county plan. Bath and Adler (2/23/81), ff. Tr. 18,975, at 55-56. The Dauphin County Plan specifically assigns responsibility to the Dauphin County Emergency Management Coordinator for ensuring that the county plan, and supporting plans, are updated annually. See Board Ex. 6, at 5. Cf., Commonwealth Ex. 2.a, at 26-27.

1837. Because of the importance of the supporting plans to the overall county plan, the Board ultimately agrees with the Commonwealth and the Combined Intervenors that written school district plans should be filed promptly. The extensive proposed findings filed on this issue are as follows:

Commonwealth proposed finding ¶ 66 and reply findings ¶¶ 13-16; Combined Intervenors proposed findings ¶¶ 86, 540, 558, 565(c); Staff proposed findings ¶¶ 260-68 and reply findings ¶¶ 29-33; and Licensee proposed findings ¶¶ 362-70 and reply findings ¶¶ 30-45.

1838. The revised York County Emergency Plan imposes upon school districts the responsibility to develop protective action plans for their students, to coordinate plans with their transportation resources, and to provide bus transportation for evacuating students. Board Ex. 5, at 0-1. Also included in the York County Plan are provisions to notify school district superintendents upon declaration of a Site Area Emergency or a

General Emergency to have them pre-position buses for use if evacuation is ordered and provisions in a General Emergency to directly notify bus companies. Board Ex. 5, at H-3, 0-2. The school districts themselves have existing procedures for bussing students during winter storms and other emergencies (Tr. 20,908 (Curry)) and, therefore, have existing mechanisms for notifying and mobilizing bus transportation resources. Thus, provision has been made through the revised York County Plan in conjunction with existing school district procedures to notify and mobilize school transportation resources, even in the absence of completed written school emergency plans.

1839. York County is developing a county master plan for the evacuation of schools, identifying relocation points and evacuation routes, and providing a general concept of operations. Evacuation destinations for all York County schools within the plume exposure pathway EPZ are listed in the current Annex O to the York County Plan. See Board Ex. 5, at O-4. York County has contacted local school district superintendents to coordinate the operational procedures implementing the county master plan. Bath, ff. Tr. 22,350, Attachment 3, at 5.

1840. Although the school plans are not yet complete, FEMA witness Bath and York County Coordinator Curry testified that the schools have the capacity to evacuate their populations. Tr. 22,430 (Bath); Tr. 20,908-09 (Curry). In this regard, provisions have been made to meet shortfalls in school buses through county resources. Tr. 22,430-31 (Bath). Some help may also be available from the Pennsylvania Department of Education, although the specific nature of the help available from this source is unclear. Tr. 20,862 (Belser). In regard to the absence of letters of agreement with school superintendents of school boards, it was the testimony of the FEMA witness that such letters are unnecessary since FEMA is "essentially seeking a school district plan" which would be superior to letters of agreement. Tr. 22,430 (Bath). Further, FEMA does not believe that specific letters of agreement are needed if the service or organization providing the service is a normal portion of government and that the services are the normal resources of that given organization. Tr. 19,216 (Bath). On the other hand, letters of agreement are necessary if the services are from private organizations, *i.e.*, private bus companies. Adler and Bath (3/16/81), ff. Tr. 18,975, at 35-36. FEMA anticipates that in an emergency available vehicles would be used to assist evacuation regardless of the status of existing documented agreements. *Id.*, at 36. The current York County Plan does include two letters of agreement from school districts outside the TMI plume exposure pathway EPZ, Spring Grove Area School District and South Eastern School District, indicating that the school districts would make buses and drivers available to York County in an emergency. See Board Ex. 5, at T-2, T-3. Such resources

could be used by the county transportation coordinator to supplement the buses provided by the school districts in the risk area for the evacuation of their students (See Board Ex. 5, Annex O) or could be used in the transportation of individuals without private transportation (see Board Ex. 5, Annex K).

1841. FEMA testified that the lack of individual school plans is a deficiency which should be corrected eventually and that additional planning on the issues of school evacuation and bus rerouting school be included in the York County Plan. Bath, ff. Tr. 22,350, Attachment 3, at 5; Adler and Bath (3/16/81), ff. Tr. 18,975, at 57. However, according to FEMA, individual school plans are not required for compliance with the Commission's emergency planning regulations. Tr. 22,401-02 (Bath). FEMA indicated that discussions between the York County Emergency Management Coordinator and the county school district superintendents, discussions with Pennsylvania Department of Education personnel, the progress being made in the development of school plans, and the historical capability of York County schools (as demonstrated in circumstances other than a nuclear emergency) to notify parents and bus drivers of unscheduled school closings provided assurance that — even in the absence of written school plans — York County schools within the risk area could be evacuated successfully. Tr. at 22,397 (Bath); see generally Tr. 20,908-09 (Curry); Tr. 19,411-13 (Pawlowski, Adler, Bath). For these reasons, the absence of written school plans did not preclude FEMA from making a finding of overall adequacy with respect to the plans of the Commonwealth and the risk counties. Tr. 22,687 (Dickey).

1842. However, this Board heard over and over from local citizens, not only those who intervened but those who made limited appearance statements (see, for example, Tr. 14,491-92 (Minnich); Tr. 15,507-08, 15,515-16 (Charles); Tr. 21,570 (Wentzel); Tr. 17,991 (Drazba)), the concern that in the absence of written school plans parents and school personnel would lack assurance that school children could and would be safely evacuated. In the view of this Board the very exercise of writing and coordinating such plans would cause to surface any weaknesses or inconsistencies which should be corrected. In essence the County Plan is merely the skeleton for which the school plans will provide the corpus. In this instance we were not sufficiently assured by the planning at the county level and our detailed examination of plans at the sub-county level also failed to provide sufficient assurance. Consequently, the Board finds that the lack of written generalized plans for each school district in the county is a deficiency which requires *prompt* correction prior to restart. We direct the Staff, preferably with FEMA's assistance, to certify to the Commission when written plans for each school district in the plume EPZ have been completed and reviewed for adequacy. Without these plans there is not

adequate assurance that school children could be or would be evacuated in a prompt and orderly manner. This sizeable segment of the population does not have the maturity, or the skills (such as driving), or the means to self-evacuate. We do not wish to see school children, in a radiological or any other emergency, at the mercy of oral agreements or *ad hoc* arrangements, however well intentioned.

8. Individuals Without Private Transportation

1843. The Board next reviews those contentions which address provisions for the transportation of individuals without private transportation in the event of an emergency at TMI. These contentions include:

Newberry Contention EP-16(G):

Appendix 8, Attachment 8-1, indicates that there are local pickup points for individuals who are without transportation. There is no indication within the Emergency Plan as now drafted that there will be police protection for people waiting at the pickup points in order to ensure security. Moreover, the pickup points as listed do not ensure that individuals who assemble at these points will be sheltered for their protection under some type of cover. Until or unless it is assured that there will be police protection provided and that sheltering will be provided, the Plan is deemed inadequate.

Newberry Contention EP-16(H)

Appendix 8, Attachment 8-2 of the Dauphin County Plan provides that local municipalities shall provide one personal lead vehicle to the E.O.C. Reception Area from the Staging Area. The problem with this particular part of the Plan is that there is no designation of who will be the person to lead vehicles to the E.O.C. Reception Area. Moreover, there is a candid admission that there is the chance that municipalities will hijack vehicles intended for other communities. Until and unless there is some type of security provided for incoming and outgoing units, the Plan shall remain deficient. Moreover, there is no provision in this Plan to provide for refueling of the incoming buses and ambulances and until and unless there is some indication of how refueling is going to take place, there is the risk that incoming buses and ambulances would run out of fuel and be rendered useless.

Newberry Contention EP-16(R)

The Dauphin County Plan as presently written envisions mass transportation vehicles to assemble at two staging areas. Upon arriving at the staging areas, the vehicles would then be dispatched to various areas to be led by community leaders. It is submitted that such a plan without the provision of security being placed on the buses and mass transportation vehicles does not ensure that said vehicles will be able to carry out their intended functions. It is submitted that more staging areas would be required in order to effectively deal with mass transportation and until and unless those local regionalized areas are stated in an emergency plan, all plans will remain deficient.

1844. Below we discuss points raised by the Combined Intervenors' proposed findings which disagree with the positions of the Staff and Licensee. Except for these, our overall findings in this section rely heavily on the Staff's proposed findings because we found them to be accurate, balanced and complete and in agreement with our findings.

1845. Newberry Contention EP-16(G) asserts a need for police protection and sheltering at the local pickup points for individuals in Dauphin County who are without private transportation. NUREG-0654, Planning Standard J, Criterion 10.G calls for provisions for evacuating persons without their own means of transportation. The criteria do not stipulate, however, that police protection be provided for such individuals. Adler and Bath (3/16/81), ff. Tr. 18,975, at 39. FEMA has testified that, in its experience with mass evacuations, security has not been a problem. *Id.* That experience includes toxic chemical spills requiring the evacuation of persons by buses from local pickup points. Tr. 19,427-48 (Pawlowski). There is no evidentiary basis for believing that security or crowd control will be a problem at pickup points and we find no planning deficiencies in the lack of explicit provisions for security in this regard.

1846. Similarly, there are no requirements or criteria calling for the provision of short-term shelter or cover for persons at pickup points, and lack of provision for such shelter is not a planning deficiency. Adler and Bath (3/16/81), ff. Tr. 18,975, at 39. We have been given no basis for finding to the contrary.

1847. In sum, we find no planning deficiencies in the Dauphin County Plan's failure to provide police protection or short-term shelter for pickup points for persons without their own means of transportation. Accordingly, we reject Contention EP-16(G).

1848. In regard to Contention EP-16(R), under the Dauphin County Emergency Plan, emergency transportation staging areas will be staffed with an overall coordinator, communications personnel, an incoming resource coordinator, an outgoing traffic dispatcher, a fuel coordinator and three traffic control assistants, giving substantial government presence at

each staging area. Adler and Bath (3/16/81), ff. Tr. 18,975, at 59; Board Ex. 6, at G-8. In addition, security for all Dauphin County emergency operations will be provided by state police and municipal police forces coordinated by the county emergency management coordinator. Curry, *et al.*, ff. Tr. 20,787, Wertz Testimony, at 2. Thus, there will be a highly visible governmental and law enforcement presence at the transportation staging areas and throughout the evacuation area, particularly along major evacuation routes. In these circumstances, we see no need for additional special security measures at staging areas or on emergency vehicles. FEMA has testified that it knows of no mass evacuations in which emergency vehicle security has been a serious problem. Adler and Bath (3/16/81), ff. Tr. 18,975, at 58-59.

1849. FEMA has evaluated the need for emergency vehicle staging areas in Dauphin County. From that evaluation, it concluded that the two staging areas selected by the County should be adequate. *Id.*, at 59. We have been given no evidentiary basis on which to disagree with FEMA's conclusion in this regard.

1850. In sum, we find no need for additional security measures for staging areas and mass transportation vehicles in Dauphin County and we find no need for the designation of additional staging areas. Consequently, the Board finds Newberry Contention EP-16(R) to be without merit.

1851. As to the lack of specific designations for lead vehicles operators (Contention EP-16(H)) the evidence shows that specific personnel may be selected to lead emergency vehicles to reception centers from among the municipal personnel available at the time of the evacuation, and that there is no need to predesignate such personnel in an emergency plan. The lack of such predesignation is, therefore, not a planning deficiency. Adler and Bath (3/16/81), ff. Tr. 18,975, at 40.

1852. We have previously addressed the matter of the need for additional emergency vehicle security. The source of the "candid admission that there is some chance that municipalities will hijack vehicles" is unknown, but FEMA, for its part, has indicated that the hijacking of emergency vehicles should not be a serious problem. From FEMA's experience, it is unaware of any disaster where such hijacking occurred, except in wartime, in which one government hijacked the vehicles of other governments to provide for evacuation or emergency services. *Id.*, at 40. We can ascertain no basis for concluding that emergency vehicle hijacking would be a problem in the event of an emergency at TMI. The record does not establish a need for additional security, above and beyond that already provided, in order to prevent the hijacking of emergency vehicles.

1853. Intervenors in their proposed findings ¶¶ 348-351 urged that the Board find the FEMA witnesses' testimony on these contentions unreliable and lacking in credibility because (1) "the data base [on which] the basic

assumptions of orderly behavior of cooperation and behavior in a mass evacuation/natural disaster situation does not include radiological disaster situations" (Tr. 19,245) and that such disasters "are at least potentially very different from other kinds of disaster." Erikson, ff. Tr. 21,686, at 2.

1854. We have discussed in detail this matter of differences between radiological and other emergencies in Section F. We find no evidence either from Licensee's witness, Dr. Dynes, or intervenor's witness, Dr. Erikson, which would support a finding that extra security would be necessary because of lawlessness such as hijacking, especially on the part of a municipality.

9. Transportation and Care of Invalids and Homebounds

1855. The Board considers next the contentions in the proceeding which challenge provisions for the transportation and care of invalids and homebounds in an evacuation:

ANGRY Contention EP-6(F):

The preparation of a "list of homebounds and invalids" and a plan for their evacuation (Annex J) and satisfaction of unmet "resource requirements" (Annex L) should be accomplished prior to TMI-1 restart.

Newberry Contention EP-14(I):

Appendix 2, Section III, Subsection (g) of the York County Plan indicates that the Area Agency on Aging should develop a system to identify the homebound and invalid personnel that require special transportation needs and coordinate a consolidated listing with the transportation group. Until and unless the Area Agency on Aging is directed to effect such a system, it is Intervenor's position that the York County Plan is deficient because, without such listing, there would be no way in which local communities could be assured that all invalids and homebound persons would be removed from an evacuation area.

Newberry Contention EP-14(C) (in part):

The Plan in Subsection (c) also assumes that homebounds and invalids will be able to be transmitted by means of ambulance and bus and that individuals with no transportation could request the same through local fire companies for bus pickup. The capabilities to effect such a plan within Newberry Township are nonexistent. For example,

Newberry Township has two ambulances that could be placed into service, assuming that a volunteer would operate the same. Local communities surrounding the Newberry Township area include Goldsboro Borough and Lewisberry Borough, each borough having an ambulance to effect evacuation of their homebounds and invalids. It is submitted that within the 34 mile square area that encompasses Newberry Township and the boroughs of Lewisberry, Goldsboro and York Haven that four (4) ambulances would not be sufficient to evacuate homebounds and invalids. Moreover, transportation through local fire companies will be impossible, as local fire chiefs have indicated that they could not guarantee that any personnel could or would effect such an evacuation service. Finally, it is submitted that if local volunteer fire companies cannot assure manpower staffing during a general emergency situation, that they cannot be again counted upon to provide transportation to designated areas for bus pickup for those individuals who are without transportation.

Newberry Contention EP-16(O):

The Dauphin County Plan indicates that it has a total need of approximately 600 ambulances for the evacuation of all members of the exposed populace and indicates only 45 are available. The Plan also indicates that it could obtain an additional 226 ambulances from outside the county, still leaving a shortfall of approximately 300 ambulances. There is no solution to the problem indicated in the Plan.

Newberry Contention EP-16(K):

Appendix 13 of Annex E of the Dauphin County Plan indicates that there are approximately 4,000 long-term patients that would require relocation in the event of a general evacuation. The Appendix also includes a listing of hospitals that would be amendable to accepting long-term patients in the event of an emergency. While the Plan indicates the total number of beds available at hospitals, there is no statement as to the number of beds which would be available on an average at any set time. Until and unless the Plan indicates the number of possible available beds that could be afforded to Dauphin County in the event of an emergency, it is submitted that the Plan is deficient.

1856. Contention EP-6(F) asserts that a plan for the evacuation of homebounds and invalids in York County must be prepared prior to the restart of TMI-1. ANGRY Contention EP-6(F) further asserts, as does Newberry Contention EP-14(I), that a list of homebounds and invalids

must be prepared, prior to restart, to facilitate such an evacuation. Newberry Contention EP-14(C) alleges, in part, a general inability to effect evacuation of homebounds and invalids due to an insufficient number of vehicles. The quoted portion of EP-14(C) further alleges that local fire companies will be unable to provide transportation to local pickup points for mass transportation due to a lack of personnel, implying that many firemen would themselves evacuate.

1857. NUREG-0654 recommends development of procedures for the protection of persons whose mobility is impaired. Adler and Bath (3/16/81), ff. Tr. 18,975, at 30, 53; Staff Ex. 7, at 61 (criterion J.10.d). Provisions for the transportation and care of invalids and homebounds in private York County residences within the TMI plume exposure pathway EPZ who would require medical-type transportation are specified in Annex J to the York County Plan. In passing, we note that there are no hospitals or nursing homes in the portion of York County within the TMI plume exposure pathway EPZ. Accordingly, no special provisions for the evacuation of such facilities are necessary in York County. See Board Ex. 5, at J-1 to J-8. Annex G to the York County Plan further provides that, if required, firemen will provide transportation to mass transportation pickup points for persons who cannot otherwise walk or travel to the pickup points. Board Ex. 5, at G-3. Thus, for York County, the responsibility to prepare and maintain lists of homebounds and invalids is placed on the municipalities (Board Ex. 5, at 8) and specifically on ambulance services and fire companies. Board Ex. 5, at J-1. The municipalities and fire and rescue units are to provide for the evacuation of homebounds and invalids with the county Health and Medical EOC section coordinating and providing for unmet transportation needs for this segment of the population. Board Ex. 5, at J-1, G-1. Contrary to the assertion in contention EP-14(I), the Area Agency on Aging is not assigned a responsibility to develop a system to identify homebounds and invalids.

1858. The current York County Plan charges ambulance services, with the support of the respective fire companies, with responsibility for maintaining current lists of non-ambulatory persons living in private residences in York County who would require transportation assistance in the event of an evacuation. See Board Ex. 5, at J-1. Each of the six municipal plans already adopted in York County — Dover Township, Goldsboro Borough, Lewisberry Borough, Manchester Township, Newberrytown and York Haven Borough — recognizes the responsibility to develop a list of homebounds and invalids in that each either includes the actual list of such persons in the plan or expressly states where the list is maintained. At present, the eight other municipalities within the York County risk area are developing their municipal plans. Bath, ff. Tr. 22,350, Attachment 3, at 3-4; Tr. at 22,384 (Bath). Those eight municipalities already have

compiled lists of homebounds and invalids which would enable them to identify individuals requiring special transportation in an emergency — even in the absence of detailed written plans. Tr. 22,384-85 (Bath); Tr. 20,937, 20,806 (Curry). As noted in Commonwealth proposed finding ¶ 56, however, *ad hoc* arrangements in the event of an emergency can result in substantial delays in evacuation. Staff Ex. 20, at 4.

1859. Moreover, the public information brochures distributed to York County residents in Fall 1980 requested that persons such as homebounds and invalids identify themselves to their local emergency management coordinator, so that special provisions can be made for their transportation in an evacuation. Adler and Bath (3/16/81), ff. Tr. 18,975, at 43, 53; Tr. 22,384-85, 19,438-39 (Bath); Commonwealth Ex. 5; Belser, *et al.*, ff. Tr. 20,787, at 6 (Curry). This provides further assurance that planning for the care of homebounds and invalids is ongoing at the municipal level.

1860. In these circumstances, the completion of written municipal plans for the transportation and care of homebounds and invalids in the York County risk area in an emergency is not required for operation of TMI-1. However in Section IV.H.14 below, we suggest that municipalities propose such written plan.

1861. We note again the Board's views that emergency planning activities at the sub-county level are essentially the business of the county and the subcategory thereof, in this case the municipalities, and that emergency planning for this group is necessary regardless of whether there is a nuclear plant nearby. Consequently, while we encourage and endorse written municipal plans we do not find that their absence severely flaws the county plans with respect to the evacuation of homebounds and invalids. The Board finds that at the County level mechanisms have been established for evacuating homebounds and invalids and consequently, we reject Contentions EP-6(F) and EP-14(I).

1862. Aside from questioning whether lists of homebounds and invalids exist, these contentions also challenge whether there are adequate vehicles to transport the homebounds and invalids. The York County Plan provides that the County Emergency Management Agency will coordinate the evacuation by ambulance of non-ambulatory persons from their homes. The plan already includes a complete listing of available ambulance services in York County. See Board Ex. 5, at J-1 to J-2 and J-6 to J-8. The County Emergency Management Agency will seek support from PEMA for any health and medical needs that cannot be met with these county resources. A County Emergency Management Agency Health and Medical Officer is specifically designated as having primary responsibility for this coordinating function. Tr. 18,546 (Cox).

1863. Thus, while it is possible that some municipalities in the plume EPZ for York County will have a shortage of locally available ambulances for the evacuation of homebounds and invalids, additional ambulances are available from beyond the risk area and a mechanism has been established in York County planning for the procurement and dispatch of additional ambulance resources to supplement those in risk municipalities.

1864. In addition, fire personnel will be available to supplement ambulance services, if necessary. See Board Ex. 5, at G-3. The thyroid prophylaxis agent KI will be distributed to the firemen. See Board Ex. 5, at G-2 to G-3. The fire companies in the risk area have agreed to remain in their respective municipalities as long as radiation levels permit, though their families will evacuate to areas outside the plume exposure pathway EPZ. In regard to the Board's view of willingness of firemen to perform their duties, see Section IV.B.3.

1865. The Board finds that the York County Emergency Plan provides an appropriate mechanism for augmenting any municipal transportation and personnel shortfalls for evacuating homebounds and invalids from the York County portion of the plume EPZ. Although shortfalls could exist in this regard, this mechanism provides assurance that such shortfalls can be met and that homebounds and invalids can be safely evacuated. Accordingly, we reject the portion of Contention EP-14(C) alleging inadequacies in the planning for the evacuation of homebounds and invalids.

1866. In sum, the Board rejects ANGRY Contention EP-6(F), Newberry Contention EP-14(I), and the quoted portion of Newberry Contention EP-14(C). In so doing, we do not mean to imply that further planning is unnecessary or undesirable, or that present plans are perfect. We do find that planning at the county level is adequate to support restart. FEMA will continue to monitor York County Planning to ensure that the plans of the eight remaining municipalities fulfill their responsibilities in this area. Bath, ff. Tr. 22,350, Attachment 3, at 3-4.

1867. Moving to the Dauphin County Plan, Newberry Contention EP-16(O) alleges that this plan indicates a need for 600 ambulances, and that only 45 are available within the county, plus 226 that could be obtained from outside the county, leaving a shortfall of approximately 300 ambulances. However, 600 ambulances is the number which Dauphin County identified, in an earlier version of its plan, as required for a 20 mile evacuation. Adler and Bath (3/16/81), ff. Tr. 18,975, at 42. The Dauphin County Emergency Management Coordinator testified that Dauphin County would need a total of 98 ambulances to support the current plan. Belser, *et al.*, ff. Tr. 20,787, at 9 (Wertz); Tr. 20,950 (Wertz).

1868. The current plan lists 48 Dauphin County ambulances (of which at least 22 will be available for use in evacuation). Board Ex. 6, at K-16; Tr. 20,950 (Wertz). Additionally, Dauphin County has identified 225

ambulances from counties north of Dauphin County that would be available to Dauphin County in an evacuation, though commitments have not yet been "firmed up". Tr. 20,950-51 (Wertz). FEMA expressed confidence that, by utilizing these identified resources and converting standard vehicles into make-shift ambulances (if necessary), a sufficient number of ambulances would be available to evacuate severely incapacitated persons within the Dauphin County risk area. Adler and Bath (3/16/81), ff. Tr. 18,975, at 42. Therefore, the ambulance shortfall for Dauphin County is not 300 ambulances, as asserted in the contention, but only on the order of about 50 to 75 ambulances and the ongoing planning for procuring supplemental resources for this limited shortfall should assure that the required resources will be available if needed. Accordingly, we reject Contention EP-16(O).

1869. As to the availability of facilities for relocating long-term medical care patients in Dauphin County, Contention EP-16(K) asserts that there are approximately 4000 "long term patients" that would require relocation in an evacuation, but is deficient in that while it includes a list of hospitals which would accept evacuated "long term patients", it does not indicate the average number of beds available at each of those facilities. Although it is true that the revised Dauphin County Emergency Plan does not provide an estimate of the average number of hospital beds available at any time at each relocation hospital, we do not find this to be a planning deficiency. The Dauphin County Emergency Plan lists all hospitals and long-term care facilities within the Dauphin County portion of the plume EPZ and their distances from TMI. Board Ex. 6, at Appendices 1, 6. The Plan also provides standby and alert actions for these facilities and for the designated relocation facilities. At the time of an emergency, the Dauphin County Medical Officer, in the EOC, will provide an up-to-date census by patient group at both sending and receiving facilities in order to match patients for evacuation to the available resources at the relocation facilities. Adler and Bath (2/23/81), ff. Tr. 18,975, at 28-29. A number of the designated relocation hospitals are members of a health care consortium which can provide a patient census update for these facilities immediately upon request. Board Ex. 6, Annex K, Appendices 4, 5.

1870. The Dauphin County Plan thus provides an established information system through which the county can determine hospital censuses within the EPZ and bed availability in hospitals outside the EPZ, in a timely manner and for the specific time when the need arises. As a practical matter, these figures vary from day to day, as does the seriousness of the medical conditions being treated. In these circumstances, a fixed number of available hospital beds simply cannot be established. Nevertheless, the Dauphin County Plan has established a system for determining hospital bed availability on any given day and for relocating

hospital patients based on needs that day. Moreover, the Commonwealth's Plan provides that, in addition to established hospitals, numerous packaged disaster hospitals can be erected if there is an insufficient number of available hospital beds. Accordingly, FEMA does not consider the failure of the Dauphin County Plan to identify the average number of hospital beds available for relocated hospital patients to be a defect in the plan. Bath and Adler (2/23/81), ff. Tr. 18,975, at 29-30; Commonwealth Ex. 2.a, Appendix N to Appendix 9. The Board agrees with FEMA and we reject Newberry Contention EP-16(K).

10. Post-Evacuation Support

1871. With respect to the adequacy of post-evacuation support procedures, six contentions raised issues pertaining to the adequacy of mass care sheltering, the need for auxiliary emergency power systems, the adequacy of lead time, the adequacy of the duration of the post-evacuation time period, and the need for the storage of evacuation support materials:

ECNP Contention EP-13:

The evacuation plans for Cumberland, York, and Lebanon Counties are based, at least in part on the assumption that many if not most, evacuees will stay with friends or relatives outside the evacuation zone. This assumption is highly questionable, since during the early days of the still-ongoing TMI-2 accident, after women and children were ordered out of the area within five miles of TMI, many tens of thousands of people outside this area themselves evacuated voluntarily. In the event of another accident at TMI which causes a twenty-mile evacuation, for which each of the five counties expresses preparedness, the resultant voluntary evacuations of persons beyond the 20 mile radius might well mean that there will remain no friends and/or relatives for the 20-mile evacuees to reside with temporarily.

Newberry Contention EP-16(L):

Appendix 14 of Annex E indicates that within a 5 mile radius there are 24,426 individuals who would require evacuation from the area and there is an assumption made that 50% of the individuals would require sheltering. The total number of positions available for sheltering in the Plan equals 6,800. There is an obvious deficiency in the number of sheltering site positions available within the County Plan and until and unless there can be some type of acceptable levels of sheltering, the Plan will remain deficient. Moreover, it is Intervenor's position that there is an error in the addition that appears

within this Appendix concerning the total capacity of the shelters and that the figure of 7,625 is in error. Furthermore, it is Intervenor's position that until and unless the Plan of Dauphin County indicates that there are auxiliary emergency power systems located in each one of the sheltering systems and emergency auxiliary heating systems at such sheltering locations, the Plan will remain deficient.

Newberry Contention EP-14 (EE):

The mass evacuation centers contained in the York County Plan do not state that the centers have auxiliary backup electrical power and heating plants in the event that they are placed into use. It is Intervenor's contention that, without such auxiliary power and heating systems, that the Plan is deficient in that evacuees would arrive either at a darkened or cold evacuation center.

Newberry Contention EP-16(A):

The Dauphin County Plan, in Section V, makes the assumption that persons evacuated from a risk area will only have to remain outside of the risk area for a period of three (3) days and that adequate lead time will be available to implement the provisions of the Plan. It is Intervenor's contention that a plan based upon these assumptions is inadequate based upon past experience. In the past it has been recognized that a five (5) day selective evacuation was ordered by the Governor of Pennsylvania and that basing an assumption upon a three (3) day sheltering is a defect within the Plan itself. Moreover, there is no definition as to adequate "lead time" and whether or not a definition of that term would mean a short period of time or a relatively long period of time, and until or unless the term is specifically defined, the Plan is deemed to be inadequate.

Newberry Contention EP-16(S):

The Dauphin County Plan is deficient in that there is no long-term management provision in the event of an evacuation which would last longer than three days. Without such long-term planning, there is a possibility and a probability that confusion would reign after an evacuation of three days and it is submitted that in the March, 1979 incident, the evacuation lasted for five days. Therefore, until and unless there is greater long-term management planning provided for in the emergency plan, the Plan remains deficient.

Newberry Contention EP-14(II):

The York County Plan provides that the American Red Cross would provide for distribution of certain foodstuffs, clothing, and other personal articles. There is no mention in the Plan whether the Red Cross would have at its disposal the estimated foodstuffs required to feed the evacuated population, the cots needed for the sheltered area and the evacuation centers. Until and unless the Plan contains the statement that these items are in storage and available for distribution, it is Intervenor's position that the Plan remains deficient.

1872. These six contentions question the adequacy of post-evacuation support procedures. These procedures are described in the five risk county emergency plans. *See* Board Ex. 5, Annex I; Board Ex. 6, Annex H; Board Ex. 7, Annex H; Board Ex. 8, Annex M; Board Ex. 9, Annex B. FEMA has reviewed the adequacy of post-evacuation support procedures and found them adequate. Staff Ex. 23, at III-22. In addition, both FEMA and the Commonwealth presented testimony on post-evacuation procedures and the listed ECNP and Newberry contentions. *See* Bath and Adler (2/23/81), ff. Tr. 18,975, at 44-45, 48, 50; Adler and Bath (3/16/81), ff. Tr. 18,975, at 38, 64; Lothrop, ff. Tr. 17,996, at 3.

1873. Findings on all of these contentions were submitted by both the Licensee and the Staff. Intervenor submitted no findings on those portions of the contentions which considered the adequacy of spaces with friends and relatives available to house persons who evacuated (EP-13) and the adequacy of spaces available in mass care centers (a portion of EP-16(L)). Therefore the Board relies most heavily on the Licensee and Staff findings in these two areas.

1874. Contentions EP-13 and EP-16(L) together, question whether there are enough shelter spaces available for those who evacuated the TMI vicinity, and whether there is adequate planning for heat and electricity at mass care centers.

1875. Disaster experience shows that mass care shelters are minimally used by evacuees who, almost universally, do not depend on such shelters. Tr. 17,136, 17,143 (Dynes). Specifically, surveys of over 100 disasters have shown that fewer than 20 percent of evacuees have utilized such shelters. Adler and Bath (2/23/81), ff. Tr. 18,975, at 49. The TMI-2 accident itself demonstrated that, although there were substantial numbers of evacuees, few public shelters were used. Adler and Bath (2/23/81), ff. Tr. 18,975, at 49. Seventy-four to 81 percent of persons who evacuated during the TMI-2 accident stayed with relatives and friends and the maximum number of persons at any mass care center on any day was 180, confirming that mass care centers are minimally used. Ziegler, ff. Tr. 21,818, at 9. The evidence establishes that the present planning to provide mass care centers for 50 percent of the evacuating population of the TMI plume EPZ

is conservative and should be more than adequate *Id.*, at 49-50; Lothrop, ff. Tr. 17,996, at 3. The figure in the Dauphin County Emergency Plan for 6,800 shelter positions, referenced in Contention EP-16(L), is for only one of eight reception centers planned by Dauphin County. Adler and Bath (2/23/81), ff. Tr. 18,975, at 50. The Dauphin County Emergency Plan identifies 64,000 shelter positions, which should be far above what will actually be needed. Curry, *et al.*, ff. Tr. 20,787, Wertz Testimony at 2. Accordingly, the Board finds no basis for the assertions that planning for the number of mass care positions is inadequate and we find such assertions in Contentions ECNP EP-13 and Newberry EP-16(L) to be without merit.

1876. Contention EP-16(L), in part, for Dauphin County and Contention EP-14(EE) for York County raise concerns about auxiliary emergency power systems. FEMA does not believe that auxiliary power and heating systems are necessary. Bath and Adler, ff. Tr. 18,975, at 51. We note that NUREG- 0654 does not call for the establishment of mass care centers in an emergency, nor does it stipulate that centers which are established must have emergency electric power and heating provisions. Adler and Bath (3/16/81) ff. Tr. 18,975, at 64; Adler and Bath (2/23/81), ff. Tr. 18,975, at 51. In the event that a mass care center experiences a loss of power, persons from the affected center would be relocated to an unaffected center. Moreover, in such circumstances, additional mass care centers could be established. Bath and Adler (2/23/81), ff. Tr. 18,975, at 51.

1877. Beyond that, if power were lost to certain mass care centers, it would also be lost to residents and commercial and industrial entities in the same area. In such circumstances, efforts to promptly restore power can be expected. *Id.* On balance, the Board simply finds no basis in the record for requiring emergency power and heating provisions for mass care centers. Thus, we reject those assertions in Newberry Contentions EP-16(L) and EP-14(EE) that such auxiliary electric and heating services should be provided.

1878. Newberry Contentions EP-16(A) and EP-16(S) assert that the Dauphin County Plan is inadequate due to its assumption that evacuees will be kept out of the evacuated area for only three days. Contention EP-16(A) also asserts that the lack of a specific lead time provision in the Dauphin County Plan renders the plan inadequate.

1879. Neither the NRC's emergency planning regulations nor NUREG-0654 stipulate any minimum time that must be planned for the exclusion of evacuees from the evacuated area. Adler and Bath (2/23/81), ff. Tr. 18,975, at 46. The basis for the three day evacuation under current planning for the TMI area is that evacuees can carry with them minimum life support elements (such as clothing and special medicines) sufficient to

sustain them for such a period without being overburdened by having to carry along the life support commodities needed for a much longer period of evacuation. Tr. 17,997-98 (Lothrop). If an evacuation lasts longer than three days, the three days currently planned for allows a sufficient and reasonable period of time to resupply essential needs to sustain evacuees beyond the three day period. Lothrop, ff. Tr. 17,996, at 3-4. As to the latter concern about specific lead time, the indication in the plan that some lead time will be needed to fully implement the plan is merely a reflection of the practical realities of emergency planning. Bath and Adler (2/23/81), ff. Tr. 18,975, at 45. For example, traffic control for evacuation requires the placement of police officers at traffic control points to assist in an orderly evacuation. Those police personnel are not in place now and it would take time to put them in place. However, the absence of those personnel for some period of time will not preclude successful evacuation. Similarly, the fact that a full and orderly implementation of the plan will require lead times for various parts of the plan will not prevent the plan from being implemented. Bath and Adler (2/23/81), ff. Tr. 18,975, at 45-46. We therefore reject the assertion that the lack of a specific lead time provision in the Dauphin County Plan renders the plan inadequate.

1880. In sum, the evidence indicates that planning for a three-day evacuation is adequate as a planning criterion, and that the lack of specifically expressed lead times will not lead to a disruption of planned emergency activities. Thus, the Board finds Newberry Contentions EP-16(A) and EP-16(S) to be without merit.

1881. Newberry Contention EP-14(II) asserts that the lack of a statement in the York County Plan on the availability of mass care resources, and, specifically, whether there is available to the American Red Cross emergency supplies sufficient to meet demands, renders the plan deficient. Further, in their proposed findings ¶¶ 367-371, the Combined Intervenors interpret FEMA's Interim Findings and Determinations of June 16, 1981, Attachment 1, to support the allegation that such supplies are not available or properly planned for, and that this constitutes serious deficiencies and shortcomings in this part of emergency planning. Combined Intervenors PF ¶ 367. Combined Intervenors proposed finding ¶ 368 reads:

FEMA noted that the Red Cross served as county mass care coordinators in most counties and recommended that "Alternate staffing should be considered" (Staff Ex. 20, at 27).

1882. FEMA noted that "The Red Cross provided the bulk of on-site services and were supported by RACES, and the County Government." FEMA does recommend that the County EOC mass care Coordinator not be the Red Cross representative because of differing missions and that the

Red Cross should serve in a supporting role, not a coordinating one. Staff Ex. 20, at 27, 31. It was solely in this context that the consideration of alternate staffing was mentioned.

1883. The Board recognizes that differing organizational missions may complicate the interaction between the Red Cross and governmental organizations. However, FEMA was not critical of the Red Cross operation and it appears from the FEMA Interim Report that the Red Cross and county governmental organizations worked well together.

1884. Combined Intervenors proposed findings ¶¶ 369 and 370 speak to the lack of available cots and blankets for mass care centers. FEMA recommends that the need for cots and blankets at mass care centers could be reduced greatly by informing evacuees to bring bedding with them. Staff Ex. 20, at 31. Also experience demonstrates that the Red Cross and county emergency management agencies together have consistently provided adequately for mass care facilities in actual disasters through resources that were on hand or borrowed. Adler and Bath, ff. Tr. 18,975, at 38-39.

1885. The Board believes that because of experience and possible simple solutions there is adequate assurance that sufficient supplies will be available during emergency operations. Combined Intervenors proposed finding ¶ 371 quotes accurately FEMA's recommendations that FEMA develop implementing instructions for obtaining food and other supplies from USDA and other resources. Staff Ex. 20, at 31. FEMA did find that, although the state had no plans for obtaining additional food, the state felt that it would present no problem as they could obtain it via the school feeding program, supplemented by volunteer agencies. Staff. Ex. 20, at 27.

1886. The Commonwealth's Emergency Plan sets forth criteria for the establishment of mass care centers and assigns responsibility for mass care support to the Red Cross in conjunction with host counties. Where mass care centers are located in schools, food supplies on hand are usually sufficient for immediate needs. Under York County planning, agreement has been reached for the procurement of additional food supplies through the Pennsylvania Department of Agriculture and the General Services Bureau of Government Donated Foods with the Red Cross authorized to make the necessary requests for foodstuffs. Board Ex. 5, at 1-15.

1887. In consideration of the above discussion, the Board finds that there is reasonable assurance that the mass care centers will be adequately supplied with food and other materials by the Red Cross, the state and other organizations and agencies. Therefore we reject Newberry Contention EP-14(II).

11. Medical Facilities and Decontamination

1888. Issues raised in regard to adequacy of state and local medical facilities and decontamination procedures included the adequacy of medical services for contaminated individuals, the training of medical personnel, the need for an inventory of medical supplies, the availability of adequate radiological monitoring equipment and proper training in its use, and the proposed location for decontamination areas. The six contentions dealing with these issues were as follows:

ANGRY Contention EP-6(A):

There is inadequate provision in the York County plan for providing medical services for contaminated individuals, for training persons providing these services, and for transporting radiological victims to medical facilities, all as required by N. 0654 Sec. L.

ECNP Contention EP-10:

Appendix D of the Plan contains reference to the need for the decontamination of radiologically contaminated individuals (p.16) but does not provide any information as to how many people may be contaminated, the kind and degree of contamination expected or to be planned for, or the number of facilities and medical personnel appropriately trained in decontamination and radiation injury treatment techniques which may be necessary.

Newberry Contention EP-14(JJ):

The York County Plan provides that there would be care provided for victims of radiation exposure; however, there is no statement that there are supplies on hand for radiation care or that there are sufficient numbers of supplies on hand to take care of a large mass evacuation in the event that there was a radiation leak. It is Intervenor's contention that, in order to provide sufficient medical care for the populace at risk, it is necessary that the Plan contain statements that inventories are available and are presently in place. Without such statement, the Plan remains defective.

Newberry Contention EP-14(K):

Appendix 3, Annex A, Situation Analysis group, of the York County Plan provides that it will support the State Bureau of Rad. Health with available personnel and equipment and that in the event of a general evacuation on request it will support fire and mass care operations with monitors for decontaminations. Nowhere in the Plan

does it state that the Situation Analysis Group will have the necessary equipment required in order to support the various bureaus and fire and mass care operations with the necessary equipment monitors for decontamination operations.

Newberry Contention EP-14(S) (in part):

The Plan also contains a concept that the county would distribute radiological monitoring equipment to individual fire companies to be monitored by the fire company personnel. There is no indication in the Plan that volunteer firemen have been trained to operate such equipment and there is no assurance that such equipment is presently located within the county for distribution. Until these deficiencies are resolved, it is Intervenor's position that the Plan is deficient.

Newberry Contention EP-14(Z):

The York County Plan provides for the decontamination of personnel and vehicles and Subsection C of that Plan provides that all vehicles passing through a designated reception center will be decontaminated and also that all vehicles that will be on major routes leaving the county will be decontaminated. The inclusion of this in the Emergency Plan of York County renders the Plan deficient and inoperable. It is Intervenor's position that, by decontaminating vehicles and personnel at the designated locations as set forth in the Plan will only cause the projected traffic flows to be severely diminished as a result of the decontamination. The Plan is deficient also because there is no projection as to the number of cars that would be able to travel on the evacuation routes after the initial jam-up occurs at the decontamination routes. In other words, the decontamination areas will provide a bottleneck for the evacuation of area residents out of risk areas that will effectively render the evacuation plan inoperable. Unless the decontamination points are removed to some other point besides the major evacuation arteries, it is submitted that the Plan is deficient.

1889. These six contentions question the adequacy of the state and local medical facilities and decontamination procedures for the area surrounding TMI-1. The medical facilities and decontamination procedures are described in the Commonwealth's Plan, at Appendix 9, pp. R-1 to R-27 and Appendix 16, and in the York County Plan at Annex R. Commonwealth Ex. 2.a; Board Ex. 5. FEMA reviewed the adequacy of the state and local medical facilities and decontamination procedures. Staff Ex. 23, at III-23 to III-25. In addition, both FEMA and the Commonwealth presented

direct testimony on medical facilities and decontamination procedures and the listed ANGRY, ECNP and Newberry Contentions. Bath and Adler (2-23-81), ff. Tr. 18,975, at 30-31 and 42-44; Adler and Bath (3-16-81), ff. Tr. 18,975, at 27-28, 31, 32-34 and 44-45; Cox, ff. Tr. 18,497, at 2. Proposed findings were submitted by the Licensee, the Staff, and the Combined Intervenors. Generally the Licensee and Staff urged the Board to find that adequate provisions have been made for medical facilities and decontamination, while intervenors' proposed findings dwelt on perceived serious deficiencies in these areas.

1890. ANGRY Contention EP-6(A) asserts that the York County Plan does not adequately provide for medical services for contaminated individuals or for their transportation to medical facilities. The contention further asserts that the plan does not adequately provide for the training of persons providing such services. The Board disagrees with these claims.

1891. Medical services for radiation victims in York County will be provided by the 18 primary support hospitals identified in the Commonwealth's Department of Health Plan as capable of providing medical care to contaminated persons. The revised York County Emergency Plan includes two hospitals from the State Plan which are proximate to TMI. Commonwealth Ex. 2.a, Appendix 9, at R-1, R-2; Belser, *et al.*, ff. Tr. 20,787, Curry Testimony at 1; Tr. 19,429-31 (Bath). The primary support hospitals for York County have hospital disaster plans with specific portions of the plans and procedures directed to the treatment of radiological accident victims. Belser, *et al.*, ff. Tr. 20,787, Curry Testimony at 1; Tr. 20,919-20 (Curry).

1892. Training is given to persons providing medical services under the auspices of the Pennsylvania Department of Health. Adler and Bath (3/16/81), ff. Tr. 18,975, at 27-28; Commonwealth, Ex. 2.a, Appendix 10, at 10-2, 10-3. The Pennsylvania Department of Health has provided specialized training in the treatment of contaminated individuals to its physicians and is now in the process of establishing radiation seminars for its nurses. Tr. 18,553-54 (Cox). The Emergency Medical Technicians receive training in such areas as initial treatment, triage, and transport of radiated patients. Tr. 18,554 (Cox); Commonwealth Ex. 2.a, Appendix 10, at 10-2. In addition, the Pennsylvania Department of Health has distributed to its medical personnel 100,000 booklets that provide instruction on radiation in medicine and industry, as well as NCRP Report No. 65, which provides instruction on the treatment of irradiated patients. We note that the Department of Health also has distributed these booklets to veterinarians, dentists and other allied health personnel. Tr. 18,554 (Cox). We therefore find that the state and local persons responsible for providing medical services receive adequate training.

1893. The York County Plan also has made adequate provisions for the transportation of contaminated individuals to these medical facilities by means of ambulance or other appropriate vehicle. Adler and Bath (3/16/81), ff. Tr. 18,975, at 28; Board Ex. 5, Annex J, at J-1 to J-2 and J-6 to J-8.

1894. In sum, the evidence shows that the revised York County Plan (supported by the Commonwealth's planning through the State Department of Health) adequately provides for local hospitals and medical services for persons exposed to radiation. Bath, ff. Tr. 22,350, Attachment 3, at 3. Thus, we find ANGRY Contention EP-6(A) to be without merit.

1895. With regard to Contention EP-10 it is true that while the Commonwealth has not provided a prediction of the number of individuals who might be contaminated in a radiological emergency at TMI, it is not clear that such a number could be meaningfully estimated and such an estimate and projections of the kind and degree of contamination expected²⁰³ are not called for in the regulatory guidance set forth in NUREG-0654. Adler and Bath (3/16/81), ff. Tr. 18,975, at 45. At the same time, the Commonwealth's Emergency Plan identifies 228 facilities that can provide decontamination and radiation treatment. In addition, the Commonwealth's Plan sets forth the number of medical personnel trained in decontamination and radiation treatment. Additional training in this regard has been developed by the Commonwealth and is now being given. Tr. 18,554 (Cox); Cox, ff. Tr. 18,497, at 2; Adler and Bath (3/16/81), ff. Tr. 18,975, at 45. In the event that the number of persons requiring radiation treatment exceeds the capacity of the Commonwealth's resources to provide such treatment, the U.S. Department of Energy (DOE)²⁰⁴ would be called upon for assistance. Adler and Bath (3/16/81), ff. Tr. 18,975, at 45. Through the Interagency Radiological Assistance Plan administered by DOE, physicians who practice radiation medicine are available to the Commonwealth. Tr. 18,174-75 (Reilly). Thus, we find that the Commonwealth has appropriately identified facilities and trained personnel for the treatment of radiologically contaminated and injured individuals and that federal assistance can be provided to the Commonwealth in caring for and treating radiological emergency victims if state resources prove to be inadequate. In these circumstances, the Board finds ECNP Contention EP-10 to be without merit and we reject it.

²⁰³ The evidence does indicate that the type of contamination to be expected would involve contamination from beta and gamma emitters. Adler and Bath (3/16/81), ff. Tr. 18,975, at 45.

²⁰⁴ Or, if applicable, its successor agency.

1896. Newberry Contention EP-14(JJ) alleges that, without an inventory of medical supplies on hand, the York County Plan is inadequate. Contrary to the assumption of Contention EP-14(JJ), it is the Commonwealth, under the Pennsylvania Department of Health plan, which is responsible for the overall coordination and provision of medical services and care, including necessary medical supplies. Bath and Adler (2/23/81), ff. Tr. 18,975, at 30; Commonwealth Ex. 2.a, Attachment 1, at 18-19. However, as Staff witnesses Bath and Adler explained, FEMA does not believe there is a need to provide specific inventories of medical supplies in emergency plans. Bath and Adler (2/23/81), ff. Tr. 18,975, at 31. In the event that persons receive large doses of radiation, they would receive specialized treatment at those medical facilities identified in the Commonwealth's plan which have the capability to provide such treatment. Tr. 19,340 (Bath); Commonwealth Ex. 2.a, Appendix 9, at R-1, R-2. For victims receiving significant but not large doses of radiation, initial care and treatment is normally limited to diagnostic treatment involving blood samples and other testing procedures. The medical supplies required for such procedures are routinely available at any hospital. Adler and Bath (2/23/81), ff. Tr. 18,975, at 30-31. Beyond this, state inventories of needed medical supplies may be relied upon in a radiological emergency as the Commonwealth's Department of Health's Emergency Plan specifically provides for the distribution of critical medical supplies by the Department of Health. Commonwealth Ex. 2.a, Appendix 9, §IX.C.4, at 12; §IX.C.7, at 13. In these circumstances, we find no deficiencies in the failure of the York County Emergency Plan to contain statements on the availability of emergency medical supplies. Thus, we reject Newberry Contention EP-14(JJ).

1897. Newberry Contention EP-14(K) asserts that the York County Plan fails to state that its emergency response units (*i.e.*, "Situation Analysis Group") have sufficient radiological monitoring equipment to perform assigned functions in the event of a general evacuation. We note that the revised York County Plan does not define a "Situation Analysis Group", *per se*, or assign responsibilities to it. In addition, under the revised planning, the County will not supply personnel or equipment for use by state bureaus or agencies for field monitoring in relation to accident assessment and dose projection but will rely upon BRP for that function. Board Ex. 5, at R-1, §II.A. Under the Commonwealth's planning, the counties are not expected to provide field monitoring teams for accident assessment and dose projection functions. Commonwealth Ex. 2.a, §VII.B.1.hh, at 28.

1898. The revised York County Plan provides that, upon the arrival of evacuees at mass care centers, trained radiological monitoring personnel will monitor and decontaminate evacuees and their possessions (including

vehicles) if advised to do so by BRP. Board Ex. 5, at R-3. The Plan itself sets forth the procedures to be used for personnel monitoring, including specific procedures for use of the monitoring equipment and criteria for determining whether contamination exists (Board Ex. 5, Annex R, Appendix 1), and procedures for decontaminating contaminated individuals (Board Ex. 5, Annex R, Appendix 5). The Plan also contains a specific listing of all radiation monitoring survey equipment on hand in the County. Board Ex. 5, Annex R, Appendix 6. Therefore, we find that the York County Emergency Plan does, in fact, provide reasonable assurance that the necessary monitoring equipment for decontamination operations at mass care centers will be available when needed.

1899. Newberry Contention EP-14(S) asserts that there is no indication that adequate radiological monitoring equipment has been distributed to fire companies in York County, and that firemen have been trained in the use of such equipment. To the contrary, evidence indicates that radiation monitoring survey equipment has been distributed to five fire companies within the TMI plume EPZ in York County and to 27 additional fire companies within 5 to 10 miles of the plume EPZ boundary in York County. Board Ex. 5, at R-17. Provisions also have been made for the distribution of 50 additional radiological survey meters from PEMA stockpiles if there is a need for additional equipment for monitoring at mass care centers. Board Ex. 5, at R-18. Thus, previously existing shortfalls in radiological monitoring survey equipment for the County have been eliminated. Bath, ff. Tr. 22,350, Attachment 3, at 4.

1900. As to training for personnel who will perform monitoring and decontamination functions at mass care centers, we note the York County Plan itself contains rather extensive and self-explanatory instructions on how to monitor individuals and the methods of decontamination. Board Ex. 5, Annex R, Appendices 1, 5. The Commonwealth's training program provides for the training of fire company personnel in the use of radiological monitoring equipment and extensive training has been provided to such personnel in the past in this regard by the U. S. Department of Transportation and by the Defense Civil Preparedness Agency. Adler and Bath (3/16/81) ff. Tr. 18,975, at 33. In addition, York County provides a home study training program for the use of radiological monitoring equipment. Belser, *et al.*, ff. Tr. 20,787, Curry Testimony, at 4. Extensive training has been conducted through this program and over 100 trained radiological monitoring personnel are now available for York County. Tr. 20,931 (Curry). From this we find that there is, indeed, assurance that personnel trained in the use of radiological monitoring survey equipment will be available for monitoring and decontamination functions at mass care centers.

1901. In sum, we find that York County planning has provided adequate quantities of radiological monitoring equipment and adequate numbers of personnel trained in its use to support the monitoring and decontamination of evacuees at mass care centers as called for by the York County Emergency Plan. Accordingly, the Board finds that the concerns expressed in Newberry Contentions EP-14(K) and EP-14(S) have been adequately resolved. We endorse further improvements in the training program (see Commonwealth proposed findings ¶¶ 78-81) but do not find that this Board needs to direct the Staff to certify that these have been accomplished prior to restart.

1902. Contrary to the assertion of Contention EP-14(Z) that vehicles evacuating the plume exposure pathway EPZ would be decontaminated at reception centers or on evacuation routes, decontamination would take place at York County mass care centers, all of which are located well beyond the outer boundary of the EPZ. Bath and Adler (2/23/81), ff. Tr. 18,975, at 43; Tr. 19,076 (Adler); Board Ex. 5, Annex R, at R-3, R-14. Provisions for monitoring and decontamination of vehicles upon arrival at the mass care centers, when so advised by the BRP, are described in the five risk county Radiological Response Plan sections on Radiological Control. Board Ex. 5, 6, 7, 8, and 9. Given this concept of operations, egress from the plume exposure pathway EPZ should in no way be affected. The mass care centers, where decontamination operations are planned, were selected to provide, among other things, sufficient parking for evacuees so that traffic congestion and bottlenecks at the centers will be avoided. Bath and Adler (2/23/81), ff. Tr. 18,975, at 44. Moreover, as the mass care centers are sufficiently distant from the EPZ boundary, any bottleneck that may develop at a center should be of little significance. The Board therefore rejects Newberry Contention EP-14(Z).

1903. While it is true that there is no provision in any of the new county plans for monitoring or decontaminating vehicles or persons leaving the risk area who do not choose to stop at the mass care centers, provisions for the decontamination of evacuation vehicles are not called for by the criteria of NUREG-0654. Board Ex. 5, 6, 7, 8, and 9; Adler and Bath (2/23/81), ff. Tr. 18,975, at 43.

1904. The Board's view is that mandatory monitoring and/or decontamination of all cars and persons exiting the EPZ has the potential for exacerbating traffic problems and unnecessarily prolonging an evacuation. If warranted, monitoring of some or all vehicles stopping at mass care centers could provide a sample which could indicate the extent of any vehicular contamination and thus the need for further protective actions, if any.

1905. A number of defects in the early York County Plan were remedied during the course of the proceeding, as noted in FEMA testimony. Bath, ff. Tr. 22,350, at 1-5. However, Combined Intervenors still were not assured that the plan was adequate, in part because York County did not participate in the exercise of June 2, 1981. Combined Intervenors PF ¶¶ 387-390. Combined Intervenors (PF ¶¶ 392-393) also pointed to possible deficiencies in distribution of dosimetry as noted by FEMA. FEMA testimony, ff. Tr. 22,350, at 4. We address these matters in Section IV.H.13.

12. Distribution and Administration of Potassium Iodide

1906. Several contentions challenged the adequacy of provisions for the distribution and administration of a radioprotective drug for the thyroid in the event of an emergency at TMI. These contentions are as follows:

ANGRY Contention EP-5(A):

The Commonwealth's plan for distribution of a thyroid blocking agent to persons at risk in the event of a nuclear accident with offsite radiological consequences (Pa. Dept. of Health RERP, App. I) is deficient for the following reasons:

1. The plan assumes an advance warning time (1 hour; p. 2) that is in excess of that which NUREG-0654 concludes may be available before an initial release of radioactive materials to the environment.
2. The postulated warning time is that which is deemed the minimum necessary to enable Dept. of Health officials "to move ahead of evacuees in their distribution efforts." However the plan is silent with respect to the much more critical time period that would actually elapse between the initial notification of the Commonwealth of an emergency situation and the availability to the public of the medication. ANGRY submits that given the logistics of the distribution process as set forth in the plan such a time period would be well in excess of one hour. The "assumption" stated in Sec. IVA(1), p. 13, of the distribution plan is unsupportable as a planning basis.

3. In the case of York County, the movement of large numbers of people to the single designated distribution point for the medication, the County Courthouse, would require complete departure from predetermined evacuation routes, particularly for residents of Fairview and northern Newberry Townships. It would also cause massive traffic congestion in the center of York City.
4. The plan would be useless in the event of a nuclear emergency for which sheltering was the chosen protective action. It is also useless to those farmers who "consider evacuation unfeasible and elect to seek or use sheltering for themselves . . ." (Pa. Dept. of Agriculture Plan, p. 17). The stated condition to the advice to "take prescribed dosage of SSKI" (Ex. 9 to App. 1, Sec. 3(c)), namely, its availability, would of course not be met under the plan as presently outlined.

For all the foregoing reasons ANGRY submits that the only method of distribution capable of insuring the availability of a thyroid blocking agent is its *pre-distribution* to all potentially affected households and businesses, and that such pre-distribution should be accomplished prior to the restart of TMI-1.

ANGRY Contention EP-6(E):

The provisions in the York County plan for thyroid blocking agent distribution (Annex A, App. 3, Health-Medical Operations) are not coordinated with the state plan.

Newberry Contention EP-14(M):

Appendix 3, Annex A, Health Medical Operations, provides that that group would be prepared to assist the State Department of Health in the distribution of thyroid blocking and other radiological health materials. Nowhere in the Plan is it stated that these materials are readily available and until and unless the Plan specifically designates that these materials are located within the York County area, it is Intervenor's contention that the Plan is deficient.

Newberry Contention EP-14(C) (in part):

Subsection (c) of this Plan also provides that a County Medical Officer will coordinate with the Pennsylvania Department of Health the distribution of thyroid blocking agents and other radiological health materials. The assumption is that these materials would be stored in an area in close proximity to the affected area without any

assurance that such thyroid blocking agents and other radiological health materials are even available and could be delivered to the Exit 6 area of I-83 within a timeframe that would be sufficient to effect the Plan.

1907. The Commonwealth's policy on the use of thyroid blocking agents, particularly potassium iodide (KI), is described in Appendix I to Appendix 9 of the Commonwealth's Plan. Commonwealth Ex. 2.a. The Staff, with FEMA, has reviewed the Commonwealth's policy. See Staff Ex. 6, at 21; Staff Ex. 23, at III-21, Staff Ex. 20, at 2, 23-25. In addition, the Commonwealth and FEMA presented testimony on the Commonwealth's policy on the use of KI and on ANGRY Contentions EP-5(A) and EP-6(E), as well as Newberry Contentions EP-14(M) and part of EP-14(C). See Cox, ff. Tr. 18,497, at 1; Bath and Adler (2/23/81), ff. Tr. 18,975, at 33-39, *as modified by* Attachment 3 to FEMA's Interim Findings and Determinations, ff. Tr. 22,350, at 1. The oral examination of these witnesses on the subject of KI appears primarily in the transcripts of April 9 and 15-17, and July 1 and 8, 1981, though other emergency planning witnesses were occasionally briefly examined on the subject. ANGRY presented the testimony of one witness on KI. See Beyea, ff. Tr. 18,350. The oral examination of Dr. Beyea appears in the April 9, 1981 transcript. Proposed findings were submitted by Licensee, Staff, Combined Intervenors, and the Commonwealth.

1908. These contentions concern the distribution and use of the radioactive drug KI during a radiological emergency.²⁰⁵ KI, if taken before radioiodines are ingested, can serve to substantially reduce the radiation dose to the thyroid by saturating the thyroid and blocking its uptake of radioiodine. Beyea, ff. Tr. 18,350, at 6; Commonwealth Ex. 2.a, Appendix 9, at I-1. Recognizing the effectiveness and usefulness of KI for thyroid

²⁰⁵ The Staff had raised a concern about the Licensee's provisions for the use of radioprotective drugs for emergency workers on-site and had recommended that the Licensee be required to establish provisions for stockpiling thyroid blocking drugs. Staff Ex. 6, at 30. The Licensee has, however, stockpiled sufficient thyroid blocking drugs on-site to sustain on-site emergency workers for several weeks and has developed guidelines for the use of the drugs. Tr. 14,626-27, 13,771-72 (Giangi). The Staff has confirmed the existence of a stockpile of KI for emergency workers on-site and of Licensee-approved procedures for use of the drug. Staff Ex. 23, at II-9. This matter has, thus, been resolved.

blocking in a radiation emergency, the U.S. Food and Drug Administration (FDA) invited submissions of "new drug applications" for KI in oral dosage forms for use in a radiation emergency²⁰⁶ and approved two "new drug applications" for the production of KI in tablet and in liquid form for use in a radiological emergency only.²⁰⁷

1909. Intervenors urge that prior to restart of Unit 1 KI should be predistributed to all residents of the plume EPZ for use in a radiological emergency. *Beyea*, ff. Tr. 18,350, at 6, 8-9. The Pennsylvania Department of Health, however, has established a policy that will limit distribution and use of KI to persons who cannot be evacuated quickly (*Cox*, ff. Tr. 18,497, at 1), specifically, members of off-site emergency response organizations operating within the plume EPZ (including policemen, firemen, ambulance personnel and emergency management personnel) and the staff and patients or residents of selected institutions within the plume EPZ (including those in hospitals, nursing homes and prisons). Commonwealth Ex. 2.a, Appendix 9, at I-3. Farmers will also be able to obtain KI, Commonwealth proposed finding ¶ 120. PEMA will store and maintain the KI for state agency personnel (with the exception of a few agencies to which it will be predistributed). KI also will be stockpiled at the local emergency response organizations and institutions listed above. *Bath and Adler* (2/23/81), ff. Tr. 18,975, at 34; Commonwealth Ex. 2.a, Appendix I to Appendix 9, at I-5 to I-9. The Commonwealth's policy on KI use was developed from considerations of the toxicity level of KI and the incidence of allergic and adverse reactions to it, concerns over the unauthorized use of KI by children if it were distributed to the general public, the shelf life of the drug, and its cost. Tr. 18,507, 18,516-17 (*Cox*); *Cox*, ff. Tr. 18,497, at 1. Counties within the plume EPZ for TMI have been requested to modify their emergency plans to reflect the Commonwealth's changed policy on KI use. Tr. 18,552 (*Cox*). Thus, we are faced with a state policy and plan for KI distribution which conflicts with the policy of distribution to the general public advocated by the intervenors.

1910. While the NRC's emergency planning regulations require that a range of protective actions be developed for the public in the plume EPZ (10 CFR 50.47)(b)(10)), they do not specifically require that protective actions for the public include the use of radioprotective drugs. Guidance in NUREG-0654 indicates that planning for protective actions should include

²⁰⁶ Potassium Iodide as a Thyroid-Blocking Agent in a Radiation Emergency, Request for Submissions of New Drug Applications and Notice of Availability of Labeling Guidelines, December 15, 1978, 43 Fed. Reg. 58798 (ff. Tr. 18,577).

²⁰⁷ Potassium Iodide for Thyroid Blocking in a Radiation Emergency Only; Approval and Availability, February 22, 1980, 45 Fed. Reg. 11912 (ff. Tr. 18,577). The approval was for KI "as a thyroid-blocking agent for use as directed by State or local public health authorities in the event of a radiation emergency only."

provisions for the use of radioprotective drugs, particularly for emergency workers and institutionalized persons within the plume EPZ, and that state and local emergency plans should include a method by which the state health department may decide whether to administer radioprotective drugs to the general public during an emergency. Staff Ex. 7, at 61, 63, Criteria J.10.e, J.10.f; Adler and Bath (2/23/81), ff. Tr. 18,975, at 33. This guidance does not impose mandatory requirements which must necessarily be followed in any particular emergency plan. We deem to be controlling in this regard the Commission's directions to the NRC Staff contained in a memorandum on thyroid blocking, dated March 26, 1981, from Samuel J. Chilk, Secretary of the Commission, to William J. Dircks, Executive Director for Operations.²⁰⁸ In that memorandum the Commission requested that the Staff continue to work with FEMA, FDA, and the Environmental Protection Agency to address uncertainties in the use of KI by the general public, along with possible alternative respiratory protection strategies. The Commission further indicated that the Staff was to continue to work on source term methodology studies then under way, that until the results of those studies are presented, the Commission will make no further decisions regarding the advisability of recommending the stockpiling of KI for the general public, and that, in the interim, the Staff should assure with FEMA that there is appropriate guidance for administration of KI before requiring implementation for certain institutionalized members of the public. Chilk Memorandum, ff. Tr. 20,394. This memorandum establishes, we believe, that use of KI by the general public is not a regulatory requirement and that the Commission has not yet determined whether such use is even advisable.

1911. In these circumstances, we cannot find fault with the Commonwealth's determination that radioprotective drugs will not be distributed or administered to the general public. The Commonwealth's policy was developed by the Department of Health, the state agency most directly responsible for providing for the health of citizens within the state, based on a detailed consideration of a number of factors including the potential for adverse and possibly serious reactions to KI by limited numbers of persons. Since the Commonwealth has made a predetermination that it will not distribute KI to the general public and has made detailed plans for the redistribution of KI to emergency workers and institutionalized persons, state planning is consistent with the guidance and criteria of NUREG-0654. Adler and Bath (2/23/81), ff. Tr. 18,975, at 34-35. Accordingly, we

²⁰⁸ Pursuant to an agreement of the parties, we have taken official notice of that memorandum as well as of then Chairman Hendrie's March 25, 1981 letters to the Director of FEMA and the Acting Commissioner of Food and Drugs at the FDA requesting studies and guidance from those agencies on the use of KI by the general public, ff. Tr. 20,394.

reject the intervenor's assertions that provision must be made, prior to restart, for administration of KI to the general public within the plume EPZ.

1912. The Commonwealth's Emergency Plan contains detailed provisions for the distribution of KI to state emergency response agencies and organizations (Commonwealth Ex. 2.a, App. 9, at I-5, I-6) and for predistribution to risk counties in the TMI plume EPZ. *Id.*, App. 9, at I-6 to I-9. Specific numbers of KI units to be distributed to Lancaster and Lebanon Counties are listed for each emergency organization and institution in those counties that are to receive KI. Although the current version of the State Department of Health's Emergency Plan does not contain similar explicit listings of KI doses for emergency response organizations and institutions in Cumberland, York, and Dauphin Counties, such lists have been completed and are set forth in the respective county plans. Tr. 22,420-21 (Bath); Board Ex. 5, at R-23 to R-28; Board Ex. 6, at N-22 to N-29; Board Ex. 8, at N-22, N-23. The State Plan also sets forth criteria for ordering the administration of KI to emergency workers and institutionalized persons and provisions for notifying all emergency response organizations and institutions as to when KI should be administered. Commonwealth Ex. 2.a, App. 9, at I-4, I-5.

1913. In Contention EP-5(A) “. . . ANGRY submits that the only method of distribution capable of insuring the availability of a thyroid blocking agent is its *pre-distribution* to all potentially affected households and businesses, and that such pre-distribution should be accomplished prior to the restart of TMI-1.” [Emphasis in original.] Both contentions EP-5(A) and EP-14(C) assert inadequacies in the planning for distribution of thyroid blocking drugs to the general public and were formulated and admitted as issues at a time when plans were indeed directed to such distribution. As previously discussed the Commonwealth has determined that it will not provide for the administration of thyroid blocking drugs to the general public. We have found the Commonwealth's policy in this regard to be consistent with NRC guidance and to be acceptable.

1914. Since thyroid blocking drugs will not be distributed to the public, the problems with regard to public distribution identified in these contentions will not exist. Thus, there is no need for lead time to effect distribution of KI to the public, evacuees will not be held up in their evacuation or directed to specific locations to obtain KI, and members of the public who have been advised to shelter will not be asked to leave shelters to obtain KI. Adler and Bath (2/23/81), ff. Tr. 18,975, at 37. In the same vein, there is no need for provisions in the York County Emergency Plan for the delivery of KI to public distribution points. *Id.*, at 38-39.

1915. The Board steps lightly in areas such as this one, where the Commonwealth has balanced the risks associated with exposure to radioiodine against factors such as the incidence of allergic and adverse reactions to KI, the logistical problems of KI administration, and the availability of other protective action options, and has made a public health policy decision at the state level not to provide for the distribution of KI to the general public in the event of a radiological emergency. See generally Tr. 18,509, 18,527, 18,536 (Smith). We are also sensitive — in a general way — to the present uncertainties as to the amount of radioiodine which would be released in an accident and the toxicity of radioiodine to the thyroid.²⁰⁹ Even based on our own independent consideration of the cited factors — particularly the potential side effects and adverse and allergic reactions to KI — we are not inclined to overrule the Commonwealth's public health policy decision and order that provisions be made for the distribution of KI to the general public in the event of an emergency. The case against the *predistribution* of KI to the general public is even more compelling. Accordingly, we find ANGRY Contention EP-5(A) and that portion of Newberry Contention EP-14(C) directed to the distribution of KI to be without merit.

1916. ANGRY Contention EP-6(E) asserts that the provisions of the York County Plan for KI distribution are not coordinated with the provisions of the Commonwealth Plan. With the revision of state policy on the distribution and use of KI, a revised KI distribution plan was developed by the Commonwealth and coordinated with the risk counties. Cox, ff. Tr. 18,497, at 1. In turn, KI distribution plans for the risk counties, including York County, were revised and are not wholly consistent with the State

²⁰⁹ Given these uncertainties, which impact the *need for* for KI, we note also that there are significant costs associated with KI. The Commonwealth estimates the cost of KI at approximately 75 cents per unit (14 tablets). Using that figure, the total cost to administer one unit of KI to each person within the TMI plume exposure pathway EPZ would be approximately \$105,000. Tr. 18,512 (Cox). Nor would the cost represent a one-time expenditure, since Thyro-Block has a shelf life of only two years. Cox, ff. Tr. 18,497, at 1; Commonwealth Ex. 2.a, Appendix 1 to Appendix 9, at p. 1-2. Dr. Beyea disputes the cost figures used by the dix 9, at p. 1-2. Dr. Beyea disputes the cost figures used by the Commonwealth. See Beyea, ff. Tr. 18,350, at 11. However, Dr. Beyea's figures are based on extrapolations from the cost of the KI program in Sweden, whereas the Commonwealth's figures are based on price quotations from the company which actually sells Thyro-Block in the U. S. Compare Beyea, ff. Tr. 18,350, at 10-11, and Tr. 18,424 (Beyea) with Tr. 18,512 (Cox). These differences in cost figures matter little to the Board. While we cannot completely disregard the cost of KI as a factor in our decision, we accord little weight to that consideration and instead rest our decision on the other factors discussed.

Emergency Plan provisions for KI distribution. Tr. 20,797 (Curry); Bath, ff. Tr. 22,350, Attachment 3, at 1. The Board, therefore, finds ANGRY Contention EP-6(E) to be without merit and we reject it.

1917. Newberry Contention EP-14(M) asserts that the York County Plan is deficient in that it does not expressly provide for the stockpiling of KI in York County. Under the revised State and York County Emergency Plans, KI will be predistributed in predetermined amounts to the York County Plans, Management Agency, to the emergency management agencies of each of the 14 municipalities within the York County portion of the TMI plume EPZ, and to 16 fire companies, 12 ambulance services, and 11 police departments in the plume EPZ for York County. Commonwealth Ex. 2.a, Appendix 9, at I-9, Board Ex. 5, at R-23 to R-28. With such predistribution, State assistance in the actual physical distribution of KI in York County during an emergency is not necessary.

1918. Although the Department of Health's Emergency Plan states that KI was to be predistributed to the counties by June 1981 (Commonwealth Ex. 2.a, Appendix 9, at I-6), the Commonwealth has experienced difficulties in procuring KI in suitable form and we have no evidence indicating that predistribution to the counties has yet been accomplished. As reflected in the Commonwealth's Plan, the State had originally planned to procure KI in tablet form. Subsequent planning to obtain the drug in liquid form was abandoned and the Commonwealth is now seeking to procure KI in tablet form for distribution in accordance with the State's Emergency Plan provisions. Tr. 22,767 (Adler). The KI currently available in tablet form has a shelf life which expires on December 31, 1981 although that shelf life may be extended. Tr. 22,768 (Adler). The Commonwealth has every intention of securing KI in tablet form and is continuing its efforts to do so. Bath, ff. Tr. 22,350, Attachment 3, at 1. We are confident that the Commonwealth will continue in its efforts to procure KI until suitable KI is obtained at which time it will predistribute the drug in accordance with the provisions of the Commonwealth's Emergency Plan and forthcoming FDA guidance. At this time, however, we find no deficiencies in the York County Plan for its failure to state that thyroid blocking drugs are located within the York County area. Thus, we reject Newberry Contention EP-14(M). However, Board suggests that the Commission direct the NRC Staff to notify it within one year following any restart whether predistribution of KI has been accomplished in accordance with the Commonwealth and county plans.

13. Farmers and Livestock

1919. Five contentions litigated in the proceeding related generally to the adequacy of emergency planning and preparedness to protect farmers and livestock:

Aamodt Contention EP-2:

It is contended that present evacuation plans do not provide for care and/or relocation of livestock. It is further contended that such provision should be made before restart of TMI-1.

ANGRY Contention EP-4(A):

There is no provision in the EP for the prevention of damage to property (e.g., livestock) in the area surrounding the plant site as required by Appendix E to 10 CFR §§II(C), III, and IV(C).

ANGRY Contention EP-5(G):

the Commonwealth's Dept. of Agriculture Plan is inadequate for the reason that it provides no information on measures for the self-protection of farm personnel who "consider an evacuation unfeasible and elect to seek or use sheltering for themselves . . ." (p.17). The plan offers the farmer no choice between the two extremes of exposing himself to potentially dangerous levels of radiation or complete abandonment of his investment in his livestock.

Newberry Contention EP-14(BB):

Annex R of the York County Plan does not provide for any evacuation of domestic farm animals and until and unless the Plan does provide for a plan of evacuation, the Plan remains deficient. Domestic farm animals cannot be left for any period of time without human care and attention and, therefore, it is assumed that farmers who have such large investments in livestock will not leave their investment unattended and, thus, they are left at risk. Moreover, the agricultural part of the York County Plan provides that the County Emergency Management Agency Director will charge and distribute dosimeters for agricultural personnel who are required to enter the designated risk area but does not state who will provide the dosimeters and who will interpret the dosimeter readings. Until and unless these two facets of the York County Plan are remedied, it is Intervenor's contention that the Plan remains deficient.

ANGRY Contention EP-6(G):

The York County Fairgrounds is an inappropriate location for the agricultural "Information Center" (Annex R, Sec. IVF) since it is within the 20-mile distance from the plant to which under the plan's assumptions a total evacuation may be required. The provision establishing this center fails to provide also for the necessary predetermination by farmers wishing to avail themselves of its services of the nature and timing of the "essential functions" for their farms, the number of persons needed to perform such functions, and the identity of such persons. Dissemination of information concerning this program and the compiling of information provided in response thereto should be accomplished prior to TMI-1 restart.

1920. Proposed findings on these contentions were submitted by the Licensee and Staff. In addition, intervenors ANGRY, Newberry Township and the Aamodts submitted proposed findings on this particular group of contentions. The Commonwealth submitted one proposed finding on this issue (§ 120).

1921. The Aamodts, in general, adopt the findings of ANGRY and Newberry Township that relate to their contention. Aamodt PF § 2. However, the Board has reviewed the findings which the Aamodts use to supplement and emphasize the intervenors' case and find them to contain incorrect citations, incorrect statements and misleading extrapolations from the testimony. These supplemental findings generally track the subjects of those of the other intervenors. The major areas covered are (1) planning for evacuation of animals, (2) consideration of costs and effectiveness of sheltering of animals, (3) radiological and non-radiological health hazards to animals which are not evacuated, (4) the dilemma of farmers as to whether or not to leave their animals, (5) the potential impact on the families of farmers, (6) cost and value of animals in the TMI area and of their evacuation, (7) planning by the Commonwealth and the five counties in the area in regard to handling livestock, and (8) knowledge of radiation protection by county agents and communications problems among farmers and county agents. The Board agrees with the Staff in its characterization of the Aamodt findings (Staff Reply PF §§ 44-45), *i.e.*, to a substantial degree these proposed findings of fact are largely unsupported by evidence of record.

1922. The Commonwealth's Plan and the five county plans include sections addressing the particular problems posed by farmers and livestock in the event of an emergency at TMI-1. See Commonwealth Ex. 2.a, Appendix 7; Board Ex. 5, Annex N; Board Ex. 6, Annex O; Board Ex. 7, Annex O; Board Ex. 8, Annex K; Board Ex. 9, Annex K. In addition, the NRC Staff and FEMA presented testimony on the listed contentions. See Chesnut, ff. Tr. 15,007, at 66-68; Bath and Adler (2/23/81), ff. Tr.

18,975, at 47-48; Adler and Bath (3/16/81), ff. Tr. 18,975, at 49-51, 63. The Commonwealth presented prepared testimony on a number of the listed contentions (see Van Buskirk and Cable, ff. Tr. 18,296) and also presented a witness to generally address the Commonwealth's Agriculture Plan, though that witness did not sponsor prepared testimony. See Tr. 18,831-95 (Furrer). The Commonwealth on behalf of the Board also presented testimony through a panel including the Emergency Management Coordinators of Dauphin and York Counties, which addressed, *inter alia*, the general subject of these contentions. See Belser, *et al.*, ff. Tr. 20,787. The Aamodts presented testimony from local farmers, veterinarians, and county agricultural agents on their Contention EP-2. See Lytle, *et al.*, ff. Tr. 18,749; Weber, ff. Tr. 18,799 (including oral testimony of Samples and Weber, beginning at Tr. 18,755); and Stewart and Smith, ff. Tr. 20,243²¹⁰ Oral examination of these witnesses, and others, on the general topics raised in the listed contentions appears in the transcripts of March 10 and 24, April 7 and 8, 14 through 16, 24 and 29, and May 1, 1981.

1923. Aamodt Contention EP-2 and Newberry Contention EP-14(BB) (a York County Plan contention) primarily focus on the lack of plans for evacuation of livestock in the event of a radiological emergency. ANGRY Contention EP-4(A) asserts that Licensee's emergency plan fails to comply with specified provisions of the Commission's emergency planning regulations, in that the plan does not provide for the prevention of damage of property *e.g.*, livestock). The parts of 10 CFR Part 50, Appendix E, cited in the contention — Sections II(C), III and IV(C) — do not require that emergency plans provide for the protection of property in areas surrounding a plant site. The cited sections deal with information needed in the Preliminary Safety Analysis Report at the construction permit stage, information needed in the Final Safety Analysis Report at the operating license stage, and emergency plan provisions for activation of the emergency organization, respectively. None of these provisions relate in any way to requirements for the protection of property. Chesnut, ff. Tr. 15,007, at

²¹⁰ Mr. Stewart and Mr. Smith are the County Agricultural Agents of Dauphin and York Counties, respectively. Stewart and Smith, ff. Tr. 20,243. They testified in this proceeding under subpoena of the Board, issued upon motion of the Aamodts. Tr. 17,985-88 (Chairman Smith).

66-67. Newberry Contention EP-14(BB) further suggests, as does ANGRY Contention EP-5(G), that farmers may refuse to leave their livestock. For this reason, Contention EP-5(G) asserts that the Commonwealth's Plan should provide information on "measures for the self-protection of farm personnel" who refuse to evacuate.²¹¹ Newberry Contention EP-14(BB) also alleges that, though the York County Plan provides for the charging and distribution of dosimeters for agricultural personnel who enter the risk area, the Plan does not state who will provide and interpret the dosimeters, and is defective in that respect.

1924. At the outset, with regard to Contentions EP-2 and EP-4(A), we are constrained to note that the NRC's new emergency planning rules and guidance are directed to measures to protect public health and safety and do not require explicit planning for the protection of property.²¹² As shown in the Statements of Consideration accompanying the new emergency planning rules, the Commission had considered imposing regulations requiring an outline of "corrective measures to prevent damage to onsite and offsite property".²¹³ The Commission determined not to impose such requirements "because public health and safety should take clear precedence over actions to protect property. Measures to protect property can be taken on an *ad hoc* basis as resources become available after an accident." 45 Fed. Reg. 55402, 55407. Consistent with this, the Licensee, Commonwealth and five risk county emergency plans are primarily oriented toward protecting the health and safety of the general public rather than property (Rogan, *et al.*, ff. Tr. 13,756, at 113) and the absence from any plan of specific provisions which will assure the protection of property, including the evacuation livestock, is not a planning deficiency or defect. Chesnut, ff. Tr. 15,007, at 67-68; Adler and Bath (3/16/81), ff. Tr. 18,975, at 50.

1925. Nevertheless, extensive information on measures that may be taken to protect animals and livestock is presented in the Pennsylvania Department of Agriculture's Plan. Rogan, *et al.*, ff. Tr. 13,756, at 113; Commonwealth Ex. 2.a, Appendix 7. The pending Plan of the Department of Agriculture allows farmers to remain on their farms to care for their livestock during a general evacuation, to evacuate themselves and their

²¹¹ Contrary to the assertions in this contention, information on self-protection of farm personnel is contained in Section V of the Pennsylvania Department of Agriculture's Plan which specifically discusses evacuation, sheltering and protective action selection for farm operators. Commonwealth Ex. 2.a, Appendix 7, Section V, at 15-17.

²¹² The reference in Contention EP-4(A) to parts of Appendix E to 10 CFR Part 50 is misplaced. None of the referenced sections in the new Appendix E, which became effective on November 3, 1980, relate in any way to requirements for the protection of property. Chesnut, ff. Tr. 15,007, at 67.

²¹³ Emergency Planning - Final Rule, 45 Fed. Reg. 55402, 55407 (August 19, 1980).

families, leaving their livestock behind and notifying the country agricultural agent of the situation, or to evacuate livestock if the livestock is not diseased. Tr. 18,845-46 (Furrer).²¹⁴

1926. Beyond this, we do not agree with the assertion that farmers are left with the choice of two extremes — exposing themselves to radiation or abandoning their investments in their livestock.²¹⁵ Protective measures in the form of sheltering are available to farmers. Commonwealth Ex. 2.a, Appendix 7, at 15-17. In addition, we have previously discussed the arrangements that can be made to provide care for livestock in the event that the farmer decides to evacuate. Such arrangements for care can help to preserve livestock left behind by evacuating farmers and thus reduce the potential loss of his investment in his livestock.

1927. General guidance to the farmer for the protection of his livestock and poultry is set forth in Annex B to the Department of Agriculture's Plan. This information, designed in the form of reproducible fact sheets, as well as information on the protection of food in Appendix 7 of the Department of Agriculture's Plan, was to be distributed by the State Department of Agriculture to all farmers within the TMI plume emergency planning zone by about mid-July of 1981. Tr. 20,421-22 (Furrer). The guidance on the protection of livestock emphasizes sheltering of livestock and the use of stored feed and water in the event of a radiological emergency (Van Buskirk and Cable, ff. Tr. 18,296, at 1), providing information on suitable shelters, radiation attenuation factors from various types of shelters, measures to augment sheltering capabilities, priorities for sheltering certain types of livestock, required space and ventilation for sheltered livestock, measures to provide protected feed and water to sheltered livestock, and specific measures for the protection of dairy cows, beef

²¹⁴ The Commonwealth has somewhat changed its approach towards farmers and the protection of livestock. Farmers with livestock will be treated as emergency workers during any fixed nuclear facility incident. Before restart, the state and county plans will include provisions for the distribution of dosimetry and potassium iodide (KI) to farmers as needed during an emergency. The dosimetry and KI will not be pre-distributed to individual farms; supplies adequate to equip one emergency worker per farm will be pre-distributed to the county level. Farmers will be given the opportunity to obtain training at the local level regarding use of the dosimetry equipment. Commonwealth PF ¶ 120. This change is not part of the record, but was part of the Commonwealth's Proposed Findings on Emergency Planning Issues. The Board welcomes this initiative by the Commonwealth, and trusts that it will relieve some concerns of the intervenors. As will be noted, however, this action does not alter the Board's findings in this subject area.

²¹⁵ Farmers from the TMI area testified that the State Department of Agriculture's plan to arrange for care of livestock would be a consideration in the farmers' decision as to whether they themselves would evacuate in an emergency. Tr. 18,728 (Lytle); Tr. 18,730 (V. Fisher). It seems clear from note 214 by the limitations on the availability of KI to returning farm workers and the opportunity for farmer training in the use of dosimetry equipment that the overriding factor remains health and safety and not property consideration.

cattle, sheep, swine and poultry. Commonwealth Ex. 2.a, Appendix 7, Annex B, at 4-21. Testimony from several farmers and local veterinarians who reviewed the guidance provided in the Department of Agriculture's Plan indicates that various recommendations related to sheltering may not be practical for all farms in the TMI area. Tr. 18,738 (Lytle); Tr. 18,766-67 (Samples). The Department of Agriculture itself admits that it may be impractical, if not impossible, to provide shelter and care for all livestock. Commonwealth Ex. 2.a, Appendix 7, Annex B, at 6. Nevertheless, we find that guidance has been provided which should allow farmers to provide some form of sheltering protection for their livestock in the event of a radiological emergency.²¹⁶

1928. Further guidance advises farmers to report their status and the status of their livestock to the county agricultural agents or county emergency management agencies if a precautionary evacuation advisory is issued to the public. Van Buskirk and Cable, ff. Tr. 18,296, at 2. Although the Commonwealth's planning does not provide a means for the evacuation of livestock (*id.*, at 3; Adler and Bath (3/16/81), ff. Tr. 18,975, at 50),²¹⁷ it does provide a means whereby evacuating farmers may arrange for assistance in caring for livestock left behind. Van Buskirk and Cable, ff. Tr. 18,296, at 2; Tr. 18,883-84 (Furrer). Such assistance would be arranged through the county agricultural emergency boards, the U.S. Department of Agriculture, and the State Department of Agriculture which itself has 57 officers throughout the State, most of whom are farmers, who could be diverted to provide assistance in an emergency. Tr. 18,853, 18,850-51 (Furrer); Tr. 18,302-303 (Cable).

1929. The county agricultural agents (emergency workers) will work closely with evacuated farmers to provide for their earliest return to their property and livestock. Bath and Adler (2/23/81), ff. Tr. 18,975, at 48. Depending on conditions, the farmers may be allowed to return to their livestock for maintenance purposes during the period of general public evacuation; and travel within the plume exposure pathway EPZ for livestock care will be controlled by local officials, based on local conditions.

²¹⁶ Provision has been made for notifying farmers of the need to shelter livestock through prepared EBS messages to be broadcast during an emergency. Adler and Bath (3/16/81), ff. Tr. 18,975, at 50.

²¹⁷ Farmers may evacuate their herds without prior authorization from the Commonwealth provided that the herd has not been quarantined. Tr. 18,314 (Van Buskirk). Although the evidence indicates that it probably will not be possible to evacuate all herds in the TMI plume EPZ on short notice, such an evacuation could be accomplished over a period of several days. Tr. 18,822-23 (Weber). In this regard, there are a number of commercial livestock haulers in the TMI area and many local farmers have their own livestock trucks that can be used to relocate a limited number of livestock. Tr. 20,234 (Stewart). Thus, the means for a limited evacuation of livestock (possibly of the most valuable livestock on specific farms) exist, even on short notice.

Adler and Bath (3/16/81), ff. Tr. 18,975, at 51; Tr. 18,333 (Van Buskirk). Thus, while evacuation of livestock has not been provided for, provision has been made as conditions permit for arranging for emergency care for livestock left behind by evacuating farmers. We do not find failure to provide a means for evacuating all livestock in the plume EPZ to be a planning deficiency.

1930. Should the assessment of the incident indicate that the evacuation of the public will continue for a protracted period and that accumulated doses will be a health hazard to the farm operators, assistance can be arranged in caring for the farmers' livestock. Should the assessment of the incident indicate that the accumulated doses will be a hazard to the livestock, a decision may be made to permit farm operators on an individual case-by-case basis to relocate livestock. Van Buskirk and Cable, ff. Tr. 18,296, at 2. *See* note 217, *supra*.

1931. In sum, although there is no way to guarantee the safety of livestock, we find that there are sufficient options and guidance for care and maintenance of these animals to reduce damage to them in the event of an emergency. Therefore, the Board rejects Aamodt Contention EP-2 and ANGRY Contention EP-4(A).

1932. The information on measures for self-protection of farm personnel using sheltering is the same as that provided to the population at risk in the exposure zone. Van Buskirk and Cable, ff. Tr. 18,296, at 4. In this regard, we have previously addressed in some detail the emergency information pamphlets prepared by the Commonwealth and the five counties within the TMI plume EPZ as well as the Licensee's commitment to distribute those pamphlets to all residents of the plume EPZ. Through this means, farmers in the area should have access to necessary information on protecting themselves and their families in a radiological emergency. In addition, the county agricultural agent, an emergency worker, will work closely with farmers during an emergency, providing advice on self-protection as well as advice on measures to protect livestock. Adler and Bath (2/23/81), ff. Tr. 18,975, at 47-48. Also, as previously mentioned, information on the protection of foodstuffs and use of contaminated food, as set forth in the Department of Agriculture's plan, is also to be distributed to farmers in the TMI plume EPZ. In this regard, State milk sanitarians will contact dairy farmers in an emergency to provide information on the possible contamination of milk (Tr. 20,407 (Fouse)) and farmers who get their milk from their own cows will be similarly advised. Tr. 20,417-18 (Fouse). Therefore, we find that sufficient measures have been taken to provide farmers with information and advice on self-protection in a radiological emergency contrary to the intervenors' assertions in ANGRY Contention EP-5(G).

1933. The concerns about the provision of dosimetry to agricultural personnel raised in Newberry Contention EP-14(BB) are addressed by the sections of the current York County Plan providing for dosimetry for emergency workers. The county emergency management agency will provide self-reading dosimeters and dose record cards to agricultural emergency workers who may be required to survey the risk area to assess the effects of the accident on the ingestion pathway. Adler and Bath (3/16/81), ff. Tr. 18,975, at 51; Board Ex. 5, at R-2 to R-3, R-10 to R-12.

1934. We have previously addressed the fact that existing emergency plans do not provide for the evacuation of livestock. We have also discussed the information provided to the farmer on how he can protect himself and his farm animals in the event of a radiological emergency. Protective measures for farm animals are available, and, together with arrangements for continuing care for farm animals, can serve to reduce losses of animals left behind when it is necessary for farmers to evacuate. Thus, we have found that the failure of emergency plans to provide for the evacuation of domestic farm animals does not constitute a planning deficiency under the emergency planning regulations.

1935. As to the assertions in Contention EP-5(G) with regard to dosimetry for agricultural personnel, the revised York County Emergency Plan specifically provides that each *emergency worker*²¹⁸ in the County will be supplied with two self-reading dosimeters and one thermoluminescent dosimeter (TLD). Board Ex. 5, at R-2, R-3, R-4. Explicit instructions on use of the personal dosimetry are set forth in the plan. *Id.*, Annex R, Appendix 3. The self-reading dosimeters will be interpreted by the emergency workers themselves whereas the TLDs will be read by the Bureau of Radiation Protection. *Id.*, at R-10.

1936. Under the York County Emergency Plan, the self-reading dosimeters will be provided to emergency workers by the York County Emergency Management Agency through radiological equipment kits which have been predistributed to fire companies throughout York County or from a stockpile maintained in the County Emergency Management Agency storeroom at the EOC. *Id.*, at R-15, R-17, R-18. One thousand additional self-reading dosimeters have been reserved by PEMA for York County's use and PEMA is currently attempting to procure 1000 TLDs which will be reserved for York County. *Id.*, at R-16, R-18. Thus, the

²¹⁸ Testimony indicates that all farmers are not considered to be emergency workers and will not necessarily be given dosimetry. Adler and Bath (3/16/81), ff. Tr. 18,975, at 50. However, since farmers who evacuate may be permitted to return to the evacuated area, under the control of local officials, for livestock maintenance purposes, it is possible that dosimetry will be issued to them in certain circumstances. Adler and Bath (3/16/81), ff. Tr. 18,975, at 51; fn. 214, *supra*.

York County Emergency Plan does indicate the source of the dosimetry to be provided to York County emergency workers, including those agricultural personnel who are considered to be emergency workers. The evidence also indicates that a sufficient quantity of self-reading dosimeters is in stock and that PEMA is in the process of securing TLD dosimetry for emergency workers, of which there is a current shortfall. Tr. 22,427-28 (Bath); Staff Ex. 21. Thus, the Board finds no merit in the assertions made in this regard in Newbery Contention EP-14(BB) and we reject that contention.

1937. In sum, the Board finds that the emergency plans adequately provide for the protection of livestock in the event of an accident at TMI. We recognize that there is no way to guarantee the safety of livestock and no way to resolve the dilemma of farmers as to whether or not to evacuate and leave their property. However, we feel that a proper balance has been made between protecting property and public health and safety. The Board further finds that those farmers who choose to remain with their herds will be informed on measures for self-protection. Finally, the Board finds that an adequate supply of self-reading dosimetry, along with other dosimetry, as appropriate, will be supplied by the York County Emergency Management Agency to agricultural emergency workers who must enter the risk area. Therefore, the Board rejects Aamodt Contention EP-2, ANGRY Contention EP-5(G), and Newberry Contention EP-14(BB).

1938. ANGRY Contention EP-6(G) alleges that the York County Fairgrounds are an inappropriate location for the agricultural "Information Center", since the fairgrounds are within a 20 mile radius of TMI. The contention further asserts that, prior to restart, information concerning the services of the "Information Center" should be provided to farmers, and information about farmers wishing to avail themselves of those services should be compiled.

1939. This contention was directed to an early version of the York County Emergency Plan which provided for the establishment of an agricultural information center. The revised York County Plan does not provide for the establishment of such a center. Curry, *et al.*, ff. Tr. 20,787, Curry Testimony, at 2. Moreover, such a center and the public information functions and services it might provide are not called for in emergency planning guidance and criteria. Adler and Bath (3/16/81), ff. Tr. 18,975, at 63. Such services would simply supplement assets already in place for York County — assets which currently meet NUREG-0654 criteria for public information dissemination. In these circumstances, no further provision for an agricultural information center is necessary. *Id.* Since planning for such a center is no longer being undertaken and is unnecessary in any event, the Board finds ANGRY Contention EP-6(G) to be inappropriate and we reject it.

1940. We recognize that a general evacuation of a rural area will almost certainly result in hardships to farmers with livestock, as well as to persons in many other occupational categories. We hope that farmers, county agents and veterinarians on their own initiative will continue to improve their emergency response procedures not only for radiological, but for all categories of emergencies. However, this Board must concern itself primarily with the public health and safety, rather than with property. While we would find it highly desirable to have better agricultural emergency response plans, we cannot find that the current plans are sufficiently defective to cause us to recommend against restart of TMI-1 because the deficiencies do not adversely affect the public health and safety, as distinguished from property.

14. Coordination

1941. Newberry Contention EP-15(E) asserts a general lack of coordination among the various emergency response plans. The specific example alleged in the contention relates to the protective action decisionmaking process and the manner in which the selected protective action option will be transmitted from the state level to the county and municipal officials responsible for implementing the selected option.

1942. The Combined Intervenors urge the Board to require further development and completion of written emergency plans at the municipal level before restart. The Commonwealth also supports further development of written emergency plans at the municipal level but does not believe that this effort need be completed prior to restart. The Commonwealth seeks a status report on the progress being made in developing municipal plans as of January 1, 1982.²¹⁹ The Board does not doubt the desirability of having written municipal plans and would encourage their preparation, but we do not find that they are required for restart.

1943. The Contention is as follows:

Newberry Contention EP-15(E):

Section 4.6.5.1(2) of the Emergency Plan provides that the responsibility for actions to protect persons in the off-site areas rests with the Commonwealth of Pennsylvania and that the Pennsylvania Emergency Management Agency shall be the agency with which the

²¹⁹ These Combined Intervenor and Commonwealth views on written municipal plans were introduced in their respective Proposed Findings. Commonwealth proposed findings ¶¶ 51-59; Combined Intervenors proposed findings ¶¶ 70-85. We have included this discussion here to indicate the agreement between these two parties regarding the need for more complete written emergency plans.

responsibility rests for the placing, in effect, of protective options such as evacuation, sheltering and thyroid prophylaxis. The same section indicates that in the event of a general emergency, precautionary measures may be taken such as sheltering, evacuation and evacuation of certain sectors based upon wind speed and direction. It is again Intervenor's contention that this particular section of the Emergency Plan providing for the precautionary measures cited have not been coordinated with local county plans to any measurable extent. For example, in the county plans, there is no indication of how the counties would instruct its local Civil Defense Directors to evacuate only certain sectors within a community instead of within radial distances of the Three Mile Island nuclear facility. This is again only but one example of a lack of coordination between the Emergency Plan and the various county plans and it is Intervenor's position that this lack of coordination is symptomatic of the entire Emergency Plan as it is now written. The Emergency Plan submitted by the licensee should encompass a total coordination of all Emergency Plans formulated by federal, state and county agencies. This lack of coordination creates a deficiency which has to be remedied.

1944. Despite the claims in Contention EP-15(E) of a general lack of coordination in planning between the Licensee and off-site organizations, only a single example of alleged conflict in planning has been cited. That instance involves a reference in the Licensee's Emergency Plan to "evacuation of certain areas based on wind speed and direction" which Licensee cites as an "example" of precautionary measures which the Commonwealth could take. Licensee Ex. 30, at 6-14. It is indeed true that the county emergency plans do not contain explicit provisions for sector evacuations. In addition, the evidence indicates that, in general, the Commonwealth will not order a sector evacuation because of the potential for substantial wind shifts in short periods of time, although efforts and resources for evacuation will be concentrated in the direction at greatest risk. Lothrop, ff. Tr. 17,996, at 5. However, we do not deem the Licensee's mere reference to a sector evacuation as an example of a possible protective action to be taken by the state as indicative of a general lack of coordination between the Licensee's planning and off-site planning. The fact that the Commonwealth has indicated a general disinclination for ordering a sector evacuation does not mean that it would never direct such

an évacuation where it determined that a sector évacuation would be appropriate and could be accomplished.²²⁰

1945. Contrary to the assertions in Contention EP-15(E), the evidence indicates that there has been substantial coordination of planning among the Licensee, the Commonwealth, PEMA and BRP through meetings, agreements on organization and communications concepts (Rogan, *et al.*, ff. Tr. 13,756, at 9-10), provisions for Licensee training for off-site emergency response organizations and provisions for testing communications (*id.*, at 13-14). Coordination efforts were also concentrated in the areas of emergency classification, notification of the counties, protective action recommendations, and the prompt notification system. Tr. 13,866-68 (Rogan, Giangi). Licensee coordination with the five risk counties on communications systems, notification procedures, the prompt alerting system and emergency response resources was accomplished through meetings with the county emergency management coordinators. Rogan, *et al.*, ff. Tr. 13,756, at 10. This effort has resulted in a reasonably coordinated and consistent set of emergency response plans by all affected parties. By necessity, such planning must begin at the highest government level and work down. Knopf, *et al.*, ff. Tr. 21,816, at 11. In this regard, the Commonwealth of Pennsylvania, working together with Licensee and FEMA, has developed general concepts of operations that it will follow in responding to radiological emergencies at TMI. See Commonwealth Ex. 2.a, especially §VI and Appendix 6, §III, at 8 to 11 and 6-2. The Commonwealth's plan assigns to state and county agencies those responsibilities necessary to implement the concept of operations described in the plan. See Commonwealth Ex. 2.a, especially §VII, at 11 to 30. The Commonwealth plan further specifies the manner in which the key state level agencies will discharge those responsibilities. See Commonwealth Ex. 2.a, especially Appendices 7, 8 and 9; see generally Knopf, *et al.*, ff. Tr. 21,816 at 12.

²²⁰ The Commonwealth's Emergency Plan contains a discussion of the identification of protective action areas in which it indicates that, in general, a protective action area will include a wedge-shaped sector of about 90° centered in the down wind direction. Commonwealth Ex. 2.a, App. 8, at VII-1. As to the capability to effect a sector évacuation, we note that PEMA has directed the five counties in the plume EPZ for TMI to include in their emergency plans maps which show sectors utilized by the Licensee so that sectors at greatest risk could be clearly identified to local emergency response personnel. Incorporation of these sector maps into state and county emergency plans will serve to identify the various sectors on clear and common terms. This, in combination with the direction of coordinated protective actions by PEMA, should provide county and local emergency response organizations with a clear understanding of the areas to be évacuated in the event that a sector évacuation were ordered. Chesnut and Bath, ff. Tr. 19,626, at 12-13.

1946. With respect to those responsibilities assigned to county-level agencies, each of the five risk counties within the TMI plume exposure pathway EPZ also has developed a plan for responding to a radiological emergency at TMI. See Board Ex. 5, 6, 7, 8, and 9. The concept of operations specified in the county plans is both consistent with that specified in the Commonwealth's Plan and limited to those matters unique to the county-level response. See Knopf, *et al.*, ff. Tr. 21,816, at 12. Much of this decision has focused on concerns raised about the adequacy of particular provisions, or the lack thereof, in the Dauphin and York County plans. Based on our review of those issues, the Board is confident that adequate (albeit not perfect or final) emergency response plans have been developed at the county level.

947. The responsibilities assigned to municipal governments require the resources that would have to be brought to bear most quickly in the event of a radiological accident at TMI. Tr. 20,908-09 (Curry); Tr. 20,910-11 (Belser). These are the same resources that routinely respond to a broad range of community emergencies — *i.e.*, police, fire, medical and county EOC personnel. Knopf, *et al.*, ff. Tr. 21,816, at 13.

1948. The remaining question on coordination concerns the weight that the Board should give to the necessity for written municipal plans.²²¹ There is testimony indicating that with the substantial amount of planning done by the Commonwealth and the five risk counties, there is little need for municipalities to engage in additional planning. *Id.*, at 12. Further, while it would be highly desirable to have written municipal plans, the absence of such plans does not indicate that the response at the local level will be inadequate. Tr. 20,908-09 (Curry); Tr. 20,910-11 (Belser); Knopf, ff. Tr. 21,816, at 13. In addition, from Mr. Knopf's, Mr. Curry's and Mr. Belser's testimony, because municipal organizations that respond to everyday emergencies are the same as would respond to large radiological emergencies, detailed plans would be unnecessary. Further, Licensee's expert, Dr. Dynes, views planning as a process rather than a product (Dynes, ff. Tr. 17,120, at 4), noting that it is desirable that planners focus on the essential principles for an effective emergency response rather than on elaborate written plans with details that may soon become obsolete. *Id.*, at 4-5. In pursuit of improving the planning process at the municipal level the Licensee has retained consultants who have worked with each of the 38 municipalities within the TMI plume exposure pathway. One goal of this effort was to identify specific local conditions that should be considered by the local planners. Knopf, *et al.*, ff. Tr. 21,816 at 6-7, 13. Licensee has arranged also to provide ongoing assistance in this area. *Id.*, at 14.

²²¹For further discussion of municipal plans see Section IV.H.9.

1949. The Commonwealth and Combined Intervenors on the other hand believe that detailed written municipal emergency plans are necessary. However, they disagree about when these plans should be developed with regard to restart.

1950. For the 38 municipalities mentioned above, 25 have submitted some form of plans to FEMA for review. Board Ex. 5, 6, 7, 8, and 9, Annex V; Board Ex. 13. Municipalities which have not submitted written plans are all located in York and Dauphin Counties. Board Ex. 5 and 6, Annex V. Both York and Dauphin Counties have assigned significant responsibilities to the municipalities within the plume exposure pathway EPZ in each county, including such areas as designating pick-up points for residents without transportation, identifying invalids, homebounds and mobility-impaired persons with special transportation needs, indentifying necessary traffic control points within the municipality, coordinating route alerting as a means of notifying the public of an emergency, and identifying available and unmet equipment and personnel resources. Tr. 19,025 (Bath); Tr. 19,446-48 (Bath). Without written plans or implementing procedures covering these areas of responsibility, the ability of the 13 remaining municipalities to perform their assigned duties promptly remains an unknown. *E.g.*, Tr. 22,392 (Bath). The Board also notes that its brief review of the plans contained in Board Ex. 13 supported FEMA's observation that many of the existing municipal plans are deficient in these particular areas. Staff Ex. 21, at 1 of update, 4.

1951. The Board notes that, with respect to current identification of pick-up points for invalids, homebounds and mobility-impaired persons, FEMA has stated that York County's Plan, in particular, would not be "fully adequate". Needed also is a demonstration that sufficient vehicles are available to service the pick-up points identified. Bath, ff. Tr. 22,350, at 4. The Board also notes that FEMA concludes for the general population that even without a complete set of written municipal plans that lists the designated pick-up points, "York County can utilize its Resource Manual, supporting municipal plans and the [Parsons, Brinckerhoff] study to effectively evacuate persons without transportation even with the present transportation plan, Annex K". Bath, ff. Tr. 22,350, at 5.

1952. The Board agrees that municipalities should have written plans outlining in general how provisions will be made for evacuation of chronic invalids or other handicapped persons who are unable to evacuate themselves. Such plans are desirable for general emergency preparation, not just for radiological emergencies. Beyond this level of planning, the Board agrees that it is desirable to list names and addresses of such individuals with the appropriate local response agency but also notes that such lists

require frequent updating. We note again our view that planning at this level of detail is best left to local governmental units and has no place in NRC licensing proceedings.

1953. Review of the emergency plans indicates that primary responsibility for identifying traffic control points is shared jointly by the Pennsylvania State Police, Penn DOT and the risk counties. *See, e.g.*, Commonwealth Ex. 2.a, §§VII.A.18.a, b and e, VII.A.21.a, VII.B.1.1, at 23-26; Board Ex. 5, §VI.B.13 and Annex E, at 7 and E-1 to E-3. Further, Mr. Belser from PEMA indicated that, in response to Licensee's evacuation time study, PEMA, the State Police and the risk counties were undertaking an additional review of traffic control points to ensure that the important bottlenecks would be manned but that coordination between county and municipality would be difficult. Tr. 20,943, 20,973 (Belser). The Board finds that the input of municipalities on local traffic bottlenecks is important. It may be difficult for the State Police to provide manpower for all control points in the event of an emergency of the magnitude calling for evacuation. Therefore, the Board suggests that municipalities prepare written plans describing, as a minimum, how local manpower would be supplied in the event of an emergency to augment the State Police efforts at traffic control points.

1954. After installation and activation of a prompt alerting system by Licensee, it is anticipated that a route alerting system will be relied upon for supplementary or backup notification capability only. Tr. 22,793-94 (Adler); Tr. 22,450 (Bath); Staff Ex. 21, at 9; Bath and Adler (2/23/81), ff. Tr. 18,975, at 22-23. It should be noted, however, that the full extent of reliance on supplementary route alerting cannot be determined until the siren system is installed and fully tested. Adler and Bath (3/16/81), ff. Tr. 18,975, at 14-15.

1955. The Commonwealth identified a need for written municipal plans which relate to route alerting as a supplement to Licensee's prompt alerting system. Commonwealth PF ¶ 57. In this regard, the Commonwealth misreads NUREG-0654, Appendix 3, §B.2.c, as recommending that "the route alerting system must be capable of assuring 100% coverage of the plume exposure pathway EPZ within 45 minutes of notification of a general emergency to the county." *Id.* However, the NUREG-0654 criterion explicitly states that special arrangements, *i.e.*, route alerting, must be made to assure that "the population who may not have received the initial notification within the entire plume exposure EPZ" is notified within 45 minutes. Staff Ex. 7, at 3-3. Thus, rather than recommending a totally redundant, back-up system, NUREG-0654 only suggests that supplemental means of notification be developed for those areas not covered by Licensee's siren system. The Licensee has testified that the siren system is designed to provide 100 percent or nearly 100 percent coverage of the

EPZ, and if there are areas not adequately covered by the sirens, there will be enough to develop route alerting procedures for those areas at a later date. Tr. 22,793-94 (Adler); Tr. 22,450 (Bath); Adler and Bath, ff. Tr. 18,975 at 18.

1956. The Board finds that it would be a wasted effort to write detailed municipal plans establishing an extensive supplementary alerting system prior to testing and evaluation of the new proposed siren system. In the event that evaluation of the siren system, which is to be done prior to restart, indicates areas of non-coverage, then detailed plans for a supplementary alerting system must be established for those areas prior to restart. In Section IV.E.2, we require the Staff to report to the Commission on its review of the results of the testing and evaluation of Licensee's siren system prior to restart.

1957. The county plans have assigned to municipalities the responsibility of determining unmet needs and reporting them to the county; but since municipal plans are presently lacking there is no evidence as to whether this has been done. Board Ex. 5, at 8 §§VI.C.9, C.10, and C.13; Board Ex. 6, at 6, §§V.C.8 and C.10. The Commonwealth (PF ¶ 58) would have detailed municipal accounting of these unmet needs. These needs are highlighted by the Commonwealth as traffic control points and personnel (Adler and Bath (3/16/81), ff. Tr. 18,975, at 55-56; Tr. 20,943 (Belser); Tr. 20,973 (Belser); emergency services such as wrecker and fuel services (Belser, *et al.*, ff. Tr. 20,787, at 4; Tr. 17,831 (Lamison); Tr. 19,202 (Adler)); and buses and ambulances (Tr. 20,807-808 (Curry); Tr. 19,444 (Bath)). (*See also* Commonwealth proposed findings ¶¶ 103-05.

1958. The Licensee relies on the testimony of Mr. Curry, the York County Emergency Coordinator, to support the view that, while the municipalities are responsible for reporting their need to the county, it is the emergency management coordinators at the county level who are responsible for coordinating this information and documenting available and unmet resources countywide in the county emergency response plans. Tr. 20,934 (Curry). However, Mr. Curry also indicates some uncertainty about the ability to completely define needs since he testifies that he would hope to be able to identify most resources. Tr. 20,935 (Curry). This would indicate to the Board that some listing or written accounting of unmet municipal needs should be constructed, not only for the purpose of reporting to the county, but also for keeping track of residual needs.

1959. In summary, the Board finds that restart of TMI Unit 1 without in-place detailed municipal plans on the above discussed subject areas would not constitute a serious potential health and safety hazard. However, it is important that written municipal plans be prepared in finalizing the overall emergency plans. The Board suggests but does not have the jurisdiction directly to require that municipalities prepare written plans to

(1) provide for pick-up of persons who, by virtue of poor health or other such impairment, would be unable to evacuate the EPZ by themselves (and maintain lists of the names and addresses of these individuals, although not as part of the plan), (2) describe local traffic bottlenecks and how local manpower would be supplied to augment the State Police efforts at traffic control points, and (3) indentify unmet municipal needs for reporting to the county.

1960. In sum, the Board finds that the various emergency response organizations have initiated efforts to coordinate the plans at the different levels (municipal, county, state) and that these plans, while neither complete nor perfect, represent an adequate basis for permitting restart of Unit 1. Implicit in this finding is the Board's expectation that the coordination efforts will be continued and improved. We recognize that governmental units in the TMI area, in common with those in other areas near nuclear power plants, have only recently been charged with the responsibility of complying with the new emergency plans. Throughout the testimony on emergency planning the Board noted that agencies in the TMI area have made and continued to make massive efforts to produce coordinated and detailed emergency response plans. We appreciate these efforts and, while we recognize certain defects which need correction, we do not find the plans to be fatally flawed. We expect that the Staff will continue to monitor the progress of emergency response planning at the state and the county level, and at the municipal level where county level plans are dependent on local actions. We suggest that the Commission require the Staff to report to it on emergency planning progress by state, local and municipal governments approximately one year of any restart of TMI-1.²²² See also Section IV.L, *infra*.

I. Maintaining Emergency Preparedness

1961. The three major issues dealing with maintenance of emergency preparedness were the adequacy of the training received by emergency response personnel within the plume exposure pathway EPZ, the adequacy of the annual radiation emergency exercise conducted by the on-site and off-site response groups, and Licensee's ability to audit and review its Emergency Plan.

²²²In our view the Commonwealth, if it wishes, is in a position to obtain for itself, through the efforts of PEMA, an updated view on the progress in developing municipal plans by January 1, 1982.

1. Training

1962. Two contentions were raised by Intervenor ANGRY:

ANGRY Contention EP-5(F):

TMI-1 should not be permitted to restart until persons responsible for implementing emergency response plans at all levels of the response network within the plume EPZ have successfully completed the training mandated by N. 0654 Sec. 04 and provided for in Pa. DOP App. 10.

ANGRY Contention EP-5(H):

The Commonwealth plan for hiring and training a nuclear engineer to be dispatched to the TMI-1 control room upon the occurrence of any future nuclear accident should be completed before restarting is authorized.

1963. These two contentions question the adequacy of the training received by the emergency response personnel. Licensee's training program, described in Section 4.8.1.1 and Table 12 of its Emergency Plan (Licensee Ex. 30), has been reviewed by the NRC Staff, the favorable conclusions of which are reported in the EPE and Supplement 1 thereto. Staff Ex. 6, at 26-28; Staff Ex. 23, at II-12 to II-13. The Commonwealth of Pennsylvania's training program is described in Appendix 10 of its emergency response plan. Commonwealth Ex. 2.a. Each of the five risk county plans also contains a section on training. Board Ex. 5, Annex Q; Board Ex. 6, Annex R; Board Ex. 7, Annex R; Board Ex. 8, Annex T; Board Ex. 9, Annex S. Licensee, the NRC Staff and the Commonwealth presented testimony on the training program for emergency response personnel and ANGRY Contentions EP-5(F) and EP-5(H). *See Rogan, et al.*, ff. Tr. 13,756, at 114-20; Chesnut and Bath, ff. Tr. 19,626, at 15-18; Lamison (Training), ff. Tr. 17,818. Oral examination of these witnesses on this subject appears throughout the March 3-5, March 10, April 7, and April 21 hearing transcripts. Intervenor presented no testimony on this issue, although these parties did participate in the cross-examination of the witnesses.

1964. Below, we first address the concerns raised in ANGRY Contention EP-5(F) as to the training provided to Licensee, Commonwealth, and local emergency response personnel. We then address ANGRY's Contention EP-5(H) which contends that prior to restart the Commonwealth must have the capability to send its nuclear engineer to the TMI-1 control room in the event of an emergency.

1965. Licensee has developed a three-part Emergency Plan training program to ensure that all personnel receive adequate instruction. Rogan, *et al.*, ff. Tr. 13,756, at 115. The training program is designed for on-site Licensee personnel, Licensee headquarters support personnel and off-site emergency response personnel. Tr. 13,841 (Tsaggaris). Licensee committed to begin this training program April 1, 1981, with the expectation that the program would be well under way by June 2 drill. Tr. 13,846 (Rogan). In addition, Licensee has committed to complete one entire iteration of the program prior to restart. Tr. 13,845 (Rogan). The training of Licensee personnel is divided into two parts Tr. 13,841 (Tsaggaris). The first part is the general employee training program, which all TMI employees and contractor personnel permitted unescorted access to Unit 1 receive each year. The program includes orientation on the content of the Emergency Plan and implementing Document, employee responsibilities, emergency facilities and equipment, familiarization with station alarms and communication systems, radiation protection, and instructions and requirements associated with accountability, evacuation, and exposure criteria. Rogan, *et al.*, ff. Tr. 13,756, at 115; Licensee Ex. 30, at 8-2. The second part of training provided to Licensee personnel includes specialized instruction to personnel with specific emergency response functions. The Emergency Plan and Implementing Document outline which personnel will receive specialized training, the type of training, and the minimum required frequency of such training. Rogan, *et al.*, ff. Tr. 13,756, at 115; Licensee Ex. 30, at 8-3. In addition to the training described in the Emergency Plan and Implementing Document, Licensee has committed to provide to the members of Licensee's senior management who have joined Licensee in the last two years and who are designated to act as Emergency Directors or as Emergency Support Directors a formal training course addressing site-specific plant design features. Licensee Ex. 56, at 4.

1966. On-going training of Licensee emergency response personnel is provided in walk-throughs, drills, and exercises. Chesnut and Bath, ff. Tr. 19,626, at 16; Tr. 13,843 (Giangi). Drills and exercises which are to be conducted on a periodic basis include the medical emergency drill, fire emergency drill, repair and damage control drill, communication links test, radiological monitoring drill, radiological controls drill, and a radiation emergency exercise (*i.e.*, a major drill appropriate to a Site or General Emergency). Rogan, *et al.*, ff. Tr. 13,756, at 117; Tr. 13,842-44 (Rogan, Giangi); Licensee Ex. 30, at 8-8, 8-9. During 1980, more than a dozen Emergency Plan drills were run at TMI. These drills exercised various facets of Licensee's on-site and off-site emergency organizations, as well as state and local emergency response agencies. Rogan, *et al.*, ff. Tr. 13,756, at 117; Tr. at 13,843 (Giangi). The Board therefore finds that Licensee's emergency response personnel have received adequate training.

1967. As to training for state emergency response personnel, the guidance of NUREG-0654 calls for periodic training for various categories of state and local emergency response personnel who are responsible for implementing radiological emergency response plans. Criterion 0.4(a) calls for training of state and county emergency management coordinators. Staff Ex. 7, at 76. In this regard, specialized training as set forth in the Commonwealth's Emergency Plan, has been provided by PEMA, with the initial round of training completed about mid-April of 1981. Tr. 17,939-41 (Lamison).

1968. Provision has been made in the Commonwealth's Emergency Plan for the training suggested by NUREG-0654, Criterion 0.4(b) for state personnel responsible for accident assessment, and by NUREG-0654 Criterion 0.4(c) for state radiation monitoring teams and radiological analysis Personnel. Tr. 17,941-43 (Lamison). The state's accident assessment personnel have received training in this regard within the last year and the BRP staff, responsible for radiological monitoring and analysis, was given training in monitoring in the fall of 1980. Tr. 18,127 (Reilly). Five separate reactor accident training drills were conducted for BRP accident assessment personnel during April and May of 1981. Bath ff. Tr. 22,350, Attachment 3, Pre-Exercise Training at 1, 2.

1969. NUREG-0654, Criteria 0.4 (d), (f) and (g) state that training should be provided to local police, security and firefighting personnel, local first aid and rescue personnel and local support services personnel. Staff Ex. 7, at 76. In this regard, the Licensee's Emergency Plan has been modified to include commitments for training for emergency personnel and the Licensee has committed to complete, prior to restart, one full iteration of emergency organization training including training for off-site support organizations. Chesnut and Bath, ff. Tr. 19,626, at 16. Specific training will be offered by the Licensee to local fire companies, ambulance services and police departments to familiarize them with the TMI site and the Licensee's Emergency Plan. Tr. 13,842 (Tsaggaris); Staff Ex. 6, at 27. The Licensee's Plan also provides for training for the State Police and the Middletown Police Department on emergency classifications and communications and training for fire and rescue services on security force interfaces, basic radiological controls, on-site firefighting equipment and communications. These training programs satisfy the NUREG-0654 criteria. Chesnut, ff. Tr. 15,007, at 72-73. Finally, Radiation Management Corporation (RMC), acting for the Licensee, provides annual training for ambulance and hospital personnel. RMC provided training for local emergency medical personnel from off-site organizations in September of 1980. Rogan, *et al.*, ff. Tr. 13,756, at 45, 48. Further training for state and local medical support personnel as specified in the guidance of NUREG-0654,

Criterion 0.4.h is provided by the Pennsylvania Department of Health in accordance with specific medical support training programs set forth in the State Emergency Plan. Tr. 17,944 (Lamison).

1970. Finally, NUREG-0654 Criterion 0.4.j suggests that training should be provided to state and local personnel responsible for transmission of emergency information and instructions. Staff Ex. 7, at 76. The evidence indicates that such training has already been provided and that plans are to provide retraining in this regard at least quarterly. Tr. 17,945-46 (Lamison). In the section on communications, we discuss the requirement for a communications exercise to follow up on problems noted in the June 2, 1981 emergency exercise. In summary, the evidence indicates that appropriate training for state and local emergency response personnel has already been provided, is ongoing, or is planned for the near future. Thus, the Board finds that Contention EP-5(F) has essentially been satisfied.

1971. The Board next considers ANGRY Contention EP-5(H), which asserts that the Commonwealth's plan for sending its nuclear engineer to the TMI-1 control room in the event of an accident should be in place prior to restart. First of all, we observe that there is no requirement or guidance stipulating that a state and/or local emergency response organization is to station a nuclear engineer or other technical analyst in the control room during an emergency. The regulatory guidance indicates a preference for having state technical analyses representatives at the Licensee's EOF. Staff Ex. 7, at 41, Criterion C.2(a); Chesnut and Bath, ff. Tr. 19,626, at 17-18. The Commonwealth has two full-time nuclear engineers on its staff but is not at this point prepared to commit to 24-hour coverage seven days a week. Tr. 23,019-20 (Dornsife). The Commonwealth could not at the time of the hearing make a commitment as to where it will send its nuclear engineers in the event of an emergency since it was unclear at the time whether or not the Licensee would have an operational EOF within one hour after declaration of a site area emergency. Tr. 23,017-19 (Dornsife, Adler). Should there be an operational EOF at that time, the Commonwealth presently *intends* to send a nuclear engineer to it (Tr. 23,017 (Dornsife)) but has not reached a decision as to whether it will change its emergency plans to reflect a *commitment* to do so. Tr. 23,018 (Dornsife).

1972. The Board finds that the intent of Contention EP-5(H) would be better satisfied by having the state's nuclear engineer report to the EOF when it is operational, rather than report to or remain in the control room. Based on the evidence we find that the Commonwealth is adequately staffed to provide a nuclear engineer to either or both places, should it desire. Further, the Board finds no evidence that the Commonwealth is

unwilling to participate fully and promptly, but instead finds assurance to the contrary.

2. Exercise and Drills

1973. Issues raised as to the adequacy of the annual radiation emergency exercise include provisions for the participation of federal agencies, the need for all major elements of the various emergency response organizations to be tested in an exercise prior to restart, and a requirement that York County direct all local emergency service forces to participate in the annual exercise. We consider each issue below. The contentions are as follows:

ANGRY Contention EP-4(F):

The provisions for the conducting of a "Radiation Emergency Exercise" of the licensee (EP, p. 8-8) and of the Commonwealth (Pa. DOP, App. 14) are inadequate in that they do not clearly provide for the participation therein of federal agencies. The necessity for such participation is clearly established by the extensive involvement of federal agencies in the TMI accident. Second, the aforementioned appendix to the Commonwealth's emergency plan indicates that "all major elements of the plans and preparedness organizations" may be tested only over a period of five years. All such elements should be tested in an exercise prior to the restart of TMI-1.

Newberry Contention EP-14(C) (in part):

Moreover, Section VI, Subsection (c)(4) provides that there will be an exercise and training of emergency service forces to include at least one annual exercise conducted in connection with PEMA. It is submitted that this part of the Plan is deficient because it does not require mandatory participation of all of the local emergency service forces. A most recent test conducted by PEMA in July of 1980 did not include the participation of a majority of the local townships and boroughs because the persons who would have been involved in that training exercise are volunteers and would not or could not obtain leave from their employers to participate in such a training exercise. It is contended that the Plan is still deficient in this area unless and until the Commonwealth of Pennsylvania through its police powers provides that those who are considered to be emergency service forces within the local boroughs and townships are given nonprejudicial paid leave time by their employers in order to participate in such an exercise.

1974. Contrary to the assertions in Contention EP-4(F), both the Commonwealth's Emergency Plan and the Licensee's Plan anticipate federal participation in the full-scale radiation emergency exercises. Thus, the Commonwealth's Plan specifies that "[p]rovisions will be made to include Federal emergency response in this annual exercise." Commonwealth Ex. 2.a. Licensee's Emergency Plan provides that "[d]rill scenarios will be prepared that involve participation of several emergency teams and all or specific parts of the on-site and off-site emergency organizations including varying degrees of participation of state, county and federal agencies and organizations and local services support personnel and organizations." Licensee Ex. 30, at 8-7.

1975. Licensee's radiation emergency exercise is described in Section 4.8.1.2 of its Emergency Plan. Licensee Ex. 30. The NRC Staff has reviewed the provisions made for this exercise in Licensee's Emergency Plan and its favorable conclusions are reported in Supplement 1 to the EPE. Staff Ex. 23, at II-16. The Commonwealth's annual exercise is described in Appendix 14 of its emergency response plan. Commonwealth Ex. 2.a. FEMA has reviewed the provisions made for the Commonwealth's annual exercise and its favorable conclusions are reported in Supplement 1 to the EPE and in its Interim Findings and Determinations. In addition, Licensee, the NRC Staff and the Commonwealth presented testimony on ANGRY Contention EP-4(F) and Newberry Contention EP-14(C) (in part). See Rogan, *et al.*, ff. Tr. 13,756, at 116-18; Chesnut, ff. 15,007, at 78-80; Bath and Adler (2/23/81), ff. Tr. 18,975, at 52-54; Lamison (Exercises and Drills), ff. Tr. 17,818. Oral examination of these witnesses on this subject appears throughout the March 3-6, 10-12, 17 and 24, April 7 and 15-17, and June 1 and 7-9, 1981 hearing transcripts.

1976. 10 CFR Part 50, Appendix E, §IV.F.2 requires that plans be made for federal emergency response agency participation in a full scale emergency response exercise at least once every five years for each site at which there is one or more licensed power reactors. Federal agency participation in exercises for a particular site once every five years is adequate in view of the fact that federal agency participation in exercises in general is much more frequent because of the number of licensed plants conducting exercises. Tr. 14,275-76 (Giangi). In accordance with the provisions of 10 CFR Part 50, Appendix E, it is expected that federal agencies will participate in the full scale exercise for TMI at least once every five years. Rogan, *et al.*, ff. Tr. 13,756 at 117. The Board finds this to be acceptable and in consonance with the provisions of 10 CFR Part 50, Appendix E.

1977. The NRC's regional response team was activated and participated in the June 2, 1981 full exercise for TMI. Donaldson and Chesnut, ff. Tr. 22,236, at 5. The NRC response functions exercised at the time were

radiological assessment, operational assessment and communications functions and the functions of the NRC's Director of Site Operations. Tr. 22,321 (Donaldson).

1978. On June 2, 1981, a full scale emergency response exercise was conducted for TMI. This exercise, undertaken in response to the Commission's order in CLI-79-8 that the Licensee conduct a test exercise of its emergency plan (CLI-79-8, 10 NRC 141, 144, short term Order item 3(e)), involved direct participation by the Licensee's on-site and off-site emergency response organizations; fire companies supporting the Licensee's on-site emergency response (Donaldson and Chesnut, ff. Tr. 22,236, at 3-5); various state agencies with emergency responsibilities; Dauphin, Cumberland, Lancaster and Lebanon Counties; and one municipality in each of Dauphin, Lancaster and Cumberland Counties. Staff Ex. 20, at 3-6, 13; Staff Ex. 18, at 1. The exercise involved a comprehensive and detailed emergency scenario with the simulated accident escalating from the Unusual Event to the General Classification. Donaldson and Chesnut, ff. Tr. 22,236, at 4. The functional areas of the Licensee's Plan and emergency response organization tested in the exercise were: (1) operations staff actions in detection, classification and operational assessment of the accident; (2) notification of off-site agencies, notification and call-up of Licensee personnel and communications; (3) radiological dose assessment and projection and protective action decisionmaking; (4) Licensee personnel assembly and accountability; (5) security; (6) in-plant, on-site and off-site radiological surveys; (7) first aid and rescue; (8) interface with the NRC response organization; (9) in-plant radiation protection; (10) technical support; (11) public information; (12) repair/corrective actions; and (13) direction and coordination of the response. *Id.*, at 4-5.

1979. The functional areas of the state, county and municipal planning and emergency response organizations tested were (1) notification, alerting and emergency response organization mobilization for the state, counties and municipalities (Staff Ex. 20, at 3-6); (2) direction and control for the state, counties and municipalities (*Id.*, at 8-13); (3) accident assessment, radiological monitoring, and protective action decisionmaking for the state (*Id.*, at 16, 17, 18); (4) radiological exposure control for the state, counties and municipalities (*Id.*, at 21-24); (5) protective actions, mass care provisions, evacuation support and medical and public health support for the state, counties and municipalities (*Id.*, at 26-30); (6) communications for the state, counties and municipalities (*Id.*, at 32-33); and (7) public information for the state and counties (*Id.*, at 35). None of these functions, except for the Licensee's initial notification of the declaration of a General Emergency (Tr. 22,801-802 (Hardy)), were tested for York County, which did not participate in the exercise. Staff Ex. 20, at 1.

1980. From the standpoint of Licensee's response in the exercise, the evidence indicates that the Licensee demonstrated its ability to carry out its own approved emergency procedures, to coordinate its response with that of off-site agencies, and to respond to the emergency simulated by the exercise scenario. No shortcomings or deficiencies which degraded the sufficiency or effectiveness of the Licensee's emergency response in any of the functional areas were observed. Donaldson and Chesnut, ff. Tr. 22,336, at 5. Deficiencies that were observed were minor and insignificant and did not degrade the Licensee's response. These deficiencies have, however, been noted by the Licensee for correction, and correction or resolution of the deficiencies will be scrutinized and verified by the NRC's Office of Inspection and Enforcement. *Id.*, at 6.

1981. In regard to the state, county and municipal responses in the exercise, a team of 38 federal observers from FEMA, EPA, the Department of Energy, NRC, FDA, the Public Health Service, the U.S. Department of Agriculture and the U.S. Department of Transportation noted a number of response deficiencies resulting in 72 recommendations for planning improvements. Some of these recommendations were consolidated into seven planning areas which should be given priority for improvement. However, the federal observer team found that the overall response capability for Pennsylvania (with the exception, of course, of York County) was shown to meet minimum emergency response standards notwithstanding the improvements that were recommended. Staff Ex. 20, at 1-2; Tr. 22,747 (Adler). The Commonwealth has made a commitment to address each of the 72 recommendations which pertain to state emergency planning and response and to provide as much assistance as possible to the counties in addressing those deficiencies pertaining to the counties and municipalities. Tr. 22,834-35 (Straube). *See also* Section IV.L.

1982. From the evidence outlined, we find that the June 2, 1981 exercise constituted a full scale emergency exercise which adequately tested the major elements of plans and preparedness for the Licensee, the state, four of the five counties within the plume EPZ for TMI and representative municipalities in the plume EPZ. In addition, the Board finds that, with the exception of the lack of participation of York County, the June 2, 1981 exercise satisfied the Commission's short-term Order item 3(e) directing the conduct of a test exercise prior to restart.

1983. Because of the importance of York County in emergency preparedness for the TMI area and of the fact that FEMA was unable to provide findings and determinations on the overall adequacy of York County's emergency response capability without a demonstration of that capability in an exercise (Staff Ex. 18, at 2), we believed that York County should demonstrate the capability to implement its emergency plan through participation in at least a limited exercise as a condition for

restart of TMI-1. York County participated in a radiological emergency exercise conducted on August 29, 1981.²²³ The exercise was not on the scale of the June 2, 1981 exercise but was sufficient in scope to fully exercise York County emergency response functions and involved six municipalities within York County. (Staff Ex. 24a and 24b). The exercise evaluation indicated that York County's capability met or exceeded minimum standards to protect the citizens in the event of a radiological emergency. *Id.* Consequently, the Board finds that the Commission's short-term Order item 3(e) will be satisfied as will the assertion in Contention EP-4(F) that major elements of the plans and preparedness organizations should be exercised before restart of TMI-1.

1984. The thrust of intervenors' contentions in this area, as stated in Combined Intervenors proposed finding ¶ 504, is that there are no provisions which *require* the participation of many essential segments of the emergency response force. (Emphasis added). In our discussion of this area, we rely heavily on the Staff's proposed findings ¶¶ 347-350.

1985. At the outset, we note that the revised York County Emergency Plan does, in fact, provide for the participation of municipalities and local emergency service forces in planned exercises and drills. Under the York County Plan, the County will ensure that those municipalities within the TMI plume EPZ participate in the state-sponsored full scale exercises. Board Ex. 5, at P-1. In addition, the County will ensure the participation of risk municipalities within its jurisdiction in required smaller scale drills for TMI and in the testing of communications links through monthly communications drills. *Id.*, at P-2. The County will also coordinate the participation of local support service organizations, such as ambulance services, in scheduled drills. *Id.*, at P-3. Thus, the York County Plan sets forth commitments by the County to procure the participation of municipalities and local emergency support forces in emergency response exercises and drills.

1986. This is not to say that participation of all York County municipalities and support organizations in all radiological emergency exercises and drills is, or should be made, mandatory. The NRC's emergency planning rules require annual participation in exercises of local emergency response organizations in the plume EPZ sufficient to demon-

²²³ Pursuant to the stipulation of the parties, we are admitting into evidence as Staff exhibits two documents containing FEMA's evaluation of the York County exercise which were provided under cover of a letter from Staff Counsel, dated September 30, 1981, as follows: FEMA Interim Findings and Determination Relating to the Status of State and Local Emergency Preparedness Around the TMI Fixed Nuclear Facility for York County, dated September 18, 1981 (2 pages) (Staff Ex. 24.a) and the September 11, 1981 attachment containing the FEMA Regional Assistance Committee Observations and Recommendations on the York County Exercise (7 pages) (Staff Ex. 24.b).

strate that necessary resources and procedures are adequate but this does not mean that each element of each emergency response organization must participate. Adler and Bath (2/23/81), ff. Tr. 18,975, at 52. What is called for is a testing of representative elements of emergency response, not an exercise of every element for every emergency response organization. Tr. 19,084-85 (Adler).

1987. The evidence indicates that the Commonwealth has, on occasion, experienced difficulties in getting municipal participation in exercises because of difficulties in volunteer emergency workers' taking leave from their full-time employment. Tr. 17,957 (Lamison). This problem might be overcome, for example, by scheduling exercises on weekends when most volunteer emergency workers would not be working at their regular employment. FEMA's experience with emergency response exercises at other nuclear facilities is that sufficient emergency response personnel participate in such exercises to provide an adequate test of emergency capabilities despite the fact that some personnel have to take leave from their normal employment. Adler and Bath (2/23/81), ff. Tr. 18,975, at 53-54.

1988. Moreover, there is no federal regulatory requirement that non-prejudicial leave or pay be provided to emergency workers so that they may participate in radiological emergency exercises. Adler and Bath (2/23/81), ff. Tr. 18,975, at 53. We question our authority to require, as a condition of restart, that the Commonwealth mandate non-prejudicial paid leave time from employers of volunteer emergency workers as advocated in Contention EP-14(C). In any event, we believe that, on balance, York County's commitment in its revised Emergency Plan to ensure that participation of municipalities in emergency exercises provides assurance that adequate representative municipal participation will obtain for York County. Accordingly, the Board rejects that portion of Contention EP-14(C) dealing with York County's planning for exercises and drills.

1989. As pointed out in combined Intervenor's proposed finding ¶ 512, General Smith, when asked if PEMA favored fully exercising municipal levels, responded that it was appropriate " . . . to test all the way down, the town, the county, and in each instance the agencies associated with their effort, the state, and then the interconnections between federal and state, and private sector, the nuclear plant, all that." Tr. 17,726 (General Smith). However, he went further to say that such drilling may not involve total exercising of all aspects, but may simply involve testing notification systems, distributing information, and other tests short of full participation at the level of, for example, the public schools, and the Red Cross. Tr. 17,726-27. As General Smith explained, "when one goes below the county to the township . . . unless we directly request it, that then is the business of the county and the township people to decide how extensive that ought to be." Tr. 17,728-29. We agree with General Smith that planning below

the level of the county is not the business of the state, but is appropriately that of the county and township. We note further that in our view planning to this level is beyond our direct jurisdiction as well. Of course, indirectly, if we find that overall emergency planning is inadequate due to a defect in the local plans, the effect could be not to permit restart. For example, as we note in Section H.7.b there could be such a bare-boned skeletal outline at the county level of planning that it is apparent that the sub-county plans are in fact the corpus of the county response. We observe finally that there is nothing which *prohibits* participation at the sub-county level in any type of planning and drilling the affected agencies, or volunteer organizations, deem desirable.

3. Audit and Review of Plans

1990. Sholly Contention EP-17(B) states:

Licensee's Emergency Plan fails to adequately provide a mechanism which will assure the effectiveness of the Emergency Plan throughout the operational lifetime of the TMI-1 facility.

1991. This contention questions Licensee's ability to maintain the effectiveness of its Emergency Plan throughout the operational lifetime of TMI. Licensee's procedures for the audit and review of its Emergency Plan are described in Sections 4.8.1.2, 4.8.1.3, and 4.8.2 of its Emergency Plan. Licensee Ex. 30. The NRC Staff has reviewed the adequacy of Licensee's audit and review procedures and its favorable conclusions are reported in the EPE and Supplement 1 thereto. Staff Ex. 6, at 28-29; Staff Ex. 23, at 11-16. In addition, both Licensee and the Staff presented testimony on Licensee's audit and review procedures and Sholly Contention EP-17(B). See Rogan, *et al.*, ff. Tr. 13,756, at 118-20; Chesnut, ff. Tr. 15,007, at 80-81. Proposed findings on this contention were submitted by Licensee and Staff but not by intervenors.

1992. Contrary to the assertion of Contention EP-17(B), Licensee's Emergency Plan does, in fact, provide mechanisms to maintain the effectiveness of the plan. Chesnut, ff. Tr. 15,007, at 81-82; Licensee Ex. 30, at 8-7, 8-9, 8-10. For example, Licensee's Emergency Plan provides for a Supervisor-Emergency Preparedness who is responsible for the coordinating of proposed revisions to the Emergency Plan and the Implementing Document, the upgrading of emergency equipment and supplies, and the monitoring of changes in federal regulations and guidance that impact emergency planning. Rogan, *et al.*, ff. Tr. 13,756, at 118; Licensee Ex. 30, at 8-7, 8-9, 8-10. In addition, the Emergency Plan requires that a critique be scheduled and held as soon as practicable following a drill or exercise.

Rogan, *et al.*, ff. Tr. 13,756, at 118; Licensee Ex. 30, at 8-7. The comments of observers and participants in the drill are presented to the Supervisor-Emergency Preparedness for resolution and follow-up as appropriate. Licensee uses an action item tracking system to ensure timely resolution of these items. Rogan, *et al.*, ff. Tr. 13,756, at 118. These comments are submitted to the Vice President TMI-1 for his review. Recommended changes approved by the Vice President TMI-1 will be incorporated into the Emergency Plan or Implementing Document under the direction of the Supervisor-Emergency Preparedness. *Id.*, at 118-19; Licensee Ex. 30, at 8-7. In addition, the TMI-1 Emergency Plan, including appended letters of agreement, will be reviewed and updated on an annual basis. The Quality Assurance Department is responsible for conducting an independent periodic audit to verify compliance with the Operational Quality Assurance Plan, the Fire Protection Program Plan, Licensee's internal rules and procedures, federal regulations, and operating license provisions. The Supervisor-Emergency Preparedness provides a further ongoing review of the TMI emergency preparedness program. Rogan, *et al.*, ff. Tr. 13,756, at 119; Licensee Ex. 30, at 8-10.

1993. Further, Licensee's Emergency Plan provides that the Licensee, the Commonwealth, the counties and federal agencies, all of which maintain controlled copies of the Plan, will receive revisions to the Plan as they are issued. Chesnut, ff. Tr. 15,007, at 82. In addition, provision is made to assure that all members of Licensee, state, county and federal emergency response organizations are informed of the Licensee's Emergency Plan, implementing procedures, and revisions to each.

1994. The Staff concluded that Licensee has established responsibilities for plan development and review and for distribution of the Emergency Plan and procedures, and has mechanisms in place for maintaining plan effectiveness in accordance with the NRC's planning standard on the development, periodic review and distribution of emergency plans. Staff Ex. 6, at 28-29. The Board agrees and finds that, contrary to the assertions in Contention EP-17(B), Licensee's Emergency Plan adequately provides mechanisms to maintain the effectiveness of the Plan throughout the operational life of the TMI-1 facility and we find the concerns expressed in Contention EP-17(B) to be adequately resolved.

J. Funding for Emergency Response

1995. Newberry Contention EP-14(GG) asserts that:

The York County Plan does not contain any treasury or source of financing in the event that an emergency is declared and payment to be made. It is a general assumption, apparently on behalf of the

Plan, that the county treasury can be invaded by the Commissioners for use during an emergency; however, it is Intervenor's position that a set emergency fund should be in place and stated within the Plan so that there would have to be no indecision as to the legality of withdrawing funds in the event of an emergency situation for ad hoc expenses.

1996. We would initially note our concern that the matter of funding for emergency response, whether it be funding for the state, the counties or municipalities, appears to be a matter beyond the scope and the reach of the NRC's emergency planning regulations. Those regulations are directed toward assuring that adequate emergency preparedness provisions are in place and maintained, regardless of the source of funds required to provide adequate emergency preparedness. In its Statement of Consideration accompanying the new emergency planning rules, the Commission expressed its view that the question as to whether the NRC should or could require a utility to contribute to the expenses incurred by state and local governments in upgrading and maintaining their emergency planning and preparedness is beyond the scope of the new emergency planning rules. 45 Fed. Reg. 55402, 55408 (August 19, 1980). We question our authority to require the Commonwealth or the counties to provide "a set emergency fund" as a source of financing in the event an emergency is declared.

1997. Nevertheless, if the question of funding for emergency response was such as to bring about indecision on whether to implement protective actions by emergency management personnel at the time of an emergency, the matter of funding could have an impact on emergency response warranting a consideration of means to avoid that impact. There is no evidence of record that this is the case, however. Rather, the evidence shows that each municipality and political subdivision in the Commonwealth may, by law, defray its expenses for emergency management activities. Lamison (Exercises and Drills), ff. Tr. 17,818. When the Governor declares an emergency, political subdivisions may reallocate funds to emergency response activities and dispense with competitive bidding. Tr. 17,835-37 (Lamison). Apart from this, there is a large reservoir of material resources in the Commonwealth which may be tapped to provide assistance to the counties at risk in meeting unmet resources needs. Tr. 17,868 (Lamison). Thus, political subdivisions may reallocate funds and obtain material resources necessary for emergency response. Because of this, we perceive no need to establish "set emergency funds" as a source of financing in the event of an emergency, even if we had the authority to require the establishment of such funds. The Board, therefore, finds

Newberry Contention EP-14(GG) to be without merit.

K. Compliance With the Commission's Short- and Long-Term Order Items

1998. In its August 9, 1979 Order, 10 NRC 141, 144-45, the Commission set forth two items dealing with emergency planning. Short-term order item 3 states:

3. The Licensee shall improve his emergency preparedness in accordance with the following:
 - (a) Upgrade emergency plans to satisfy Regulatory Guide 1.101 with special attention to action level criteria based on plant parameters.
 - (b) Establish an Emergency Operations Center for Federal, State, and Local Officials and designate a location and an alternate location and provide communications to plant.
 - (c) Upgrade offsite monitoring capability, including additional thermo-luminescent dosimeters or equivalent.
 - (d) Assess the relationship of State/Local plans to the licensee plans so as to assure the capability, to take emergency actions.
 - (e) Conduct a test exercise of its emergency plan.

1999. Long-term order item 4 states:

4. Improve emergency preparedness in accordance with the following:
 - (a) Modify emergency plans to address changing capabilities of plant instrumentation.
 - (b) Extend the capability to take appropriate emergency actions for the population around the site to a distance of ten miles.

2000. An examination of the emergency preparedness short- and long-term order items of the Commission's August 9, 1979 Order and Notice of Hearing reveals that, apart from short-term items 3(c) (upgrade off-site monitoring capability prior to restart) and 3(e) (conduct a test exercise prior to restart) and long-term item 4(a) (modify emergency plans to address changing capabilities of plant instrumentation), the emergency preparedness short- and long-term order items are encompassed within and

are no more rigorous than the requirements of the new emergency planning rules. Because of this, compliance with the new emergency planning rules will, of necessity, result in compliance with these emergency planning order items.

2001. As to the short-term order items not encompassed within the new emergency planning rules, we have previously found (in Section C.2, *supra*) that the Licensee has sufficiently upgraded its off-site monitoring capabilities, including its TLD capabilities, to meet the requirements of short-term order item 3(c). In addition, we have found (in Section I.2, *supra*) that a full scale test exercise has been conducted involving the Licensee, the Commonwealth, four of the five counties in the plume EPZ and several municipalities (and that a separate test exercise has been conducted for York County). Thus, the requirement that the Licensee participate in an emergency exercise as directed by short-term order item 3(e) has been met.

2002. With respect to long-term order item 4(a), the indicator parameters used by Licensee to trigger the emergency action levels reflect a broad and diverse set of present plant instrumentation. *See* Licensee Ex. 30, at Tables 21-24; Tr. 13,780-87 (Giangi). As new instrumentation is installed, Licensee has committed to modify the Emergency Plan and Emergency Plan Implementing Procedures to reflect the enhanced capabilities of this instrumentation. Licensee Ex. 30, at §4.7.6.1.7, p. 7-18. Licensee's emergency action level tables indicate with an asterisk where such changes are contemplated. Licensee Ex. 30, at Tables 21-24. We see nothing which would impede the implementation of any such modifications. We find there is reasonable assurance that long-term order item 4(a) will be complied with as new instrumentation makes it appropriate to modify the parameters used to trigger emergency action levels.

2003. The remaining four order items are encompassed within the rules. With respect to short-term item 3(a), the Board has examined in this decision whether emergency preparedness meets the requirements of the new emergency planning rules, which were promulgated after Regulatory Guide 1.101. As noted in our introduction, we have also looked to the guidance of NUREG-0654, although parties were free to argue whether compliance with that guidance is necessary and sufficient for any individual matter. The particular subject emphasized in item 3(a) is the emergency action level criteria based on plant parameters. This is now a requirement of planning standard (4) of 10 CFR 50.47(b). This matter is discussed in our findings in Protective Action Decisionmaking, Section G.

2004. Short-term order item 3(b) requires the establishment by Licensee of an Emergency Operations Center. This matter is related to and touches on several of the planning standards, *e.g.*, (1), (2), (3), and (8) of 10 CFR 50.47(b). As discussed in our findings above on Organization and Staffing

of Emergency Response Organizations, Section B. Licensee has established an Emergency Operations Facility (EOF), as well as an alternate EOF at the Crawford Station about three miles from the TMI site. *See also* Staff Ex. 6, at 15. The time of staffing of the EOF with the Emergency Support Director is a dispute on which we make findings in Section B.

2005. Short-term order item 3(d) requires an assessment of the relationship of state/local plans to Licensee's plans to assure the capability to take emergency actions. This is a broad matter which embraces the majority of our findings in the decision and is related to many of the planning standards of Section 50.47(b).

2006. Long-term order item 4(b) requires a plume EPZ of about ten miles within which protective actions (including evacuation) can be taken. This is now required by 10 CFR 50.47(c)(2) and 50.54(s)(1). Our findings above discuss definition of EPZs in Section F. The extent to which protective actions adequately can be taken within the TMI plume exposure EPZ permeates our decision.

L. Emergency Planning - Conclusions of Law

2007. The Board has considered all documentary and oral evidence presented by the parties on the contentions raised by intervenors, the questions raised by the Board, and the issues set forth in the Commission's Order and Notice of Hearing, CLI-79-8, 10 NRC 141, 144-45 (1979). Based upon a review of the entire record in this proceeding and the proposed findings of fact and conclusions of law submitted by the parties and based on the reliable, probative and substantial evidence in this proceeding and the Board's foregoing findings of fact, the Board reaches the following conclusions of law with respect to emergency preparedness issues.

- a. Subject to the satisfaction of those requirements set forth below as conditions of restart of TMI-1, a number of the contentions raised by the intervenors in this proceeding have been satisfied or will be satisfied. We also conclude that none of the remaining concerns require further modifications prior to restart to the emergency response plans of Licensee, the Commonwealth, and the five risk counties.
- b. Our concerns enunciated in Board Question 4 have been resolved.

- c. The Licensee has or, with the satisfaction of the conditions set forth below, will have improved its emergency preparedness in accordance with the Commission's short-term order item 3. Specifically, the Licensee has or will have:
 - 1. Upgraded its emergency plan to satisfy current emergency planning criteria with special attention to action level criteria based on plant parameters;
 - 2. Established an emergency operations center for federal, state and local officials, designated an alternate location and provided communications to the plant;
 - 3. Upgraded off-site monitoring capability, including thermoluminescent dosimeters or equivalent;
 - 4. Assessed the relationship of state and local plans to the Licensee plans so as to assure the capability to take emergency actions; and
 - 5. Conducted a test exercise of its emergency plan.
- d. The Licensee has or, with the satisfaction of the conditions set forth below, will have:
 - 1. Shown reasonable progress toward completion of long-term order item 4(a) requiring modification of emergency plans to address changing capabilities of plant instrumentation; and
 - 2. Extended the capability to take appropriate emergency actions for the population around the site within the plume EPZ (a radial distance of about 10 miles) in accordance with long-term order item 4(b).
- e. Subject to the satisfaction of the conditions set forth below, the radiological emergency response plans of the Licensee, the Commonwealth of Pennsylvania, and the risk Counties of Dauphin, York, Lancaster, Lebanon and Cumberland are adequate and capable of being implemented.

2008. The state of on-site and off-site emergency planning provides reasonable assurance that appropriate protective measures can and will be taken in the event of a radiological emergency at TMI-1 in accordance with the Commission's emergency planning regulations.

2009. The Board's findings of fact and conclusions of law on emergency planning are dependent upon satisfying prior to restart of the conditions set forth in the next paragraph. In addition, although not explicitly set forth here as conditions, as is apparent from a reading of our decision there may be commitments, agreements among the parties, or recommendations by FEMA or the Staff, on which some of our findings are clearly dependent (albeit not necessarily prior to restart). Furthermore, we note with approval and with recognition of the evolving nature of emergency planning, that the Commonwealth of Pennsylvania has committed to address each of the deficiencies in state planning identified by FEMA and to assist the counties in addressing each of the deficiencies pertaining to county and municipal planning. Tr. 22,834-35 (Straube). A summary of FEMA-identified deficiencies is set forth in Staff proposed finding ¶ 371, n.100. In the Board's view, those FEMA identified deficiencies, unless subsumed within either our conditions below or those matters the satisfaction of which were clearly depended upon in the course of our decision, are relatively minor in nature and are correctable. To the extent any of those deficiencies were related to matters in controversy or Board or Commonwealth concerns, they are discussed in our findings above. We suggest that the Commission direct the Staff, presumably with the assistance of FEMA and the Commonwealth, to report to it on the status of the resolution of these deficiencies approximately one year after any restart of TMI-1.

2010. The following emergency planning conditions shall be satisfied prior to any restart of TMI-1:

- a. The Licensee must have available to it qualified individuals who could act as Emergency Support Director in the EOD in the interim (up to four-hour) period prior to the arrival of the full off-site Emergency Support Organization without the need to transfer the Emergency Director from the control room to the OEF. Section IV.B.1.
- b. The Staff shall review any changes made in the five risk county brochures and the PEMA pamphlet on emergency preparedness, and advise the Commission prior to restart of the impact of the revisions on the intended purpose of these documents. Section IV.E.1.
- c. The updated PEMA pamphlet and five risk county brochures on emergency preparedness shall be distributed to the general resident population within the plume EPZ prior to restart of TMI-1. Section IV.E.1.

- d. Public information brochures on emergency preparedness shall be predistributed to likely transient locations prior to restart. Section IV.E.1.

In addition, the Board suggests strongly that provisions for informing guests or employees include, as soon as practicable, placards displayed in prominent places, such as motel lobbies, park entrances, outside public facilities, and bulletin boards of local businesses.

- e. The Licensee is directed, we hope with the assistance of PEMA, the counties, and the Chambers of Commerce, etc., to begin to offer briefings to major employers and to operators of temporary transient locations. These briefings should include key emergency planning information, and the importance of planning in advance about how the "hosts" will provide such information to transients in the event of an emergency. These briefings shall at least be underway with respect to major "hosts" by the time of any restart. Section IV.E.1.
- f. The entire siren system shall be tested audibly prior to restart in addition to the other Licensee-proposed system tests (e.g., silent and selected audible tests). The Staff shall review and certify to the Commission prior to restart the satisfactory completion and results of the various siren tests as required above and proposed by the Licensee. The Staff's certification shall include whether the results of the siren testing program disclose the need for supplementary alerting. Section IV.E.2.
- g. There must be held prior to restart of TMI-1 at least one communications drill similar to that suggested by the Commonwealth (PF ¶ 118). The drill should include ideally, communications between: Licensee and PEMA, PEMA and each risk county emergency management coordinator, each risk county and its key officials and each municipality and its key officials. Such a drill should be structured to test telephone service and the various radio systems. If possible, stress should be placed on the communications systems to test the possible effect of an emergency overload situation. Section IV.H.2.
- h. Prior to restart, the Staff is directed to certify to the Commission, preferably with FEMA's assistance, when written plans for each school district in the plume EPZ have been completed and reviewed for adequacy. Section IV.H.7.

2011. In addition to the above conditions of restart, the Board has made suggestions in the course of the emergency planning decision, as follows:

- a. The Board suggests that the Southern, Southwestern, Hanover, Red Lion and Dallastown School Districts, each of which has mass care responsibilities under the York County plan, prepare written plans setting forth their mass care emergency responsibilities. Section IV.H.1.
- b. The Board suggests that the Commission direct the NRC Staff to notify it within one year following any restart whether predistribution of KI has been accomplished in accordance with the Commonwealth and county plans. Section IV.H.12.
- c. The Board suggests that municipalities prepare written plans to (1) provide for pick-up of persons who, by virtue of poor health or other such impairment, would be unable to evacuate the EPZ by themselves (and prepare lists of the names and addresses of these individuals, although not as part of the plan), (2) describe local traffic bottlenecks and how local manpower would be supplied to augment State Police efforts at traffic control points, and (3) identify unmet municipal needs for reporting to the county. Section IV.H.14.
- d. The Board suggests that the Commission direct the Staff, preferably with the assistance of FEMA and the Commonwealth, to report to it, approximately one year after restart of TMI-1, on the status of the resolution of those deficiencies in state, county and municipal planning identified by FEMA and summarized in Staff proposed finding 371, note 100. Sections IV.H.14, IV.I.2, and IV.L.

V. REOPENED PROCEEDING ON CHEATING

2012. In the Partial Initial Decision of August 27, 1981 we reported several notifications to the Board from the NRC Staff dated July 28 and August 6, 7 and 14, 1981 providing the results of an investigation by the Office of Inspection and Enforcement (IE) into allegations of cheating by two TMI-1 shift supervisors on the NRC Senior Reactor Operator examinations. PID ¶¶ 43-45. The IE reports also raised questions concerning the adequacy of the proctoring of NRC-administered examinations and we learned that the Staff believed that a reexamination of all TMI-1 operator candidates was required. While we noted that the IE investigation raised questions affecting the issues decided in the partial Initial Decision, we

nevertheless issued the decision so that, *inter alia*, the Commission could monitor the IE investigation in the context of its relevance to this proceeding. PID ¶ 45. The Board reserved jurisdiction over the testing and cheating issues noting:

The issues of Licensee's management integrity, the quality of its operating personnel, its ability to staff the facility adequately, its training and testing program, and the NRC process by which the operators would be tested and licensed, are all important issues considered in this partial decision.

Id.

2013. On September 8, 1981 the Licensee itself brought to the Board's attention its concern about "several cases of strong parallelism" in answers on some Licensee-administered examinations.²²⁴

2014. On October 2, 1981 we reopened the evidentiary hearing to inquire into the matter and appointed Professor Gary L. Milhollin, an NRC Administrative Judge, as a Special Master to preside over the hearing pursuant to 10 CFR 2.722(a)(2). Tr. 23,116, *et seq.*; *see also* Board Memorandum and Order of September 14, 1981 reopening the record and appointing a special assistant. The Board delegated to Professor Milhollin the authority to inquire into twelve specific issues and to add additional issues under the following broad issue:

The board issue to be heard in the reopened proceeding is the effect of the information on cheating in the NRC April examination on the management issues considered or left open in the Partial Initial Decision, recognizing that, depending on the facts, the possible nexus of the cheating incident in the NRC examination goes beyond the cheating by two particular individuals and may involve the issues of Licensee's management integrity, the quality of its operating personnel, its ability to staff the facility adequately, its training and testing program, and the NRC process by which the operators would be tested and licensed.

Memorandum and Order on October 2, 1981 Conference of the Parties Relative to the Reopened Proceeding, October 14, 1981, at 2. Subsequently, as a result of two later IE investigation reports (dated October 13 and 28, 1981), the reopened proceeding was expanded. The Special Master presided over an accelerated discovery program among the parties and began receiving evidence on November 10, 1981 in Harrisburg. The evidentiary

²²⁴ Licensee's September 8, 1981 Response to Board Order Relative to the Submission of Views on the Investigation of Cheating Dated August 20, 1981.

sessions over which Professor Milhollin presided concluded at about the time this Partial Initial Decision issued. In the next few weeks the Board will determine whether additional evidence is required to complete the record. Then we must consider the Special Master's report and the views of the parties on the reopened proceeding. We estimate that the Board's final decision on the cheating episodes will not issue until March or April 1982.

2015. The very great importance of operator competence has been recognized by the Commission and the various inquiry groups since the TMI-2 accident. At the outset of this proceeding the Commission expressed its concern about ". . . several human errors that occurred during the accident and contributed to its severity." August 9, 1979 Order and Notice of Hearing, 10 NRC 141, 143. Short term item 1(e) of the order directed that the Licensee augment the retraining of all its Reactor Operators and Senior Reactor Operators and that the Licensee and NRC Staff reexamine the operators. *Id.*, at 144. As the Licensee's own internal investigation of the TMI-2 accident stated, "Inadequate operator training was clearly one of the most important factors which contributed to the accident" GPU Accident Review Task Force Final Summary Report, R.W. Keaten, *et al.*, December 15, 1980 (at 12).²²⁵ This report described numerous weaknesses in the pre-accident training program. *Id.*, at 12-13, 35-36.

2016. In our August 27, 1981 PID we endorsed the adequacy of the Licensee's retraining program and the testing programs of the Licensee and NRC Staff. *See generally* PID ¶¶ 163-207, 225-76, *particularly* ¶¶ 204-07, 268-72. As we noted throughout the Partial Initial Decision, our endorsement was brought into question by the implications of cheating and the possible defeatability of the purpose of NRC and Licensee-administered examinations.

2017. In Part II above we have made many determinations favoring restart dependent upon improvements in the TMI-1 machinery. However it can be readily observed that our determinations also depend very heavily upon correct operator procedures essential to safety. Operators whose competence has been ensured by appropriate training which has been verified by NRC and company-administered examinations are an indispensable element of nuclear safety despite the many improvements in plant design.

2018. As examples, in the event of a SBLOCA, although no mitigating actions are required within ten minutes, the operator must decide, on the basis of the control room instrumentation, that coolant is being lost. *See* ¶

²²⁵This report is not in evidence but it has been served upon the Board and the parties in this proceeding. We make no findings or conclusions based upon it. It is cited here to provide a contextual background to our comments.

927. He must distinguish between an SBLOCA and an overcooling event on the basis of procedures and training. ¶ 658. In order to maintain cooling in the presence of voids, procedures call for the operator to raise the level of water in the steam generator and provide for a sump switchover. ¶ 931. The operator must take whatever actions are necessary to assure that a subcooling margin of at least 50° F exist. ¶ 929. Although procedures permit operator override of protection systems (¶ 747), and the criteria for such action have been incorporated in the procedures; knowledge of those criteria is an important part of operator training. Section C of Part II addressed the adequacy of the operating procedures for dealing with transients beyond the design basis. In that section we perceived inadequacies that must be corrected in the long term

2019. We had earlier considered the possibility of requesting the Special Master to issue an interim report upon which a Board recommendation now could be made but when the issues to be heard in the reopened proceeding were expanded an interim report turned out to be impractical.

2020. Because of the important ramifications of the issues being examined in the reopened proceeding the Board has had difficulty in arriving at a firm recommendation to the Commission concerning a possible restart before our decision in the reopened proceeding. Dr. Jordan would permit restart at full power based upon the various short and long-term commitments and requirements as discussed throughout this decision. It is his view that the license conditions set out under ¶ 583 of the August 27 PID must be met, but that once they are met the conditions provide reasonable assurance that TMI-1 can be operated safely in the sort term pending the outcome of the reopened proceeding. He believes that the testing and staffing requirements of the ¶ 583 license conditions override the issues of the reopened proceeding; that the real issue is whether those license conditions can be met.

2021. Dr. Little agrees with Dr. Jordan concerning the need for the license conditions under ¶ 583 but would limit operation upon any restart to five percent of nuclear power until the final decision on the reopened hearing. Dr. Little believes that, although the license conditions of ¶ 583 override many of the issues of the reopened proceeding, there are other issues being considered in the reopened proceeding not covered by the license conditions. Operation at no more than five percent of design power level would facilitate testing of many nuclear safety devices and systems but would essentially eliminate the possibility of an accident having serious consequences for the public health and safety.

2022. Both Dr. Little and Dr. Jordan base their belief that any operation is permissible before the final decision on the cheating matter on the premise that such operation would be very short-term with the understanding that TMI-1 would be shut down if the result of the reopened proceeding does not favor operation.

2023. Because of want of technical expertise and the absence of a respective evidentiary record, Chairman Smith has no view on the relative merits of full power versus five percent power. He agrees with Dr. Little that the ¶ 583 license conditions do not override all of the issues to be considered in the reopened proceeding. Since both of the technical members of the Board agree that operation at five percent of design power poses no threat to the public health and safety under the proposed conditions, Chairman Smith defers to their expertise where they agree. He joins Dr. Little's position as the more reasonable because of the reopened issues not covered by the license conditions. The result is that the Board unanimously determines that the pendency of the reopened proceeding should not be a bar to the restart of TMI-1 up to, but not exceeding five percent of design power with the particular proviso that the staffing, training and testing license conditions set out in PID ¶ 583 be enforced.

VI. CONCLUSION

2024. In Part II relating to plant design and procedures, in Part III relating to the separation of the Three Mile Island nuclear units, and in Part IV relating to emergency planning in the vicinity of Three Mile Island, we have found various deficiencies in design, procedures and planning which must be corrected before restart. These corrections in the form of Licensee commitments, NRC Staff requirements and Board-imposed conditions provide reasonable assurance that, with respect to the issues decided in this Partial Initial Decision, Three Mile Island Unit No. 1 can be operated in the short term without endangering the health and safety of the public. The Board has also found in Parts II, III and IV that the Licensee has made reasonable progress with respect to various necessary and sufficient long-term actions which, relative to the issues decided, provide reasonable assurance that Three Mile Island Unit No. 1 can be operated in the long term without endangering the health and safety of the public.

2025. In Part II, Section S, ¶ 1138, the Board found that the Staff's method of determining that all of the necessary TMI-2 accident-related recommendations have been identified is sufficient to provide reasonable assurance that Three Mile Island Unit No. 1 can be operated in the short and long term without endangering the health and safety of the public.

2026. In Part V the Board has determined that the pendency of the reopened proceeding on cheating, particularly in view of the license conditions imposed in ¶ 583 of the Partial Initial Decision of August 27, 1981, should not bar short-term operation of Three Mile Island Unit 1 not to exceed five percent of design power. The Board had retained and continues to retain jurisdiction to consider the effect of the information developed in the reopened proceeding on all issues considered or expressly left open in the Partial Initial Decision of August 27, 1981 and in this Partial Initial Decision.

VII. EFFECTIVENESS AND APPEALABILITY

2027. Comments to the Commission with respect to its immediate effectiveness review shall be in accordance with Commission orders.

2028. Within ten days after service of this Partial Initial Decision, any party may take an appeal to the Appeal Board by filing exceptions to all or portions of the decision. A brief in support of the exceptions shall be filed within thirty days thereafter or within forty days in the case of the Staff. 10 CFR 2.762. This Board recognizes that, with the simultaneous comment period before the Commission on the issue of immediate effectiveness, and considering the length of this Partial Initial Decision, an extension of time for the filing of exceptions with the Appeal Board might be appropriate. However, this Board is without jurisdiction to modify the appellate procedures or schedules. Any request to modify the time period set out in Section 2.762 should be made to the Appeal Board designated to hear the initial appeals.

THE ATOMIC SAFETY AND LICENSING BOARD

Walter H. Jordan
ADMINISTRATIVE JUDGE

Linda W. Little
ADMINISTRATIVE JUDGE

Ivan W. Smith, Chairman
ADMINISTRATIVE LAW JUDGE

Bethesda, Maryland
December 14, 1981

APPENDIX

Emergency Planning Testimony and Exhibits

- A. The direct testimony offered by the Licensee and received in evidence is as follows:
1. Licensee's Testimony of Robert E. Rogan, George J. Giangi, and Alexis Tsaggaris on the Adequacy of Onsite Emergency Preparedness at Three Mile Island Unit 1) (Rogan, *et al.* ff. Tr. 13,756)
 2. Licensee's Testimony of William E. Riethle in Response to Contention Nos. EP-3(c)(1) and EP-18 and Board Question 4 (Offsite Radiological Monitoring) (Riethle, ff. Tr. 14,842)
 3. Licensee's Testimony of Russell R. Dynes on the Principles of Planning for Emergencies (Dynes, ff. Tr. 17,120)
 4. Licensee's Testimony of Bruce E. Podwal, Albert E. Schaufler, and Robert E. Rogan on Evacuation Time Estimates for the Plume Exposure Pathway Emergency Planning Zone at Three Mile Island (Podwal, *et al.*, ff. Tr. 17,140)
 5. Licensee's Testimony of Milton Levenson on Realistic Estimates of the Consequences of Nuclear Accidents for Use in Emergency Planning (Levenson, ff. Tr. 19,525)
 6. Licensee's Testimony of Eugene F. Knopf, William Gallagher and Oran Henderson Relating to Emergency Planning (Knopf, *et al.*, ff. Tr. 21,816)
- B. The direct testimony offered by the intervenors and received in evidence is as follows:
1. Aamodt Testimony to Support Aamodt Contention 4 (Aamodt, ff. Tr. 14,517)
 2. Direct Testimony of Dr. Jan Beyea on behalf of the Anti-Nuclear Group Representing York Regarding A.N.G.R.Y. Contention No. III B(D) (Beyea, ff. Tr. 18,350)
 3. Testimony of Paul M. Lytle, Jr., Jeremiah K. Fisher and Vance Fisher in Support of Aamodt Contention EP-2 (Lytle, *et al.*, ff. Tr. 18,749)

4. Testimony of Dr. Robert Weber in Support of Aamodt Contention EP-2 (Weber, ff. Tr. 18,799)
5. Testimony of Bruce Molholt, Ph.D, in Support of Off-site Contentions of the Environmental Coalition on Nuclear Power (EP-7 (ECNP 2-8), EP-10 (ECNP 2-28), EP-11 (ECNP 2-33)) (Molholt, ff. Tr. 19,690)
6. Intervenor Aamodt's Testimony of County Agricultural Agents Harold E. Stewart of Dauphin County and John T. Smith of York County Regarding Contention EP-1 (Stewart and Smith, ff. Tr. 20,243)
7. Testimony on Behalf of the Anti-Nuclear Group Representing York on Municipal and School Emergency Planning in York County, PA and York County Emergency Response to Three Mile Island (Ryscavage, *et al.*, ff. Tr. 21,508)
8. Testimony of Kai T. Erikson on Emergency Planning for the Three Mile Island Area Communities in Rebuttal to the Testimony of Dr. Dynes (on behalf of ANGRY) (Erikson, ff. Tr. 21,686)
9. Testimony of Donald Zeigler on Emergency Planning for the Three Mile Island Area Communities on Behalf of the Anti-Nuclear Group Representing York (Zeigler, ff. Tr. 21,818)

In addition, Mrs. Aamodt called Dr. Lawrence Samples who testified on her behalf beginning at Tr. 18,775. He did not submit pre-filed direct testimony.

- C. The Commonwealth of Pennsylvania, which is participating as an interested state under 10 CFR 2.715(c), called numerous witnesses to testify on its behalf. The direct testimony offered by the Commonwealth and received in evidence is as follows:
 1. Commonwealth of Pennsylvania's Testimony of General DeWitt C. Smith and James N. Lothrop Outlining the Commonwealth's Approach to Testimony (Smith and Lothrop, ff. Tr. 17,698)
 2. Commonwealth of Pennsylvania's Testimony of Kenneth R. Lamison Pertaining to Warning (Contentions E-5(d) and EP-15(f)) (Lamison (Warning), ff. Tr. 17,818)

3. Commonwealth of Pennsylvania's Testimony of Kenneth R. Lamison Pertaining to Exercises and Drills (Contentions EP-4(f) and EP-5(d)) (Lamison (Exercises and Drills), ff. Tr. 17,818)
4. Commonwealth of Pennsylvania's Testimony of Kenneth R. Lamison Pertaining to Training (Contention EP-5(f) (Lamison (Training), ff. Tr. 17,818)
5. Commonwealth of Pennsylvania's Testimony of Kenneth R. Lamison Pertaining to Command and Control (Contentions EP-5(c), EP-6(b), EP-14(c), EP-14(h), EP-14(j), EP-14(r), and EP-14(x)) (Lamison Command and Control), ff. Tr. 17,818)
6. Commonwealth of Pennsylvania's Testimony of James N. Lothrop Pertaining to Evacuation (Contentions EP-13, EP-14(kk), EP-14(nn) EP-16(a), EP-16(n), and EP-16(p)) (Lothrop, ff. Tr. 17,996)
7. Commonwealth of Pennsylvania's Testimony of John J. Comey Pertaining to Public Information (Contention EP-12) (Comey, ff. Tr. 18,038)
8. Commonwealth of Pennsylvania's Staff Testimony of Margaret A. Reilly in Response to Contentions EP-5B, EP-5E, EP-11, EP-18C, EP-18E (Emergency Planning-Bureau of Radiation Protection) (Reilly, ff. Tr. 18,125)
9. Commonwealth of Pennsylvania's Testimony of Dr. Max A. Van Buskirk, Jr. and Dr. John W. Cable Regarding Contentions EP-2, EP-4(a) and EP-5(g) (Livestock Evacuation) (Van Buskirk and Cable, ff. Tr. 18,296)
10. Commonwealth of Pennsylvania's Testimony of Julia Cox Pertaining to Thyroid Blocking Agent Distribution (Contentions EP-5(a), EP-6(e), and EP-10) (Cox, ff. Tr. 18,497)
11. Testimony on ECNP Contention 2-33 (EP-11) by George K. Tokuhata, Dr. P.H., Ph. D. (on behalf of Commonwealth) (Tokuhata, ff. Tr. 20,097) and Additional Tokuhata Data in Form of Table and Map (Tokuhata Data, ff. Tr. 20,106)
12. Commonwealth of Pennsylvania's Testimony of Leroy C. Corbin, Jr. Regarding Contention EP-18(E) (Contaminated Foodstuffs) (Corbin, ff. Tr. 20,286)

13. Joint Testimony of Adolph L. Belser (PEMA), Randy L. Curry (York County) and Michael E. Wertz (Dauphin County) Pertaining to York and Dauphin County Emergency Planning (Contentions EP-6, EP-14 and EP-16) (Curry, *et al.*, ff. Tr. 20,787)

In addition, Robert C. Furrer (Tr. 18,832), George Fouse (Tr. 20,396), Ralph J. Hippert (Tr. 22,873), and William Dornsife (Tr. 23,011) testified on behalf of the Commonwealth. They did not submit pre-filed direct testimony.

- D. The direct testimony offered by the NRC Staff and received in evidence is as follows:
 1. NRC Staff Testimony of Stephen H. Chesnut on Contentions Related to Onsite Emergency Planning and the Licensee's Emergency Plan (Chesnut, ff. Tr. 15,007)
 2. NRC Staff Testimony of Joseph R. Levine on Contentions Related to Onsite Emergency Planning (Levine, ff. Tr. 17,298)
 3. NRC Staff Testimony of Dale E. Donaldson on Emergency Planning Contentions (Donaldson, ff. Tr. 17,354)
 4. Testimony of Frederick J. Bath and Vernon E. Adler of the Federal Emergency Management Agency on Certain Offsite Emergency Planning Contentions (Adler and Bath (2/23/81), ff. Tr. 18,975)
 5. Testimony of FEMA's Vernon E. Adler and Frederick J. Bath on Contentions Related to Offsite Emergency Preparedness (Adler and Bath (3/16/81), ff. Tr. 18,975)
 6. Testimony of Thomas Urbanik on Evacuation Time Estimate Study for Three Mile Island (Urbanik, ff. Tr. 19,137)
 7. Joint Testimony of NRC Staff's Stephen Chesnut and FEMA's Frederick J. Bath on Contentions Related to Onsite/Offsite Emergency Preparedness (Chesnut and Bath, ff. Tr. 19,626)
 8. NRC Staff Testimony of Harold T. Peterson, Jr. on ECNP Contention 2-33 (EP-11) (Peterson, ff. Tr. 20,500)
 9. NRC Staff Testimony of Stephen H. Chesnut on Unresolved Onsite Emergency Response Matters from the February 9, 1981 NRC Staff Testimony of Dale E. Donaldson on Conten-

tions EP-4D and EP-18 (Chesnut (Unresolved Matters), ff. Tr. 22,235)

10. NRC Staff Testimony of Dale Donaldson and Stephen Chesnut on Licensee's Response in June 2, 1981 Exercise and NRC Staff's Exercise Report (Donaldson and Chesnut, ff. Tr. 22,236)

E. In addition to the direct testimony received in evidence, the parties offered various exhibits in the emergency planning phase of this proceeding. The following Board exhibits related to emergency planning were received in evidence;

Board Ex. 3 Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG-0654, Appendix 5 (Tr. 4,463)

Board Ex. 5 Draft, York County Radiological Emergency Response Plan for Incidents at the Three Mile Island Nuclear Power Station, April 14, 1981 (Tr. 20,790)

Board Ex. 6 Draft, Dauphin County Radiological Emergency Response Plan for Incidents at the Three Mile Island Nuclear Power Station, April 7, 1981 (Tr. 20,791)

Board Ex. 7 Cumberland County Radiological Emergency Response Plan, April 28, 1981 (Tr. 21,813)

Board Ex. 8 Lancaster County Radiological Emergency Response Plan, March 20, 1981 (Tr. 21,813)

Board Ex. 9 Lebanon County Radiological Emergency Response Plan, April 21, 1981 (Tr. 21,813)

Board Ex. 11 FEMA Proposed Rule, 44 CFR 350, 45 Fed. Reg. 42341, June 24, 1980 (Tr. 22,639)

Board Ex. 12 FEMA/NRC Memorandum of Understanding (Tr. 22,643)

Board Ex. 13 Municipal Emergency Plans (Tr. 22,996)

The Board also had five maps prepared which visually describe the area around the Three Mile Island site. These maps were identified as:

- Board Physical Ex. A. Three Mile Island Nuclear Power Station, Middletown, PA; 50-Mile Radius Area Population Density Map; 1977 Estimate, by Census County Subdivision. July 1980, U.S. Geological Survey (Tr. 19,373)
- Board Physical Ex. B. Land Use and Land Cover Map, Harrisburg, PA 1972, U.S. Geological Survey (Tr. 19,373)
- Board Physical Ex. C. Computer Plotted Map of Land Use and Land Cover, Three Mile Island Vicinity, with Census Tracts. U.S. Geological Survey (Tr. 19,373)
- Board Physical Ex. D. Three Mile Island Nuclear Power Station, Middletown, PA; 20-Mile Radius Population Density Map; 1977 Estimate by Census County Subdivision. July 1980, U.S. Geological Survey (Tr. 19,373)
- Board Physical Ex. E. Three Mile Island Nuclear Power Station, Middletown, PA; 10-Mile Radius Area. July 1980, U.S. Geological Survey (Tr. 19,373)

F. The following Licensee exhibits relating to emergency planning were received in evidence:

- Licensee Ex. 30 GPU Nuclear Emergency Plan for TMI-1, Revision 3, January 1981 (Tr. 13,759)
- Licensee Ex. 31 Three Mile Island Nuclear Station, Unit No. 1, Administrative Procedure 1053, Emergency Equipment Readiness, Revision O, January 7, 1981 (Tr. 14,839)
- Licensee Ex. 52 Evacuation Time Estimates for the Plume Exposure Pathway EPZ of Three Mile Island Nuclear Generating Facility, 3/3/81 (Tr. 17,408)
- Licensee Ex. 58 Letter dated July 8, 1981 to J. Gray, NRC, from R. E. Zahler, re Licensee's commitment on staffing of EOF (Tr. 22,934)
- Licensee Ex. 59 Letter dated July 7, 1981 to R. Adler, Commonwealth, from E. L. Blake, re Licensee commitments on management (operational staffing) (Tr. 23,003)

G. The intervenors also introduced certain documents for identification. Only one of the documents pertaining to emergency planning was received in evidence;

ANGRY Et. 3 Map of school districts in EPZ (Tr. 21,669).

H. The following Commonwealth of Pennsylvania exhibits related to emergency planning were received in evidence:

Commonwealth Ex. 1 Pages 59 through 67, Three Mile Island, A Report to the Commissioners and the Public, NRC Special Inquiry Group, Mitchell Rogovin, Director (Tr. 16,200)

Commonwealth Ex. 2.a Commonwealth of Pennsylvania Disaster Operations Plan, Annex E, Fixed Nuclear Facility Incidents, dated February 23, 1981 (Tr. 17,815)

Revised Appendix 7 to the Commonwealth of Pennsylvania Disaster Operations Plan, Annex E, Fixed Nuclear Facility Incidents, dated February 23, 1981 (Tr. 20,400)

Commonwealth Ex. 2.b Map, excerpt of the Commonwealth of Pennsylvania Disaster Operations Plan, Annex E, Fixed Nuclear Facility Incidents, dated February 23, 1981 (Tr. 17,815)

Commonwealth Ex. 3 Commonwealth of Pennsylvania brochure entitled "Emergency Information: What You Should Know About Nuclear Radiation Incidents", issued 11/79 (Tr. 18,208)

Commonwealth Ex. 4 Lancaster County brochure entitled "Emergency Information for Lancaster County" (Tr. 18,208)

Commonwealth Ex. 5 York County brochure entitled "Emergency Information for York County" (Tr. 18,208)

Commonwealth Ex. 6 Commonwealth's TMI Fault Tree Procedures (Tr. 18,912)

Commonwealth Ex. 7 Dauphin County brochure entitled "Emergency Information for Dauphin County" (Tr. 19,683)

I. The following NRC Staff exhibits on emergency planning were received in evidence:

Staff Ex. 1 NUREG-0680, TMI-1 Restart Evaluation of Licensee's Compliance with the Short and Long Term Items of Section II of NRC Order Dated August 9, 1979. Metropolitan Edison Company, *et al.*, Three Mile Island Nuclear Station Unit 1, Docket No. 50-289 (Tr. 20,122)

- Staff Ex. 4 NUREG-0680, Supplement No. 1 (Tr. 11,941)
- Staff Ex. 6 NUREG-0746, Emergency Preparedness Evaluation for TMI-1 (Tr. 15,009)
- Staff Ex. 7 NUREG-0654, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Revision 1 (Tr. 15,010)
- Staff Ex. 8 NUREG-0696, Functional Criteria for Emergency Response Facilities, with attached letter dated March 5, 1981 from Darrell G. Eisenhut to all licensees of operating plants and holders of construction permits (Generic Letter No. 17) (Tr. 15,433)
- Staff Ex. 10 NUREG-0728, Report to Congress: NRC Incident Response Plan, September 1980 (Tr. 16,110)
- Staff Ex. 14 NUREG-0680, Supplement 3 (Tr. 20,122)
- Staff Ex. 17 Affidavit of Stephen Chesnut on Closeout Inspection on 30 Health Physics-Emergency Planning Significant Findings from Inspection 50-289/80-22, on Licensee's Shift Manning Using One Licensed Senior Reactor Operator Rather Than Two and on Containment High Range Monitors for Emergency Response (Tr. 22,234)
- Staff Ex. 18 Memorandum dated June 16, 1981 to B. K. Grimes, NRC, from R. T. Jaske, FEMA, containing [FEMA] Interim Findings and Determinations Relating to the Status of State and Local Emergency Preparedness around Three Mile Island (TMI) Fixed Nuclear Facility (Tr. 22,512)
- Staff Ex. 19 FEMA Responses to Licensing Board Questions on Extent to Which Panic and Psychological Stress Were Factored into NUREG-0654/FEMA-REP-1, on Data on Persons Who Panic in Disaster Situations, and on Documentation Available to FEMA on Extent to Which Evacuees Respond to Instructions Perceived To Be Contrary to Their Best Interests (Tr. 22,513)

- Staff Ex. 20 Attachment 1 to FEMA's Interim Findings and Determinations of June 16, 1981: Pennsylvania REP Exercise Site - Specific to TMI - Observations and Recommendations (Tr. 22,514)
- Staff Ex. 21 Attachment 2 to FEMA's Interim Findings and Determinations of June 16, 1981: Update of May 14, 1981 Review of Pennsylvania Planning Site - Specific to TMI (Tr. 22,515)
- Staff Ex. 22 Brief Summary of the [FEMA] Guidance Memorandum Series for Use as an Index, dated December 15, 1980 (Tr. 22,593)
- Staff Ex. 23 NUREG-0746, Supplement No. 1 (Tr. 22,879)
- Staff Ex. 24a and b FEMA Interim Findings and Determination Relating to the Status of State and Local Emergency Preparedness Around the TMI Fixed Nuclear Facility for York County (September 18, 1981); enclosing Pennsylvania REP Exercise Site Specific to TMI, Observations and Recommendations, York County (September 11, 1981). (Admitted pursuant to stipulation after the hearing. *See* Section IV.I, *supra*.)

J. Other documentary evidence pertaining to emergency planning which was incorporated into the record is as follows:

1. Professional Qualifications, Brian K. Grimes (ff. Tr. 15,007, 15,855)
2. Resolution No. OR-9-171, dated July 16, 1979, Organization Chart for PEMA (PEMA Organization Chart, ff. Tr. 18,286)
3. Department of Health, Education and Welfare, Food and Drug Administration, Notice Requesting Submissions of New Drug Applications for Potassium Iodide as a Thyroid-Blocking Agent for Use in a Radiation Emergency, 43 Fed. Reg. 58798 (1978) (Tr. 18,577)
4. Department of Health, Education and Welfare, Food and Drug Administration, Notice Approving Two New Drug Applications for Potassium Iodide as a Thyroid-Blocking Agent for Use in a Radiation Emergency, 45 Fed. Reg. 11912 (1980) Tr. 18,577)
5. Professional Qualifications, Robert C. Furrer (ff. Tr. 18,836)

6. Organization Chart of the Pennsylvania Department of Agriculture (ff. Tr. 18,836)
7. Professional Qualifications, Michael S. Pawlowski (ff. Tr. 18,928)
8. Memorandum dated March 26, 1981 from Samuel J. Chilk, U.S. Nuclear Regulatory Commission to William J. Dircks, U.S. Nuclear Regulatory Commission, regarding SECY-80-257/257A -Radiation Protection - Thyroid Blocking (Tr. 20,394)
9. Letter dated March 25, 1981 from Joseph M. Hendrie, Chairman, U.S. Nuclear Regulatory Commission, to Louis Guiffrida, Director, Federal Emergency Management Agency (Tr. 20,394)
10. Letter dated March 25, 1981 from Joseph M. Hendrie, Chairman, U.S. Nuclear Regulatory Commission, to Dr. Mark Novich, Acting Commissioner for Food and Drugs, Food and Drug Administration (Tr. 20,394)
11. Professional Qualifications, George W. Fouse (ff. Tr. 20,397)
12. Official Notice of Calculations Performed by Dr. Walter H. Jordan on Dose to Thyroid (May 15, 1981 ASLB Memo. and Order, ff. Tr. 21,304)
13. Attachment 3 to FEMA's Interim Findings and Determinations of June 16, 1981: Changes in Preparedness on Issues Before the Board - Unresolved Matter Based on Filed Testimony of FEMA's Bath/Adler and FEMA's Bath/NRC Chesnut (Bath (Attachment 3), ff. Tr. 22,350)
14. Stipulation of a chronology of events regarding advisories to the public during the TMI-2 accident (Tr. 22,501)
15. Professional Qualifications, Robert T. Jaske (ff. Tr. 22,508)
16. Professional Qualifications, John E. Dickey (ff. Tr. 22,508)
17. Professional Qualifications, Thomas E. Hardy (ff. Tr. 22,508)
18. Professional Qualifications, Bruce J. Swiren (ff. Tr. 22,508)
19. NRC Staff Position on Emergency Preparedness for TMI-1 (ff. Tr. 22,881)

20. Official Notice of Pennsylvania Statute, Title 635, Part 5, Chapters 71, 73, 75, 77 (Tr. 22,958)
21. Professional Qualifications, William P. Dornsife (ff. Tr. 23,011)

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Ivan W. Smith, Chairman
Dr. Walter H. Jordan
Dr. Linda W. Little

In the Matter of

Docket No. 50-289-SP
(Restart)
(Reopened Proceeding)

**METROPOLITAN EDISON
COMPANY**
**(Three Mile Island Nuclear
Station, Unit 1)**

December 15, 1981

The Licensing board refuses to hold evidentiary hearings on certain contentions relating to the adequacy of an Environmental Impact Appraisal (EIA) and the need for an Environmental Impact Statement (EIS). It also denies a motion to reject the EIA.

**LICENSING BOARDS: DELEGATED AUTHORITY OR
JURISDICTION**

Each action the board takes must be founded upon either express or necessarily implicit delegation of authority. The board has strong doubts that it has jurisdiction to consider the need for and content of an EIS where the Commission has shown considerable interest and become directly involved in the proceeding, and where neither the Commission's notice of hearing nor any later Commission document suggests that the board should consider the need for an EIS.

LICENSING BOARDS: JURISDICTION

The parties cannot by agreement confer on the Board subject matter jurisdiction. However, the Board will take jurisdiction to rule on NEPA

issues where 10 CFR §51.52(d) at least arguably authorizes the Board to decide these issues, and where an exercise of jurisdiction by the board would ultimately produce the most efficient and orderly disposition of the issues.

NEPA: HEARINGS

The Board's mandate is not to conduct a plenary review to determine whether the Staff has complied with NEPA and 10 CFR Part 51, but rather to decide any matters in controversy among the parties.

RULES OF PRACTICE: CONTENTIONS, ADMISSIBILITY OF

Where the only NEPA matters in controversy are legal contentions that there has been a failure to comply with NEPA and 10 CFR Part 51, the Board will rule on the contentions without further evidentiary hearings, making use of the existing evidentiary record on substantive issues and additional material of which it can take official notice.

NEPA: ENVIRONMENTAL IMPACT APPRAISAL; ENVIRONMENTAL IMPACT STATEMENT

In determining whether it can hold as a matter of law that the requirements of NEPA and 10 CFR Part 51 have not been met, the Board considers not only the EIA but also any relevant supplemental information in the hearing record and in its own partial initial decisions.

TECHNICAL ISSUES DISCUSSED:

- Impact of Class 9 accidents;
- Impact of Unit 2 cleanup on Unit 1 operation;
- Impact of fuel handling accident;
- Cumulative dose from Unit 2 cleanup and Unit 1 restart;
- Radioactive waste storage onsite;
- Radioactive waste disposal offsite;
- Impacts of emergency preparedness requirements on state and local governments;
- Impacts of alert-notification system;
- Impacts of evacuation and other protective actions;
- Construction effects;

Psychological stress;
Effluent monitoring;
Ground water monitoring;
Protection of ground water.

MEMORANDUM AND ORDER ON NEPA - COMPLIANCE ISSUES

In this Memorandum and Order we rule on the various contentions before us alleging noncompliance with the requirements of the National Environmental Policy Act of 1969 (NEPA) and the Commission's regulations implementing that statute, 10 CFR Part 51.

Background

Early in the proceeding several intervenors filed contentions that an environmental impact statement (EIS) should be prepared before a decision is made on the restart of TMI-1. There is no EIS for the proposed restart and the Staff's position always has been that none is required. Nevertheless, on November 9, 1979, the Staff announced, Tr. 373, that it would prepare and issue an environmental impact appraisal (EIA) — a summary evaluation contemplated by the Commission's regulations as a basis for a determination that no EIS is required *See* 10 CFR §51.7(b). In its First Special Prehearing Conference Order, LBP-79-34, 10 NRC 828 (December 18, 1979), the Board identified five EIS contentions and declared its intention to address them in a later order. 10 NRC 828, 841-42, 848. Then, on March 12, 1980, we advised the parties that we would take no action on whether an EIS is required until after the Staff had issued its EIA. *See* Memorandum on the Need for Preparing a Final Environmental Statement Prior to Restart of TMI-1.

Two of the five contentions are no longer before us. In our Fourth Prehearing Conference Order of February 9, 1980, we reconsidered Ms. Aamodt's contention and dismissed it on the ground that it was not really an EIS contention but, rather, an argument of state public utility law beyond our jurisdiction. And on June 5, 1980, Intervenor Steven C. Sholly (Mr. Sholly), withdrew his EIS contention. Therefore, only three of the original EIS contentions (CEA No. 1, TMIA No. 8 and UCS No. 20) survive for consideration at this time.

On March 27, 1981, some fourteen months after announcing its intention to do so, the Staff issued an EIA. At this point Mr. Sholly moved the Board for an order rejecting the EIA and directing the Staff to prepare either a new EIA or a supplement on (1) the environmental impact of Class 9 accidents, (2) the environmental impact of TMI-2 cleanup on the

operation of TMI-1, and (3) certain socioeconomic impacts of restarting TMI-1. In the alternative, he sought leave to litigate three new contentions, one on each of these subjects, designated Sholly EIA-1, -2, and -3, respectively.¹

The Commonwealth of Pennsylvania also attacked the EIA. Although it did not present contentions as such, the Commonwealth nevertheless specified that its concerns as to the adequacy of the EIA related to (1) Class 9 accidents; (2) plant separation issues including (a) fuel handling accident, (b) cumulative radiation dose from Unit 2 cleanup and Unit 1 restart, (c) onsite interim storage of radioactive waste and adequacy of long-term offsite disposal facilities; (3) socioeconomic impacts, including (a) costs to state and local governments for increased emergency preparedness, (b) environmental effects of the Licensee's alert-notification system, and (c) potential adverse effects of evacuation and other protective actions; and (4) the effects of construction and site development.

On May 11, 1981, the Staff, as part of its response to the Commonwealth's position, issued a supplement to its EIA, discussing the construction impacts of the interim solid waste staging facility, the combined effects of radioactive releases from Unit 2 cleanup and Unit 1 restart, and the environmental impacts of the Emergency Operations Facility and the alert-notification system. The Commonwealth later advised the Board that it was satisfied as to the issues addressed in the supplement. Tr. 21,810. At the same time the Commonwealth apparently abandoned, as a NEPA environmental issue, the matter of the fuel handling accident. *Id.* Mr. Sholly, however, renewed his motion to reject, explaining that he had found the supplement wholly unsatisfactory in one area (Class 9 accidents) and only partially satisfactory in the remaining two (TMI-2 cleanup impacts and socioeconomic impacts).

Jurisdiction and Scope of Review

A threshold issue here is whether this Board has jurisdiction to consider whether any applicable requirements of NEPA and 10 CFR Part 51 have been satisfied. As we stated in our Memorandum of March 12, 1980 we have strong doubts that the Commission intended to include the question of the need for and content of an EIS as part of our mandate in this proceeding. Each action we take "must be founded upon either express or necessarily implicit delegation of . . . authority." *Carolina Power and Light Co.* (Shearon Harris, Units 1, 2, 3 and 4), ALAB-577, 11 NRC 18, 30

¹ By a pleading dated April 22, 1981, intervenor ANGRY asked leave "to adopt" Mr. Sholly's proposed contentions if the Board "elects to allow Mr. Sholly to introduce new contentions."

(1980). In this proceeding the principal instrument of delegation is the Commission's Notice of Hearing, CLI-79-8, 10 NRC 141 (August 9, 1979), which contains no suggestion that we should consider the need for an EIS or an EIA. Nor is there any such suggestion in any later Commission document. The Commission's silence on this matter strikes us as significant in view of the Commission's considerable interest and direct involvement in the proceeding.

The parties have had an opportunity to express themselves on this matter, and no party has urged us to dispose of these contentions on purely jurisdictional grounds. The Licensee and the Commonwealth have recommended that we rule on the NEPA issues. We are of course mindful that the parties cannot by agreement confer on the Board subject matter jurisdiction. However, on further consideration we have concluded that 10 CFR §51.52(d) at least arguably authorizes the Board to decide these issues. For this reason, and because we agree with the Commonwealth's observation that an exercise of jurisdiction by this Board over NEPA issues "would ultimately produce the most efficient and orderly disposition of the issues"² we have decided to rule on the NEPA contentions.

If jurisdiction exists, the Board's mandate is not to conduct a plenary review to determine whether the Staff has complied with NEPA and Part 51, but rather to "decide any matters in controversy among the parties." 10 CFR §51.52(d); *compare* 10 CFR §51.52(c)(1) (full compliance review required in construction permit cases).

Determination of Matters in Controversy

Upon careful consideration of the parties' contentions, we have concluded that the only NEPA matters in controversy are legal contentions that there has been a failure to comply with NEPA and Part 51. The parties have not properly stated in these contentions any factual issues that must be resolved in an evidentiary hearing.³ In ruling on these contentions we shall use only the existing evidentiary record and additional material, if any, of which we take official notice.

² Commonwealth of Pennsylvania's Response to Intervenor Steven C. Sholly's Motion to Reject the NRC Staff Environmental Appraisal on TMI-1 Restart, dated April 22, 1981, p. 2.

³ Mr. Sholly, in his Contention EIA-1, does assert the factual proposition that ". . . the environmental impacts of accidents which are beyond the design basis of TMI-1 and which bear a close nexus to the TMI-2 accident are different in impact and/or magnitude from the accidents evaluated in the Final Environmental Statement." However, Mr. Sholly has failed to state any basis for this contention as required by 10 CFR §2.714(b). In any case, as noted below, we exclude all of Mr. Sholly's contentions because they are untimely.

The existing evidentiary record is not, of course, adequately developed in many of the areas in which the intervenors are interested, and in some there is no record at all. What should be the consequence of this? In this particular proceeding, and at this stage of the proceeding, the burden of an inadequate evidentiary record should, in the Board's opinion, be placed on the parties seeking more analysis. At the beginning of this proceeding, as already noted, the Board did defer consideration of contentions calling for an EIS. But there was never any deferral or blanket prohibition applicable to substantive environmental issues.⁴ And indeed, at least some such issues were raised by the parties and allowed by the Board.⁵ In addition, as a consequence of the short-term action item 4 of the August 9, 1979 hearing order (10 NRC at 145) there was a substantial evidentiary presentation on the monitoring of effluents from TMI-1 and the Board made a determination on this subject in our December 14, 1981 Partial Initial Decision ¶ 1279). The Board itself raised and decided questions relative to the adequacy of groundwater monitoring at the TMI site (Board Question 9a) and the adequacy of measures taken to ensure against groundwater contamination (Board Question 9b). See ¶¶ 1307-25.

In the next section we deal with certain contentions that we reject as untimely or beyond the scope of the proceeding. Then we take up the matter of whether, as a matter of law on the basis of the existing record, we can hold that there has been a failure to comply with NEPA and Part 51.

Contentions Rejected as Untimely or Beyond the Scope of the Proceeding

The Board rejects the Sholly contentions because they are untimely, a psychological stress contention because it is foreclosed by prior Commission action, and certain other contentions because they lack nexus to the TMI-2 accident.

⁴ The psychological stress issues were, of course, taken out of the proceeding by action of the Commission, as discussed in the next section.

⁵ *E.g.*, CEA Contention (2)(c) (economic effect of radioactive discharges on Chesapeake Bay fisheries) and TMIA Contentions 1 and 2 (concerning the effects of low-level releases from TMI-1 in combination with TMI-2 accident and decontamination releases, respectively).

Sholly contentions

The three Sholly EIA contentions are in a special category because they were advanced both late in the proceeding and long after Mr. Sholly had unequivocally abandoned his EIS contention.⁶ These contentions clearly are not based on any newly discovered information. And one of the subjects raised in the EIA contentions (impact of Class 9 accidents) was actually addressed in the original Sholly contention. The contentions are therefore untimely. Based on the lack of good cause for the failure to file on time, and perceiving no grounds for granting relief from the consequences of late filing under the five-factor analysis of 10 CFR §2.714(a)(1), we rule that the Sholly EIA contentions will not be entertained by the Board.

Psychological stress contention

Under the disposition of the psychological stress issues made by the Commission on certification by the Board earlier in the proceeding, CLI-80-39, 12 NRC 607, 608 (1980), "there is no authorization for the Board to admit psychological stress contentions." This ruling would appear to apply to contentions on socioeconomic impacts resulting from psychological stress (*e.g.*, depressed housing sales) as well as those on direct psychological stress impacts (*e.g.*, increased anxiety), since contentions of both types were involved in the certification.⁷ CEA's Contention 1 insofar as it relates to "the impact of the re-start on business decisions to re-locate to, or remain in, the TMI area," is a psychological stress issue within the scope of the Commission's ruling, and it has been rejected for that reason.⁸

Contentions having no nexus to the accident

In determining the scope of the proceeding our guiding rule has been that we hear and decide only those issues with a reasonable nexus to the TMI-2 accident. The rule is based on the facts that TMI-1 was reviewed and approved at the operating license stage and that, but for the accident, we would not be involved in this particular proceeding. The review at the

⁶ Intervenor Steven C. Sholly Reconsideration of Contentions, dated June 5, 1980, p. 3. Mr. Sholly confirmed the withdrawal of this contention, among others, in a further Memorandum dated December 23, 1980.

⁷ See, *e.g.*, Newberry Intervenors Contentions 1 and 2 cited in Certification to the Commission on Psychological Distress Issues, LBP-80-8, 11 NRC 297, 298, n. 2. (1980).

⁸ In addition to its untimeliness, discussed above, Sholly Contention EIA-3 belongs in this category to the extent it deals with impacts on housing and the economy, including the marketability of farm and seafood products.

operating license stage included not only a safety evaluation but also NEPA environmental review culminating in the issuance of an EIS. It is appropriate, therefore, to apply the nexus rule again as we consider NEPA environmental contentions.

We reject several contentions for lack of nexus to the accident. UCS Contention 20, for one, is rejected on this ground to the extent it calls for an analysis of *all* Class 9 accidents. This is merely an extension of our ruling in the safety area, where we limited the scope of the Class 9 accident inquiry to accidents with a reasonable nexus to the TMI-2 accident. For the same reason, we hold that TMIA Contention 8 is objectionable insofar as it calls for an evaluation of *all* socioeconomic impacts. We also reject CEA Contention 1 insofar as it deals with alternative power sources and demands inquiry into "the overall climate of licensing." Finally, we are inclined to place in this category the Commonwealth's argument that the EIA should deal with the "adequacy of long-term offsite disposal facilities for the combined waste from Unit 1 operation and Unit 2 cleanup." See Commonwealth's "Response" dated April 22, 1981, p. 10.

Whether Additional NEPA Environmental Analysis Is Required as a Matter of Law

In this section we look to the existing record on the subjects mentioned in the contentions and determine whether we can hold as a matter of law that there has been a failure to comply with NEPA and Part 51. In making this determination we take into account not only the information in the EIA but also any relevant supplemental information in the hearing record and our Partial Initial Decisions. *Cf. New England Coalition on Nuclear Pollution v. NRC*, 582 F.2d 87, 94 (1st Cir. 1978).

Class 9 accidents

As detailed in our Partial Initial Decision of December 1981, Part II, Section 5, Class 9 accidents have received extensive consideration in the proceeding. We did insist that contentions based on Class 9 accidents have a reasonable nexus to the TMI-2 accident, but subject to that requirement the Board allowed contentions advanced by UCS, Mr. Sholly and ECNP. Other intervenors, whose Class 9 accidents had been rejected, were allowed to "adopt" UCS Contention 13. In addition, the Board, on its own initiative, pursued the subject through demands for additional information on (1) the staff's methodology for classifying accidents as credible or incredible, and (2) the basis for the Licensee's and Staff's conclusions that the long- and short-term "fixes" at TMI-1 have, in their totality, provided

reasonable assurance that the public health and safety is protected. We believe it is fair to say that the Board was very persistent in its pursuit of the Class 9 question and eventually succeeded in developing a full and sound record despite some defaults in this area by the parties — including an initial lack of responsiveness on the part of the Staff.

This is not to say that the record addresses to point made in UCS Contention 20, the contention now before us,⁹ since, in fact, the record does not deal with the impacts of Class 9 accidents. The Board did not independently request evidence on such impacts because (a) there was no factual issue in controversy on the subject and (b) the Board eventually was satisfied that the Staff had an adequate basis for treating as “incredible” those Class 9 accidents with a nexus to the TMI-2 accident.

The Staff and the Licensee argue that the Staff’s refusal to include in its EIA an analysis of Class 9 accidents impacts is consistent with the Commission’s Interim Statement of Policy dated June 13, 1980, 45 Fed. Reg. 40101, in which the Commission stated that its change of policy on the analysis of Class 9 accidents was not,

. . . absent a showing of *similar special circumstances* . . . a basis for opening, reopening, of expanding any previous or *ongoing proceeding*. [emphasis supplied]

The adjective “similar” in the quote portion of the Statement appears to apply to the “special circumstances” found to exist in the *Clinch River, Perryman and Offshore Power Systems* reviews, discussed earlier in the Statement, where the Staff made assessments of Class 9 accident risks. The Board is uncertain as to whether the new risk assessment policy applies or does not apply to the TMI-1 restart. We do, however, hold that if the new policy does not apply, the EIA as supplemented by the hearing record and our Partial Initial Decision, contains an adequate evaluation of Class 9 accidents.

Socioeconomic contentions

Several participants have called for NEPA evaluation of socioeconomic issues. TMIA in its Contention 8 seeks consideration of unspecified socioeconomic impacts. And the Commonwealth, though identifying some socioeconomic impacts, emphasizes that it is unable to give a complete list

⁹ Sholly Contention EIA-1, which we have held untimely, is similar. The Commonwealth has advised the Board that it concurs in the Sholly contention. See Commonwealth “Response” dated April 22, 1981.

¹⁰Mr. Sholly takes a similar position in his Contention EIA-3.

of all the socioeconomic impacts that should be examined.¹⁰ Such vague allegations lack the specified basis under 10 CFR §2.714, are not helpful to the Board in its analysis, and will not be considered further.

The specific socioeconomic concerns expressed by the participants (other than those we have treated as psychological stress issues) are the costs of emergency planning and preparedness and the potential adverse effects of evacuation and other protective actions, both raised by the Commonwealth.¹¹

The subject of emergency planning, involving more than 100 contentions, was litigated in great detail in the proceeding. In fact, the evidentiary hearing extended into the areas of emergency planning costs and evacuation effects, at least to the extent required to test the adequacy of TMI emergency planning.¹² The Commonwealth itself participated extensively in this important phase of the hearing. This is clearly a situation where the Commonwealth had ample opportunity to develop a record on its substantive socioeconomic concerns. In the existing record we see no basis for concluding that these socioeconomic impacts may be of such magnitude as to make the TMI-1 restart a major Federal action significantly affecting the quality of the human environment. We are therefore unable to conclude that, in regard to socioeconomic impacts, there has been any failure to comply with NEPA or Part 51.

Waste disposal and storage

In the hearing the Commonwealth fully participated with respect to the "separation issue"¹³ involving the disposal, including possible onsite interim storage, of solid radioactive waste from TMI-1.¹⁴ Now the Commonwealth has asked that, in addition, the matter be evaluated in a supplemented EIA.

This is a matter which was explored to the extent reasonable in the hearing. The issue arises because of the possible unavailability of offsite waste burial capacity. Whether TMI-1 will ever be affected in this regard

¹¹ Mr. Sholly, in his Contention EIA-3, also mentioned "impacts on local governments" and "impacts arising from increased emergency planning."

¹² See, e.g., Partial Initial Decision of December 14, 1981, Part IV, Sections C, F, G, H (particularly subsections 1, 4-7, 10 and 13), and J.

¹³ Intervenor Sholly, in his untimely Contention EIA-2, attempts to raise the further separation issue of the impact of TMI-2 cleanup on the operation of TMI-1. This subject was fully aired as a mandatory hearing issue under the Commission's Order and Notice of Hearing dated August 9, 1979.

¹⁴ As noted above and in ¶ 1293 of our Partial Initial Decision of December 14, 1981, we doubt whether this issue is within the scope of the proceeding.

is a matter for speculation. Indeed, as we note in our Partial Initial Decision, the circumstance that seemed to prompt the Commonwealth's concern (a threatened prohibition against disposal in the State of Washington) was reversed by a court decision on June 26, 1981, *Washington State Building & Construction Trades Council v. Spellman* (E.D. Wash., No. C-81-154 RJM). In the Board's opinion, an adequate EIA would, at most, require no more with regard to this issue than what has been done in the hearing. The Board, therefore, is unable to conclude that the EIA, as supplemented by the hearing record fails to satisfy the requirements of NEPA and Part 51.

Conclusions

For the reasons stated in this Memorandum the Board has concluded that there is no need for any additional evidentiary hearings on any of contentions relating to the adequacy of the EIA or the need for an EIS, and that the Board has no basis for ruling, as a matter of law, that the EIA is inadequate or that an EIS is required. In addition, the Board denies Intervenor Sholly's motion to reject the EIA.

**FOR THE ATOMIC SAFETY AND
LICENSING BOARD**

**Ivan W. Smith, Chairman
ADMINISTRATIVE LAW JUDGE**

Bethesda, Maryland
December 15, 1981

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Hugh K. Clark, Chairman
Dr. George A. Ferguson
Dr. Oscar H. Paris

In the Matter of

Docket No. 50-461-OL

ILLINOIS POWER COMPANY, et al.
(Clinton Power Station,
Unit 1)

December 16, 1981

The Intervenor, Prairie Alliance, and the State of Illinois (participating as an "interested state") filed motions to compel answers to unanswered interrogatories served upon the Applicants, Illinois Power Company, *et al.*, during first round of discovery. The motions were granted in part and denied in part. In addition, a stipulation with respect to certain contentions was allowed and a previously accepted schedule for future discovery was confirmed and expanded.

RULES OF PRACTICE: INTERVENTION PETITIONS (PLEADING REQUIREMENTS)

Under 10 CFR §2.714(b) an intervention petition must include the bases for each contention set forth with reasonable specificity. Contentions must be sufficiently detailed and specific to demonstrate that the issues raised are admissible and that further inquiry is warranted, and to put the other parties on notice as to what they will have to defend against or oppose.

RULES OF PRACTICE: SCOPE OF CONTENTIONS

Where a contention is made up of a general allegation which, standing alone, would not be admissible under 10 CFR §2.714(b), plus one or more alleged bases for the contention set forth with reasonable specificity, the

matters in controversy raised by each such contention are limited in scope by the specific alleged basis or bases set forth in the contention.

RULES OF PRACTICE: DISCOVERY

10 CFR §2.740(b)(1) provides in part that:

“Parties may obtain discovery regarding any matter, not privileged, which is relevant to the subject matter involved in the proceeding . . . including the existence, description, nature, custody, condition, and location of any books, documents, or other tangible things and the identity and location of persons having knowledge of any discoverable matter.”

Answers to interrogatories or requests for documents which do not comply with this provision are inadequate.

RULES OF PRACTICE: DISCOVERY

The discovery rules as between the parties are to be construed liberally. In modern administrative and legal practice discovery is liberally granted to enable the parties to ascertain the facts in complex litigation, refine the issues, and prepare adequately for a more expeditious trial.

MEMORANDUM AND ORDER (Ruling on Motions to Compel, Stipulation with Respect to Contentions, and Discovery Schedule)

I. INTRODUCTION

The Parties are the Applicants, Illinois Power Company, *et al.* (IP), the Staff of the Nuclear Regulatory Commission (Staff), the Intervenor, Prairie Alliance (PA), and the State of Illinois (Illinois) participating pursuant to 10 CFR §2.715(c). This proceeding is concerned with an application by IP for a license to operate Clinton Power Station (Unit 1). Originally the proceeding included Clinton Power Station (CPS) Units 1 and 2. By an Order dated November 13, 1981, the Board granted a Motion for Severance of Unit 2 from this proceeding and a stay in the proceeding for Unit 2 until further order of the Board.

After submitting and receiving answers to first round interrogatories, both PA and Illinois filed Motions to Compel answers to unanswered interrogatories served upon IP. As to some interrogatories which IP answered, the Motions sought more complete answers.

By joint Motion for Establishing Discovery Schedule, dated October 13, 1981, the parties proposed such a schedule. By mailgram of October 29, 1981 the Board granted the Motion and stated that confirmation would follow in a later order.

II. GENERAL PRINCIPLES

1. SCOPE OF CONTENTIONS

The contentions were drafted by PA without the benefit of counsel. Although the Board modified some of the contentions before accepting them, most of the contentions are essentially as presented by PA. Unfortunately, this has lead PA to misunderstand the scope of the allowed contentions. In most of the contentions, there are sentences making broad allegations plus specific allegations that provide the basis or bases for the broad language. In a number of such contentions the broad allegations, standing alone, fail to meet the requirements of 10 CFR §2.714(b) in that they do not set forth the basis for the contention with reasonable specificity. The purpose of the requirement for specificity is to demonstrate that the issues raised are admissible and that further inquiry is warranted, and to put the other parties on notice as to what they will have to defend against or oppose. *Philadelphia Electric Company* (Peach Bottom Atomic Power Station, Units 1 and 2), ALAB-216, 8 AEC 13, 20 (1974) and cases cited therein; *Florida Power and Light Company* (Turkey Point Nuclear Generating, Units 3 and 4) LBP-81-14, 13 NRC 677 (1981).

Where a contention is made up of a general allegation which, standing alone, would not be admissible under 10 CFR §2.714(b), plus one or more alleged bases for the contention set forth with reasonable specificity, the scope of the matters in controversy raised by such contention are limited by the specific alleged basis or bases set forth in the contention.

2. DISCOVERY: INFORMATION RELEVANT TO THE SUBJECT MATTER INVOLVED IN THE PROCEEDING

10 CFR §2.740(b)(1) provides in part that:

“Parties may obtain discovery regarding any matter, not privileged, which is relevant to the subject matter involved in the proceeding . . . including the existence, description, nature, custody, condition, and location of any books, documents, or other tangible things and the identity and location of persons having knowledge of any discoverable matter.”

Answers to requests for documents which do not comply with this provision are inadequate. IP's approach to nonprivileged matter in its answers to the first round of discovery has been to state that the pertinent documents were available for inspection at its offices. IP has not supplied information concerning the existence, description, nature, custody, condition and location of such documents. Where it does not have possession, custody or control of identified documents, IP has not stated to the extent possible the identity and location of persons having knowledge thereof or having custody thereof. Except to the extent that PA and Illinois agree to waive some part of the requirements of this regulation, IP must respond fully to discovery requests in accordance with the quoted requirements of the regulation.

3. DISCOVERY: MOTIONS FOR PROTECTIVE ORDERS

Most of IP's objections to first round interrogatories and requests for documents served on it by PA and Illinois are based on allegations that such objectionable interrogatories and requests are beyond the scope of the contentions. While IP sought protective orders as to possible forced answers involving plant security and employee personnel files, no request for protective order was filed concerning the objections based on scope.

In the absence of a motion for protective order, a Board may not excuse failures to respond to discovery regardless of how objectionable the discovery may be. 10 CFR §2.740(f) (1) reads in part as follows;

"Failure to answer or respond shall not be excused on the ground that the discovery is objectionable unless the person or party failing to answer or respond has applied for a protective order pursuant to paragraph (c) of this section."

In a telephone conference on November 16, 1981, PA and Illinois agreed to a waiver of the requirement for a motion for a general protective order as to the first round of interrogatories and requests for documents. They desired the Board to rule on their Motions to Compel as though such motions for protective orders had been filed.

III. RULINGS ON THE MOTIONS TO COMPEL FILED BY PA AND ILLINOIS

1. CONTENTIONS NOS. 1 and 6: MOTION BY PA

PA seeks a more detailed response to requests for documents and other records than the mere statement that "pertinent documents are available for inspection" or words to the same effect. The Motion to Compel

specifically refers to Contention 1, Interrogatories 2, 3c, 7, and 8; and Contention 6, Interrogatories 1, 2, 3a, 3c, 3d, 4b, 4c, 6a, 6b, 7, and 8. For reasons stated under General Principles, the Motion is granted. IP must comply with 10 CFR §2.740(b) (1).

2. CONTENTION NO. 1: MOTION BY PA

PA moves to compel more complete answers to Contention 1, Interrogatories 8, 9, 10, and 11, all of which relate to details of training programs. IP's reply gives an oversight to such programs and an estimate of their overall costs. The reply clearly indicates that the programs are still in the formative stage. The Motion is denied, but IP must keep PA informed as more detailed plans are developed.

3. CONTENTION NO. 1: MOTION BY PA

Contention 1, Interrogatories 4, 5, 6, and 14 all relate to offsite emergency responses. These interrogatories have a combined total of thirty-seven sub-interrogatories which seek detailed information as to emergency planning. In its response to first round discovery IP refused to answer on the ground that it did not have responsibility for emergency planning, which is lodged with state and local agencies. In its reply to PA's Motion to Compel, IP added the comment that, "IP does not have the detailed information requested by Prairie Alliance." In answer to General Interrogatory No. 4, IP stated that "Illinois Power is currently revising the Emergency Plan for the Clinton Power Station ("CPS"). The revised Plan identifies further work that will be necessary to implement the Plan." IP also states that: "The responsible government agencies and the agency personnel in contact with IP are identified in Appendix B to the Draft Emergency Plan." From the context, it appears that the Emergency Plan is in an incomplete state and no one has the answers to the specific sub-interrogatories. Regardless of who has the responsibility for phases of the Plan, IP is required by 10 CFR §50.34 (b) (6) (v) and 10 CFR §50 Appendix E, 9 to include in its FSAR much of the information requested by these interrogatories. IP is an essential party to implementation of the Plan. IP must make available to PA the information which it now has. Moreover, as IP obtains additional information, it must be made available to PA. The Motion is granted to the extent indicated.

4. CONTENTION NO. 2: MOTION BY ILLINOIS

Contention 2 raises issues as to the management and technical qualifications of IP. More specifically, the contention alleges that the Quality Control (QC) and Quality Assurance (QA) programs are consistently deficient in the performance of their functions.

By Interrogatories 3a, 3b, and 3c Illinois sought information concerning QC and QA personnel. IP responded as to its own employees, but gave no data as to QA or QC employees on the payroll of its contractor, Baldwin Associates, although these persons participated in carrying out at least the QC program. Illinois moves to compel complete answers to these interrogatories.

The vigilant and effective enforcement of the QC and QA programs during construction and operation of nuclear power plants is essential for the protection of the public health and safety. IP has the responsibility for the adequate operation of these programs and for the safe construction and operation of CPS. It may delegate the performance of parts of the programs to its contractors, but it can not delegate the responsibility and control of the programs. See *Pacific Gas and Electric Company* (Diablo Canyon Nuclear Power Plant, Unit 1) CLI-81-30, 14 NRC 950 (November 19, 1981). In carrying out such responsibility and control, IP should have available to it the data needed to respond to the subject interrogatories. If IP does not possess the data, it has control of it. IP must respond fully to Contention 2, Interrogatories 3a, 3b, and 3c. To this extent, Illinois' Motion to compel is granted.

5. CONTENTION NO. 2: MOTION BY ILLINOIS

Further with regard to Contention 2, Interrogatories 3d, 4c, and 5c, and document request, Illinois asked for information as to reasons for termination of former employees and access to their employment files. IP argues by analogy that this information should be denied for the same reasons that apply to Commission employees under 10 CFR §2.744 and 2.790. IP further argues that, if the information must be supplied, a protective order should issue. Illinois moves to compel discovery as to these matters.

Personnel files, including information as to the reasons for termination, are held in confidence by employers. The information is sensitive in that its disclosure may be regarded as an undue and actionable invasion of the privacy of the person involved. The information can be obtained in this proceeding under a protective order if it is shown to be relevant to the contention. This showing has not been made. Illinois' argument appears to be that it desires to make an overall analysis of IP's employment practices. This can be accomplished by stating reasons for termination by categories, without revealing termination information as to specific employees and without granting access to employment files. IP must, in lieu of the requested answer, give reasons for termination by category. To this extent the motion is granted. Moreover, if Illinois has some specific undisclosed

information in mind, we believe that such data can be obtained by suitably worded second round discovery.

6. CONTENTION NO. 4: MOTION BY PA

PA filed sixty-three interrogatories under Contention 4. IP answered Interrogatories 37, 38, and 42-49. IP objected to the rest of these interrogatories as not being within the scope of Contention 4. PA moves to compel answers to these interrogatories. Contention 4 reads as follows:

"4. The CPS should not be licensed to operate until IP has developed and demonstrated an adequate security plan which complies with 10 CFR 73.55. The FSAR does not give adequate assurance that all regulatory requirements have been or will be met prior to operation. See FSAR, p. 1.8-25, Regulatory Guide 1.17, Revision 1."

The FSAR, p. 1.8-25, states IP's position that the quality assurance requirements of a GSA specification are not applicable to hardware purchases under Regulatory Guide 1.17. The only issue specifically raised by this contention is the soundness of IP's position on this one point. The first two sentences of Contention 4 are not specific enough, standing alone, to be admissible. The contention is limited by the one specific issue. It is the only matter in controversy under Contention 4. Interrogatories 1-36, 39-41, and 50-63 go beyond the matter in controversy and are not relevant to it. Discovery not relevant to the matters in controversy amounts to a "fishing expedition" which is discouraged by 10 CFR Part 2, Appendix A, IV(a). PA's Motion with regard to Contention 4 is denied.

Contention 4 relates to the security plan for CPS. Details of security plans may not be disclosed without an appropriate protective order. IP requests that, if the Board grants PA's motion, any disclosure be subject to a protective order. Since the motion is not granted the matter of a protective order will not be further discussed except, that for future guidance, the parties' attention is called to decisions in the Matter of *Pacific Gas and Electric Company* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-80-24, 11 NRC 775 (1980); ALAB-410, 5 NRC 1398 (1977); ALAB-580, 11 NRC 227 (1980); ALAB-592, 11 NRC 744 (1980); and ALAB-600, 12 NRC 3 (1980); and to a recently issued final rule of the Commission, published 46 FR 51718-51726, October 22, 1981 which relates to protection of unclassified safeguards information.

7. CONTENTION NO. 5: MOTION BY ILLINOIS

Contention 5, as revised by a Joint Stipulation of the parties dated November 6, 1981 and approved by the Board hereinafter, reads as

follows:

The CPS should not be licensed to operate until IP has completed an ATWS analysis for (1) redundancy, (2) systems interaction, (3) loss of coolant accident, and (4) incidents such as those experienced in other GE boiling water reactors."

IP objected to answering Illinois' Interrogatories 30 and 31, which relate to anticipated transients without scram (ATWS) analyses, on the grounds that (1) the interrogatories request information beyond the scope of Contention 5 and (2) as broadly as construed by Illinois, ATWS is a generic issue listed in PA's revised contention 19, which was rejected by the Board. 10 CFR §2.740 (b) (1) states, in part, that:

"Parties may obtain discovery regarding any matter, not privileged, which is relevant to the subject matter involved . . . It is not ground for objection that the information sought will be inadmissible at the hearing if the information sought appears reasonably calculated to lead to discovery of admissible evidence."

The discovery rules as between parties are to be construed liberally. *Commonwealth Edison Company* (Zion Station, Units 1 and 2), ALAB-185, 7 AEC 240 (1974). As stated in *Pacific Gas and Electric Company* (Stanislaus Nuclear Project, Unit 1) LBP-78-20, 7 NRC 1038, 1040 (1978):

In modern administrative and legal practice, pretrial discovery is liberally granted to enable the parties to ascertain the facts in complex litigation, refine the issues, and prepare adequately for a more expeditious hearing or trial.

The information sought is relevant to the subject matter of this contention and appears reasonably calculated to lead to the discovery of admissible evidence. The Motion to Compel is granted.

8. CONTENTION NO. 9: MOTION BY PA

Contention 9 reads as follows:

"The CPS should not be licensed to operate until Applicants have demonstrated that radiation exposure levels will be maintained as-low-as-reasonably-achievable as required by 10 CFR 20.1. The FSAR does not adequately consider occupational radiation exposure to be expected from either the normal operation of CPS Unit 1 or that which may occur during an abnormal occurrence or serious accident. Specifically,

- (a) Applicants have failed to provide a sufficient number of monitors to continuously measure airborne radioactivity; additionally the monitors provided are not sufficiently sensitive in that they require up to 10 hours to detect emissions;
- (b) The area radiation monitoring equipment does not provide a reasonable assurance of accuracy in that it is only within plus or minus 20%."

PA moves to compel answers to Interrogatories 9.1, 9.2, 9.3, 9.7(c), 9.7(e), 9.8, and 9.9, which IP objected to on the grounds that they are outside the scope of Contention 9. PA admits that the said interrogatories are poorly worded and subject to misconception. These interrogatories all deal with items related to maintaining radiation exposure levels as-low-as-reasonably-achievable, but none of them fall within the scope of the specific bases set forth in (a) and (b) of the contention. For reasons discussed under the heading "General Principles", the motion is denied. However, PA may substitute new interrogatories more clearly worded to bring them within the scope of the contention.

9. CONTENTION NO. 11: MOTION BY PA

This contention, as revised by a Joint Stipulation of the parties dated November 6, 1981, and approved by the Board hereinafter, reads as follows:

"11. The effects of low-level radiation to be released from Clinton Unit 1 has not been adequately assessed and considered in the following respects:

- "(a) the methods used to calculate atmospheric effluents or routine releases are inadequate in that conservative estimates were not, but should have been, used by IP;
- "(b) the residual risks of low-level radiation which will result from the release of radionuclides from Clinton Unit 1 have not been, but should be, accurately assessed and factored into the NEPA cost-benefit analysis for Clinton Unit 1."

Interrogatories 11.1, 11.2(a), 11.3, and 11.4 relate to calculations of estimated population doses and calculations of routine atmospheric releases. These interrogatories sought information relevant to the subject matter involved and appear reasonably calculated to lead to the discovery

of admissible evidence. IP must answer them.

IV. SCHEDULE FOR FURTHER DISCOVERY

The schedule for further discovery presented in a Joint Motion by the parties dated October 13, 1981 was approved by the Board in a mailgram dated October 29, 1981. The Board hereby confirms this approval. The Board supplements the schedule by adding time periods with regard to responses pursuant to the granting of this Motion to Compel. The schedule, as supplemented, is set forth in Appendix A.

V. THE JOINT STIPULATION OF THE PARTIES DATED NOVEMBER 6, 1981 REGARDING MODIFICATION AND CANCELLATION OF CONTENTIONS

The joint stipulation of the parties dated November 6, 1981 for modification of contentions 5 and 11 and deletion of contention 7 and 8 has been reviewed and is allowed.

ORDER

For all the foregoing reasons and based upon a consideration of the entire record in this matter, it is this 16th day of December, 1981

ORDERED

1. That Prairie Alliance's motion to compel Illinois Power Company *et al.* to answer Contention 1, Interrogatories 4, 5, 6 and 14, and Contention 11, Interrogatories 11.1, 11.2(a), 11.3, and 11.4 is *granted*.
2. That Prairie Alliance's motion to compel Illinois Power Company *et al.* to make more detailed responses to Contention 1, Interrogatories 2, 3, 7, and Contention 6, Interrogatories 1, 2, 3a, 3c, 3d, 4c, 4g, 6a, 6b, 7 and 8 is *granted*.
3. That Prairie Alliance's motion to compel Illinois Power Company *et al.* to answer Contention 4, Interrogatories 1-36, 39-41, and 50-63, and Contention 9, Interrogatories 9.1, 9.2, 9.3, 9.4, 9.7(e), 9.8 and 9.9 is *denied*.
4. That Prairie Alliance's motion to compel Illinois Power Company *et al.* to make more detailed responses to Contention 1, Interrogatories 8, 9, 10 and 11 is *denied*.
5. That Illinois' motion to compel Illinois Power Company *et al.* to make more detailed responses to Contention 2, Interrogatories 3a, 3b, and 3c is *granted*.

6. That Illinois' motion to compel Illinois Power Company *et al.* to answer Contention 2, Interrogatories 3d, 4c, and 5c and document requests is *denied as to detail*, but *granted as to categorical responses* to 3d, 4c, and 5c.

7. That Illinois' motion to compel Illinois Power Company *et al.* to answer Contention 5, Interrogatories 30 and 31 is *granted*.

8. That the joint stipulation by the parties, dated November 6, 1981, to amend Contentions 5 and 11, and to delete Contentions 7 and 8 is *granted*.

9. That the schedule for further discovery shall be as set forth in Schedule A attached hereto and made a part hereof.

Judges Clark, Ferguson, and Paris all participated in the preparation of this Memorandum and Order. Chairman Clark was unavailable to sign the finished copy.

FOR THE ATOMIC SAFETY AND
LICENSING BOARD

Oscar H. Paris
ADMINISTRATIVE JUDGE

For Hugh K. Clark, Chairman
ADMINISTRATIVE JUDGE

APPENDIX A
DISCOVERY SCHEDULE

- (a) November 15, 1981. Close of first round discovery, except for document requests and interrogatories subject to a timely filed motion to compel discovery. Deadline for filing second round interrogatories and document requests, which shall be limited to clarification of matters raised in the first round.
- (b) December 15, 1981. Responses to second round interrogatories and document requests.
- (c) December 31, 1981. Close of second round document production except for requests subject to a timely filed motion to compel discovery.
- (d) January 15, 1982. Close of all discovery on presently-admitted Prairie Alliance contentions, except for depositions of hearing witnesses not yet identified and requests subject to timely filed motions to compel discovery.
- (e) January 6, 1982. Responses to interrogatories as compelled by this Order.
- (f) January 21, 1982. File additional second round interrogatories based on responses to (e).
- (g) February 5, 1982. Close of document production.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Peter B. Bloch, Chairman
Jerry R. Kline
Hugh C. Paxton

In the Matter of

Docket Nos. 50-266-OLA
50-301-OLA

**WISCONSIN ELECTRIC POWER
COMPANY**

**(Point Beach Nuclear Plant,
Units 1 and 2)**

December 21, 1981

This decision responds in part to a claim that the Board lacks the jurisdiction to determine whether filed documents claimed to be confidential should be released to the public. The Board rules that when a party files a document that it proposes be treated as confidential because it contains trade secrets, the hearing board must apply the standards set forth in 10 CFR §2.790 to determine whether all or a portion of the document should be kept confidential. The obligation placed on the Board by the rules is mandatory and does not require that any party request the Board to fulfill its obligation.

The Board also rules that an affidavit concerning the confidentiality of a filed document ordinarily cannot be reviewed by the Board to determine the legitimacy of a claim that the affidavit is confidential. 10 CFR §2.790(b)(1)(ii). However, the Board determines that this exemption from its jurisdiction is subject to three threshold limitations: that allegedly confidential portions of the affidavit must be "appropriately marked", that the certification of confidentiality must have been made in good faith by the affiant, and that the exemption does not apply to legal arguments that cannot properly be included in a confidential affidavit. The Board then holds that the allegedly confidential affidavit filed in this case did not meet any of these threshold requirements and that part of it must be released to the public.

ADJUDICATORY BOARDS: DELEGATED AUTHORITY

10 CFR §2.790(e) delegates to hearing boards the authority and obligation to determine whether proposals of confidentiality filed pursuant to §2.790(b) (1) should be granted pursuant to the standards set forth in subsections (b)(2) through (c) of that section.

LICENSING BOARDS: DELEGATED AUTHORITY

See "Adjudicatory Boards: Delegated Authority".

RULES OF PRACTICE: IMPUGNING THE INTEGRITY OF A PARTY

It is not acceptable practice for a party to impugn the integrity of another party without any evidence to support the charges.

RULES OF PRACTICE: JURISDICTION OF BOARDS

See "Adjudicatory Boards: Delegated Authority".

RULES OF PRACTICE: PROPOSALS TO WITHHOLD INFORMATION

Under 10 CFR §2.790, licensing boards must determine whether it is appropriate to grant proposals filed with them concerning the need to withhold evidence from the public. Ordinarily, when parties submit affidavits supporting claims of confidentiality, they may claim that the affidavits are confidential and the board will not have the jurisdiction to review the claim; however, the confidentiality of supporting affidavits is exempt from board jurisdiction only if they are "appropriately marked" by the affiant in good faith, after a careful review; and the board also retains jurisdiction to determine whether legal arguments have been improperly inserted into an affidavit and claimed to be confidential.

RULES OF PRACTICE: CONFIDENTIALITY OF DOCUMENTS AND AFFIDAVITS

See "Rules of Practice: Proposals to Withhold Information".

RULES OF PRACTICE: PROPRIETARY DATA

See "Rules of Practice: Proposals to Withhold Information".

MEMORANDUM AND ORDER (Concerning Preliminary Confidentiality Issues)

This decision resolves some preliminary skirmishes in a dispute about whether all or part of a Westinghouse Electric Company (Westinghouse) document "Sleeving Report for Wisconsin Electric Power Company," (Westinghouse Sleeving Report) should be released to the public.

The Westinghouse Sleeving Report was accompanied by an affidavit of Robert A. Wiesemann, who provided reasons why many portions of the report should be considered trade secrets and should be withheld from public disclosure. However, the Board raised some questions about the adequacy of these reasons, leading to the filing of a second supporting affidavit by Mr. Wiesemann.

Westinghouse first claimed that the entire second Wiesemann affidavit was confidential. It then released most of the document, withholding only a portion. However, it argues that 10 CFR §§2.790(b)(ii) and 9.12 deprive the Board of jurisdiction over the possible release the remainder of this document. It also argues that the intervenor, Wisconsin's Environmental Decade (Decade), should not obtain this affidavit even under a protective order, in part because the document is not relevant to any issue in this case. In addition, Westinghouse claims that §2.790 authorizes the Commission to consider confidentiality issues but does not delegate that authority to the Board. This point was reemphasized by Westinghouse in its Reply Brief of December 17, in which it asserts that §2.790(e), which gives the hearing board jurisdiction over confidentiality issues, is inapplicable because the Sleeving Report is not an NRC document.

The regulatory staff of the Commission (staff) supports the confidentiality of all of the Westinghouse documents. It agrees that the Board lacks jurisdiction over the confidentiality of affidavits that are filed in support of the confidentiality of other documents. It also, at one time, took the position that the Board lacked all jurisdiction over confidentiality issues. But it withdrew that position in a brief it filed on December 7.

Decade vehemently opposes Westinghouse's claims of confidentiality or the Sleeving Report, particularly with respect to safety tests completed for the purpose of complying with Commission safety regulations. It supports the Board's jurisdiction over this issue.

Wisconsin Electric Company (WE) also is concerned because it fears that were the Westinghouse report considered to be releasable, Westinghouse might withdraw permission for its use, depriving the board of a

proper basis for granting WE's application for a license amendment. WE's principal arguments are that it would be improper under applicable regulatory standards for the Board to release (or return) information that was claimed to be proprietary and that the Board should restrict its attention to confidentiality issues properly raised by Decade. WE states that the Staff's *Safety Evaluation Report* contains conclusions regarding the allegedly confidential tests and that the staff's conclusions are adequate record support for the Board's conclusions in this case.

In summary, we have before us the arguments about the release, with or without a protective order, of the second Wiesemann affidavit. The scope of our jurisdiction, which is relevant to the merits of the underlying claims concerning the confidentiality of the Westinghouse Sleeving Report, also has been questioned.

I. THE BACKGROUND

Controversy about whether certain information should be kept confidential has so pervaded this proceeding that it has seemed at times to eclipse the underlying claim concerning the safety of Wisconsin Electric Company's (WE's) project to repair tubes in its steam generator by sleeving.

The confidentiality saga began in a letter of September 30, 1981, from Decade to WE. In that letter, Decade rejected WE's offer to give it access to proprietary data contained in the Westinghouse Sleeving Report, pursuant to a protective agreement that would prohibit Decade from releasing the information to the public. Decade stated that it had "a general policy against trade secrets in matters so directly affecting the public interest."

Decade reiterated its concerns about confidentiality in a letter to the Board of October 6. In that letter, Decade agreed to accept the Board's expedited schedule for a special show cause proceeding; however, it stated that

[T]he licensee may not have informed the Board of a major impediment [to the timely completion of this proceeding] The Board should be aware that this impediment created by the Licensee, unless resolved, may make that time-line impossible to meet. Specifically, the Licensee has refused to provide us with a copy of the Westinghouse Report which serves as the major basis for the application, because of an alleged trade secret claim.

. . .

For these reasons, we would urge the Board to resolve the trade secret issue in accordance with the Commission's rules prior to tolling the time for answers to the motion for interim relief.

Decade stated two other reasons for its concern. One reason, which apparently was an error, was that Westinghouse had not provided the required affidavit concerning the confidentiality of the information. See Tr. 88-91. The other reason was that in a previous proceeding before the Public Service Commission of Wisconsin, WE had claimed that certain information was confidential and then had released favorable portions of the protected information to the press.

At this stage of the proceeding, Wisconsin Electric Company (WE) was seeking permission to conduct a steam generator repair demonstration program during the planned Fall 1981 outage of its Point Beach Unit I. Controversy over confidentiality issues threatened to delay the proceeding so that a timely decision would be impossible. Consequently, immediately upon receipt of the October 6 letter from Decade, the Board arranged for an on-the-record telephone conference that was held at 10 am on October 9. At that conference, the Board sought to divorce the issue of public release of information from the issue of whether or not Decade would review the materials involved so that the case could move forward expeditiously.

The Board outlined a procedure by which it would postpone its decision about confidentiality until after it decided whether a demonstration program should be authorized. Tr. 90-91. Decade stated it "would be willing to agree to an order . . . requiring [it] to abide by a confidentiality requirement *pending resolution of the shared secret issue.*" [Emphasis added.] Tr. 91. The board then issued the following oral, on-the-record Order:

Unless you notify me and the other parties today, then I will expect that you will execute [the protective agreement drafted by WE] . . . today, and file it in this case. *You may, of course, include a cover letter explaining that it will not waive any rights to challenge the appropriate treatment of this document as confidential.*

Tr. 92. Then, neither Decade nor WE—serving at that time as agent for Westinghouse with respect to this information—expressed any objection to this way of proceeding. Ibid.

Subsequently, Decade had second thoughts about signing the protective order. Because of its concern that it might be disadvantaged in the state legislature or the press by selective release of the confidential information, Tr. 134-135, Decade refused to review the disputed report—leading to another on-the-record telephone conference, this time on October 20. In the course of that conference, the Board ruled that pending full consideration of the confidentiality issue, the disputed information would be

considered the proprietary information of Westinghouse. Consequently, the Board refused to restrict Westinghouse in the use of its own property. Tr. 142-143.

At a hearing held in Milwaukee on October 29 and 30, 1981, the issue of confidentiality arose once again. This time Decade objected to the Board conducting *in camera* sessions to consider allegedly confidential issues. At that time, the Board ruled that Decade could attend the confidential sessions subject to the protective order that had been issued. Tr. 437-442, 450-459. The Board continued to postpone consideration of the confidentiality issue at that time, however. As an expression of their concern for the public's right to know, Decade's representatives then intentionally refused to attend several *in camera* sessions, even after the Board recessed for the purpose of letting them reconsider their decision to abstain from those sessions. Tr. 462-463.

In our November 5, Memorandum and Order, in which we authorized WE to conduct its steam generator sleeving demonstration program, we characterized Decade's position as a "strong, principled stand concerning the right of the public to know about information which may be relevant to the decision of the Board . . ." LBP 81-55 at 10. We also stated that "the public interest in open government can be resolved through the timely consideration of Decade's arguments about public release of information." *Ibid.*

II. THE ISSUE BEFORE US

The particular limb of the tree of confidentiality with which we are now concerned arose out of a directive issued by the Board during the October 9 telephone conference. At that time, the Board requested that WE submit an affidavit stating the extent to which the parts of the allegedly confidential process are "unusual and, therefore, specially valuable to Westinghouse" and "some representation as to the market which is affected by the release of this information, that is how they would be harmed by the release of some of this information." Tr. 95. The answer to this question arrived on November 13, in the form of a second affidavit from Mr. R.A. Wiesemann of Westinghouse.

It is the second affidavit that created the instant problem. The supplementary affidavit was attached to a brief cover affidavit. The cover affidavit stated:

The supplement to this affidavit contains Westinghouse proprietary information, relating to why information already furnished is proprietary, and is hereby so claimed, pursuant to 10 CFR 2.790(b)(1)(ii) (1981). I have indicated the same on each sheet thereof

There was no further particularization of why the entire affidavit should be considered confidential.

Upon receipt of the supplementary affidavit, on November 16, the Board called Westinghouse and requested further particularization of why the affidavit should be considered confidential in its entirety. We also suggested the principle that the reasons for alleging confidentiality should be sufficiently particular for the Board to be able to reach its own decision that the document was in fact confidential. Tr. 77-78. Nevertheless, Westinghouse continued to "stand by [its] . . . conclusion that the clear reading of the last paragraph of Section 2.790(b)(1)(ii) clearly gives the discretion to state baldly that the information is proprietary in its entirety, and we stand by that position." Tr. 784-785.

This stand of Westinghouse has been attenuated, however. On November 13, Westinghouse sent to all parties a non-proprietary version of the supplementary affidavit of Mr. Wiesemann. We have compared the non-proprietary version to the original version in order to characterize the remaining omissions for the record. The only omissions are:

- (1) Paragraphs (8) through (11), which contain the names of companies which Westinghouse believes to be its major competitors and some repair work which Westinghouse believes they have completed.
- (2) All paragraphs listed under "Effect of the Release of Information on Westinghouse Competitive Position." These paragraphs are withheld because they "describe the Westinghouse judgment of the altered nature of the market should the proprietary information at issue be released." However, the Board would characterize these paragraphs as containing two types of information: (a) Westinghouse's views concerning the effect on the public welfare of releasing information it holds confidential, and (b) Westinghouse's views concerning the effect on it of releasing such information.

Since Westinghouse chose to withhold this information, the issue of public release is live and we are forced to consider our jurisdiction over this issue. Only then can we address the issue itself.

III. APPLICABLE REGULATIONS

The principal regulations governing the public release of information submitted to the Commission as confidential trade secrets or privileged commercial or financial information are §§2.790 and 9.12. Also relevant is §2.744(d) governing requests for the production of NRC records or documents. *See also Kansas Gas and Electric Company, et al. (Wolf Creek*

Nuclear Generating Station, Unit 1), ALAB-327, 3 NRC 408 (1976) at 415-416.

10 CFR §§2.790(b)(1) and 9.12, in which we have underlined words we find significant, state:

§2.790(b)(1) — A person who *proposes* that a document or a part be withheld in whole or part from public disclosure on the ground that it contains trade secrets or privileged or confidential commercial or financial information shall submit an application for withholding accompanied by an affidavit which:

. . .

- (ii) Contains a *full* statement of the *reasons* on the basis of which it is claimed that the information should be withheld from public disclosure. Such statement shall address *with specificity* the considerations listed in paragraph (b)(4) of this section.

. . .

. . . The application and affidavit shall be submitted at the time of filing the information sought to be withheld. The information sought to be withheld shall be incorporated, as far as possible, into a separate paper.

The affiant may designate *with appropriate markings* information submitted in the affidavit as a trade secret or confidential or privileged information within the meaning of §9.5(a)(4) of this chapter and *such information* shall be subject to disclosure *only in accordance with the provisions of §9.12* of this chapter.

§9.12—(a) Records of the kind specified in §9.5(a) [which provides specific exemptions from the general principle that information must be disclosed to the public] shall not be produced or disclosed by NRC personnel . . . except in accordance with this Part or §§2.744 and 2.790 of this chapter. (b) NRC personnel . . . from whom a record exempt from disclosure is sought shall follow the procedure specified below:

- (1) If an exempt record is sought from NRC personnel, the request . . . shall promptly be forwarded to the Director, Office of Administration, who shall process the request provided in this Part or take such other action as may be appropriate.

Thus begins our journey through the regulations. Section 2.790(b)(1) refers us to §9.12, which apparently sends us right back again. To help us out, Westinghouse and Staff suggest we consider the following language from the statement of considerations for §2.790(b)(1)(ii):

The Rule also has been amended to permit an owner to include trade secrets or confidential or privileged commercial information in the affidavit without subjecting such supporting information to the procedural requirements of the rule. To do otherwise could result in an unnecessary number of affidavits. 41 Fed. Reg. 11808 at 11809. March 22, 1976.

We conclude that this preamble resolves a possible ambiguity in the regulations. It persuades us that, solely with respect to information properly included in an affidavit and designated by an affiant "with appropriate markings", a part of §9.12(a) should be considered inoperable. That part is the language which preserves hearing board jurisdiction over confidentiality issues by permitting releases under §§2.744 and 2.790 in addition to releases under Part 9.

On the other hand, we interpret §2.790 as establishing the principle, for which there is an exception for properly qualified portions of certain affidavits, that hearing boards have the authority to determine whether Commission documents should be released to the public. Section 2.790 is contained in Subpart G, which establishes rules for all adjudications initiated by a notice of a hearing. *See* §2.700. Although Westinghouse correctly states that §2.790 speaks of "the Commission", subsection (e) explicitly authorizes this Board to issue orders pursuant to that section. §2.790(b)(2) through (c) provides the standards for the exercise of that authority.

We are not persuaded by Westinghouse's argument that §2.790(e) applies only to Commission documents and that the Board does not have authority over its Slewing Report, which is still a Westinghouse document and not a Commission document. This argument misapprehends the entire structure of §2.790, under which a person submitting a document in a proceeding may *propose* that it be given confidential treatment. That is precisely what has happened in this case. The entire section is designed to provide standards for dealing with that proposal. And subsection (e) authorizes the hearing board to apply the standards set forth in the section to documents submitted together with a "proposal".

A further Westinghouse argument, dealing with §2.790(b)(6), also has no merit. That subsection deals with the issuance of protective orders with respect to documents whose proprietary nature is still contested. It gives hearing boards the authority to expedite their proceedings by issuing

protective orders pending final determinations on confidentiality. Furthermore, the use of the words "Commission" and "presiding officer" in that section does not lend weight to Westinghouse's interpretation. This subsection states that "the Commission" shall have the power to direct inspection of documents pursuant to a protective order. Since the purpose of the subsection is to give the hearing board the authority to issue protective orders prior to final determinations on the confidentiality of documents, we find that the subsection used "the Commission" as shorthand for hearing board (or presiding officer). We therefore conclude that the selective use of the terms "Commission" and "presiding officer" has little meaning within section (b)(6) and that it certainly has no bearing on how subsection (e) should be interpreted.

Section 9.12(a) authorizes release of records pursuant to Part 9 or to §§2.744 and 2.790. That provision therefore negates the proposition that the hearing board lacks jurisdiction over confidentiality questions because they are to be handled exclusively under Part 9.

In summary, the general rule is that hearing boards have jurisdiction under §2.790 to determine, under applicable standards, whether to release information filed in their proceeding. However, this jurisdiction is restricted by the last paragraph in §2.790(b)(1)(ii). (It is further restricted by subsection (d), relating to certain narrow categories of information.)

— IV. APPLICABLE PRECEDENT

Our interpretation of the regulations is buttressed by reliance on *Kansas Gas and Electric Company, et al. (Wolf Creek Nuclear Generating Station, Unit 1)*, ALAB-327, 3 NRC 408 (1976).

In *Wolf Creek* intervenors requested from Westinghouse information that the company claimed to be proprietary. The intervenors refused to sign the protective agreement offered to them by Westinghouse because they contested the proprietary nature of the information. The Licensing Board then ordered the information released. Pending determination of the appeal, the Appeal Board issued a protective order, which had the effect of letting the intervenor have the information on a confidential basis until the appeal was determined. *Id.* at 411.

This case is, in one respect, on all fours with *Wolf Creek*. See also *Virginia Electric and Power Company (North Anna Nuclear Power Station, Units 1 and 2)*, ALAB-555, 10 NRC 23 (1979) (in which the appeal board discusses the continuing applicability of the *Wolf Creek* standards but does not apply them only because of the absence of a live controversy). Here, also intervenors refused to sign a protective agreement. The Board then issued a protective order under which Decade could obtain the contested information pending a later determination on its confidential

nature. We expressly ruled that receipt of the information would not waive any rights to contest its proprietary nature.

In another respect, this case is different from *Wolf Creek*. In that proceeding, intervenor requested an allegedly confidential document that had not been filed with the Commission. *Id.* at 415-416. Consequently, the Appeal Board held inapplicable both §9.5(a)(4) and §2.790—which were interpreted to cover only agency records. Nevertheless, the Appeal Board held that the document could be obtained directly from Westinghouse, pursuant to procedures approved by the Commission in the proceeding concerning the acceptance criteria for emergency core cooling systems (Docket No. RM-50-1). The criteria established by *Wolf Creek* as applicable to requests to a party for allegedly confidential information are applicable here. There is no reason to restrict Decade's rights because the information it seeks from a party also could be sought from the staff. Those criteria are:

1. "The applicants are to be afforded a reasonable opportunity to establish that there is a 'rational basis' for treating as confidential [the information it claims to be confidential] . . ." *Id.* at 418.
2. If the applicants make the requisite showing the information should be kept confidential "unless the Board further finds there to be countervailing considerations militating in favor of public disclosure which clearly outweigh the potential harm . . . which might inure from such disclosure." *Ibid.*

(*See also id.* at 416-417 for a slightly different statement of applicable standards.) In addition, since Wisconsin Electric Power Company filed these documents with the Commission, they are agency documents subject to the regulatory provisions we discussed in the previous section of this decision.

Westinghouse also has argued that *Wolf Creek* is inapplicable because §2.790 was amended on January 9, 1981, 41 Fed. Reg. 11808), and became effective after *Wolf Creek* was decided. However, Westinghouse has not indicated why the change in the rules makes a difference; and we have read the Statement of Consideration for the modified rule and can not ourselves discern any reason for thinking that the new rule affects the continuing vitality of *Wolf Creek*.

V. APPLYING THE STANDARDS

Having adopted two independent reasons supporting our jurisdiction over confidentiality of documents, restricted by a specific provision relating to material contained in an affidavit and appropriately marked, we now consider Westinghouse's claim that we lack jurisdiction to release infor-

mation to the public because of the specific facts of this case and that we certainly should not release information in the supplemental Wiesemann affidavit which Westinghouse has marked as confidential.

A. Is a Confidentiality Issue Legitimately Raised in This Case?

Apart from the general questions concerning our jurisdiction, Westinghouse has argued that the information which Decade seeks to release is not relevant to this case.

We agree with Westinghouse that we have no business using our authority as a presiding officer to order the release of irrelevant information. However, to consider relevance properly, we must back up a few steps and consider the state of the proceeding when Decade refused to sign a protective agreement. At that time, the allegedly confidential information contained in the Westinghouse Sleeving Report was sought by Decade and was relevant to the proceeding. Pursuant to *Wolf Creek* and the applicable regulations, Decade had a right to a determination concerning the confidentiality of the information. However, Wisconsin Electric Power Company (WE) could not have afforded the adjudicatory delay which would have been necessary to decide this issue. Had we first pursued this issue, it could not have implemented its sleeving demonstration program on time. Hence, in order to accommodate WE's scheduling needs, we issued a protective order *without prejudice to Decade's subsequent rights to determine the confidentiality of the disputed material*. Unless our "without prejudice" condition is effectuated, Decade will have been tricked into waiving its rights; and we are not willing to perpetuate such a deceit.

Therefore, we consider the confidentiality of the underlying technical documents to be a live issue. Compare WE's argument at Tr. 796-797.

B. Availability to Decade of Marked Portions of the Affidavit

Now we climb the next step. Westinghouse has submitted a new document, a "supplementary affidavit", a portion of which it claims to be confidential. On this occasion, however, Decade has expressed a willingness to receive the allegedly confidential information under a protective order. Tr. 810, 812-813. Consequently, Decade's need to be informed can be fulfilled by providing it with information pursuant to a protective order and we need not release this information to the public in order to satisfy Decade's needs. *North Anna* at 28.

We must, nevertheless, consider whether to release some of the withheld material to Decade pursuant to a protective order. Decade seeks access to the material pursuant to such an order and Westinghouse seeks to deny

Decade access altogether, on the grounds that it is not relevant and that Decade can not be trusted to fulfill its obligations under a protective order.

The standards governing issuance of a protective order are part of the general provisions governing discovery, found in §2.740. Under those provisions, the ordinary rule is that relevant material that is not privileged can be discovered. Subsection (c) gives Westinghouse the right to request "any order which justice requires" to protect it. Although these procedures have not been followed in this case, we consider that this is the context in which Westinghouse's position must be considered.

(a) Relevance

We have already characterized the information Westinghouse has withheld, and we will consider separately the relevance of parts of the withheld material.

Our review of paragraphs (8) through (11), which were withheld, persuades us that this material would not provide relevant new information to Decade or the public. It contains a statement of Westinghouse's views concerning potential competition for the repair of steam generators. Most of what is said is common knowledge. Ordinarily it could not be withheld even from the public, but Westinghouse is concerned that its views about its competition are not known to the public and should not be released.

Regardless, this information is relevant to our determination about the confidentiality of the Westinghouse Sleeving Report. Consequently, it must be released to Decade pursuant to a protective order. We understand Westinghouse's sensitivity to release of the information, but this argument is relevant to its public release and not its release to Decade under protective order.

Our review of Westinghouse's deletions under the heading, "Effect of Release of Information on Westinghouse [sic] Competitive Position", leads us to conclude the deleted information also must be released to Decade. This section contains information which we believe should not even have been incorporated in an affidavit. Although a portion of the deleted information relates to Westinghouse's judgement of the potential effects of changed markets on its competitive position, a portion deals with a far-from-novel argument concerning the anticipated economic effects which could occur if government chose to release proprietary, technological information. We fail to see why this argument can be concealed either from Decade or from the public.

We find that Westinghouse has made a more persuasive case that it need not release to the public portions of its affidavit dealing with potential impacts of competition on it. This information could legitimately be considered confidential. On the other hand, Westinghouse considers this information relevant to our determination in this case or it would not have filed

it with us. Clearly, it is relevant. Consequently, it should be made available to Decade, under an appropriate protective order.

We note that there is nothing in §2.790 or in §9.12 which in any way affects our responsibility to release relevant information to the parties to this proceeding pursuant to the rules governing discovery.

(b) Trustworthiness

Although Westinghouse has not presented any supporting evidence whatsoever, it has on three occasions questioned the integrity of Decade's representatives. The first time was in a telephone conversation with the chairman of the hearing board, on November 16. Tr. 777, 783. Then, Westinghouse repeated these charges during the on-the-record telephone conference the following day. Tr. 783. Then, in its November 25 brief on the "ISSUE OF DECADE ACCESS TO PROPRIETARY ORDER" it repeated its unsupported charges in footnote 4 on page 6.

When the Board saw that footnote, which stated that "Westinghouse is prepared to show . . . that Decade previously has disclosed proprietary information in an unauthorized manner", it immediately telephoned Westinghouse on November 31, 1981 for the purpose of informing Westinghouse that if it had proof it should already have submitted it. However, we were informed that Westinghouse does not have such proof and cannot give us a deadline by which it may be expected.

We consequently find these charges to be utterly without basis. Furthermore, we consider it highly improper for a party to cast aspersions on the integrity of another party without any supportive evidence. We expect that counsel for Westinghouse will refrain from making any further disparaging comments unless they can be proved. Heresay from anonymous, supposedly "reliable" sources, is not a proper basis for publicly impugning any person's integrity.

B. Public Release

Now we come to an issue that Decade has not raised; hence, we are reluctant to reach it. However, despite the contrary precedent set when the Appeal Board in *North Anna* sidestepped a confidentiality issue that was not squarely presented, we conclude that the rules require us to determine the validity of Westinghouse's proposal that its documents be withheld. There is no requirement that Decade have any interest in this matter (though we are grateful to it for alerting us to our responsibilities).

We cite the relevant subsections of §2.790(b), with significant words italicized:

- (2) A person who submits commercial or financial information believed to be privileged or confidential or a trade secret shall be on notice that *that it is the policy of the Commission to achieve an effective balance between legitimate concerns for protection of competitive positions and the right of the public to be fully apprised as to the basis for and effects of licensing or rule making actions*, and that it is within the discretion of the Commission to withhold such information from public disclosure.
- (3) The Commission *shall* determine whether information sought to be withheld from public disclosure pursuant to this paragraph: (i) is a trade secret or confidential or privileged commercial or financial information; and (ii) if so, should be withheld from public disclosure.

We note also that §2.790(c) establishes the procedures to be followed should a proposal for withholding information be denied.

Since the regulatory language, "shall determine", is mandatory, we generally must decide issues of confidentiality. We may, however, still be barred from considering the confidentiality of the portions of the Westinghouse supplementary affidavit that are in question. With respect to those withheld sections, we restate the relevant language from §2.790(b)(1)(ii):

The affiant may designate with *appropriate* markings information submitted in the affidavit as a trade secret or confidential or privileged commercial or financial information within the meaning of §9.5(a)(4) of this chapter and such information shall be subject to disclosure *only* in accordance with the provisions of §9.12 of this chapter.

To fall within this exception from our jurisdiction the information must have "appropriate markings." Furthermore, since the markings must be made by the affiant, we infer that they must be made in good faith. We also infer that there is an implicit limitation on the extent to which a litigant can shelter what may be basically legal arguments merely by incorporating them in the accompanying affidavit.

In this case, we have the added wrinkle that the rules require that the affidavit covered by this exemption must be filed simultaneously with the information which is allegedly confidential. This affidavit was not so filed, but was submitted to us in a subsequent filing which we requested because we considered the original affidavit insufficient. Nevertheless, we consider that this supplementary affidavit should be accorded the same treatment as if it were earlier filed because it is of the same general nature as the filing provided for in the regulations.

(a) Appropriate Markings

The meaning of "appropriate markings" appears to be one of first impression.

We find that the markings in this case were not appropriate. They consisted of a general statement on each page, without any attempt to assign particular reasons for confidentiality to particular portions of the text. That is not enough to fulfill the "appropriate markings" requirement, even though the preamble to this regulation indicated that a redundant affidavit need not be filed in order to support confidentiality.

The markings should have been of the nature included in the Westinghouse Sleeving Report. In that report, Westinghouse used code letters defined in the basic affidavit to supply reasons for withholding portions of its documents. Thus, each portion of a document that Westinghouse considered confidential had one or more appropriate markings attached, supplying particular reasons for withholding particular sections. Using the same system on the supplemental affidavit would not have been burdensome. That is all we believe was meant by this "appropriate markings" requirement. By fulfilling that requirement, Westinghouse would have avoided the necessity for redundant affidavits. However, we find that Westinghouse did not satisfy the "appropriate markings" requirement, even after we advised it that more explanation of its reasons was needed for us to determine whether it had properly treated portions of the affidavit as confidential.

(b) Appropriateness of the Certificate by the Affiant

The regulation requires that the affiant make the appropriate markings on his affidavit. That apparently occurred in this case. Along with the markings, the affiant apparently must certify that they are correct. That also has occurred in this case.

However, our review of the document that was claimed to be confidential *in its totality* persuades us that the certification that the entire document was confidential was not affixed with sufficient care to amount to good faith. A person certifying that an entire document is confidential must review the entire document and be convinced that each section is in fact confidential. We do not believe that such a careful review could have been completed, in good faith, here.

There are several sections originally marked confidential which call the certification of its confidentiality into serious question. Even a cursory examination of the "WHAT WESTINGHOUSE SEEKS TO PROTECT" section discloses that there is nothing there of a confidential nature. It is a general description of what Westinghouse is trying to protect through

claims of confidentiality. For example, it is trying to protect "test methods and basic data" and "processes."

Furthermore, most of the sections labeled "THE NATURE OF THE COMPETITION" contain information that is generally known and can even be found in the opinion of this Board concerning authorization of the tube sleeving demonstration program.

(c) Legal Arguments

In this case, Westinghouse has chosen to treat as confidential what may be one of its best legal arguments concerning the confidentiality of its Sleeving Report. Yet our examination of that argument persuades us that it consists of a frequently made assertion concerning the effect of government disclosure of proprietary information on the development of technology. It is the kind of statement one might expect to find in the series of editorial advertisements that Mobil Oil Corporation has run in newspapers and magazines.

The claim of confidentiality for this argument places this Board in an unnecessarily uncomfortable position. We could refuse to consider the argument in this proceeding. However, we do not think that such a narrow position is appropriate. We reject the notion that the regulations gave an unqualified invitation to include legal argumentation in an affidavit; and we do not recognize the exemption from our jurisdiction as extending to this argument.

(d) Action of the Staff

We are aware that our determination is inconsistent with that of staff in its November 20, 1981, letter from Robert A. Clark to Robert A. Wiesemann, Manager of Regulatory and Legislative Affairs for Westinghouse. The staff agreed with Westinghouse that the entire Wiesemann affidavit, including large portions subsequently voluntarily released by Westinghouse, were entitled to confidential treatment.

However, the staff did not even address the question of whether specific portions of the Wiesemann affidavit should be considered confidential. It found that portions of the affidavit were appropriately treated as confidential and then neglected to examine other sections of the affidavit separately. Had it done so, we are confident that it would have discovered that substantial portions of the affidavit were not exempt from disclosure and could be released because they have no colorable relationship to confidential interests of Westinghouse. Some of those sections have since been voluntarily released by Westinghouse, and we have already discussed why we question Westinghouse's good faith in originally certifying these sections as confidential in their entirety.

The staff did not provide any reason for believing that Westinghouse's arguments on the economics of technology should not be released. We see no reason for that information, considered separately, to be considered exempt from disclosure.

A possible reason for the difference in approach of the Board and of staff is that staff does not seem to consider 10 CFR §2.790(b)(1) to be relevant. That section requires that a proposal that a document be withheld in whole *or part* must be accompanied by a full statement of reasons. In our proceedings, this requires us to consider whether reasons have been given about whether each part of a document may be withheld. *See also Collier, Shannon, Rill and Scott*, 8 DOE 180,129 (1981). We consider this section to be relevant to whether an affidavit contains "appropriate markings" from which its confidentiality may be discerned. Staff apparently does not think that it needs to consider whether separate sections of documents need be released.

(e) Conclusions

It is our responsibility to balance the public's right to know against Westinghouse's legitimate competitive interests.

We consider the first withheld material, dealing with Westinghouse's views of its competition for steam generator repair, to be proprietary and exempt from disclosure. The public would derive little from this information, which is largely common knowledge. The only new piece of information is that this common knowledge also is the corporate view of Westinghouse. (Were Westinghouse to offer its securities to the public some time in the future, it likely would have to disclose this information under the Securities Exchange Act of 1933; however, we have ascertained that it has not had a public offering in over ten years and this information currently is permitted to be kept confidential.)

In considering the withheld section called "Effect of Release of Information on Westinghouse Competitive Position", it is appropriate to divide the information into two subject-matter portions. The first portion deals with the effect on Westinghouse if government were to adopt a callous attitude toward the disclosure of proprietary information. Because the effects are on Westinghouse, this information would be of some small value to Westinghouse's competitors, who would, however, probably not be surprised by the allegedly confidential generalizations. On the other hand, the value of this information to the public also would be slight, so we have concluded that we should not order its release.

As we have already fully discussed, another portion of the withheld information consists of a legal argument about the effect widespread disclosure of proprietary information would have on the public in general. Because of the relevance of that argument to our deliberations, the public

has a strong interest in being informed of it. Westinghouse will not suffer competitive harm from its release. We therefore determine that the right of the public to be fully apprised as to the bases for possible Board action on confidentiality outweigh the possible harm to Westinghouse from release. See §2.790(b)(5). We also find that the considerations militating in favor of public disclosure of this information clearly outweigh the potential harm which might inure from such disclosure. See *Wolf Creek*. Consequently, this information must be released to the public. We consider it appropriate to direct Westinghouse to submit to us a new non-proprietary version of its filing which conforms to this ruling.

It is disappointing that it has been necessary for us to expend so much effort on this issue. If either Westinghouse or the staff had a more healthy concern for the public's right to know, we could have been saved this effort. We find Westinghouse's position particularly troublesome. It has argued:

Decade has failed to demonstrate how and to what extent this public right to know would be served by release of the information to Westinghouse competitors, for it is only this group of the interested public which has not had access to the information.

Answer of Westinghouse, November 12, 1981 at 4.

In this passage, Westinghouse shows so little regard for the public's right to know that it divides the world into but two groups: Decade and its competitors. It entirely ignores the existence of the general public. It also ignores the fact that Decade has about 50,000 members and that only two of its representatives are permitted access to this information.

VI. FURTHER PROCEEDINGS

The Board has decided that it has jurisdiction over questions of confidentiality. Therefore, it shall soon convene an on-the-record telephone conference to resolve basic issues of the confidentiality of tests described in the Westinghouse Sleeving Report. The conferees will discuss (1) procedures leading to the issuance of a protective order so that Decade may receive information which we have found should be released to it, and (2) whether the conference on the merits of the confidentiality issue should be held in Wisconsin or conducted by telephone. We also shall establish filing deadlines for briefs and affidavits, prior to holding the conference to decide the merits of the confidentiality issue.

The agenda for the conference on the merits shall address: (1) the extent to which our existing record is or is not sufficient to inform the

public (including interested scientists or engineers) of the basis for our order on the demonstration program on tube sleeving or on the merits of the proposed full-scale sleeving program; (2) the applicability or lack of applicability of §2.790(c), regarding the return of allegedly confidential material, to a proceeding in which Wisconsin Electric Power Corporation did not object to deferring considerations of confidentiality until after it was licensed to perform its demonstration program; and (3) matters added to the agenda by motion of the parties.

To effectuate this Order, we require Westinghouse to submit to this Board a new non-proprietary version of its affidavit, conforming to this decision. If it chooses, it may preserve its claim of confidentiality for the information we have ordered released by including its claim in a cover letter transmitting the new version. Should it renew this claim, we will not order the release of information to the public, either under the general powers of the presiding officer under §2.718 or under §2.790(c). Instead, in order to avoid unnecessary duplication of appeals, our order to that effect will be issued along with our determination of the merits of the confidentiality issue.

ORDER

For all the foregoing reasons and based on consideration of the entire record in this matter, it is this 21st day of December, 1981,

ORDERED

(1) Westinghouse Electric Corporation shall prepare and file within three days a new non-proprietary version of the supplement to the affidavit of R. A. Wiesemann. This new version shall conform to the requirements of this Memorandum and Order. It may be accompanied by a cover letter preserving Westinghouse's right to object to the release of information we have required to be released.

(2) Westinghouse also shall file within three days a protective agreement which it proposes to apply to Wisconsin's Environmental Decade. To the extent that the agreement may contain terms more stringent than those imposed by the Board in its existing protective order, Westinghouse shall file a brief containing reasons supporting each of the more stringent provisions. Wisconsin's Environmental Decade may call to acquiesce in one

or more of such terms; but no party need file a responsive brief on this issue unless invited by the Board.

**FOR THE ATOMIC SAFETY AND
LICENSING BOARD**

**Peter B. Bloch, Chairman
ADMINISTRATIVE JUDGE**

Bethesda, Maryland

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Marshall E. Miller, Chairman
Dr. J. Venn Leeds, Jr.
Dr. Emmeth A. Luebke

In the Matter of

Docket Nos. 50-329-CP
50-330-CP

CONSUMERS POWER COMPANY
(Midland Plant, Units 1 and 2)

December 22, 1981

In a Partial Initial Decision on a construction permit application, the Licensing Board addresses the remanded issue of misconduct by the parties and their counsel. The Licensing Board finds that the full voluntary disclosure required of all parties was not practiced, but determines that no sanctions are appropriate because the requirements for disclosure in NRC proceedings has not been specifically addressed previously and there was no evidence of deliberately unethical behavior. After reopening the record to take evidence on the effects of radon emissions from the uranium fuel cycle, the Licensing Board concludes these effects are not significant in comparison to the effects of natural radon emissions.

RULES OF PRACTICE: RESPONSIBILITIES OF PARTIES

Parties and counsel must adhere to the highest standards in disclosing all relevant factual information to the Licensing Board.

RULES OF PRACTICE: RESPONSIBILITIES OF COUNSEL

Material facts, *i.e.*, those facts which could conceivably influence the Licensing Board whether or not they in fact do so, must be affirmatively disclosed to the Licensing Board by a party or its counsel.

RULES OF PRACTICE: RESPONSIBILITIES OF COUNSEL

Counsel cannot justify nondisclosure of information by stating that it is material on which a Licensing Board may not rely or by arguing that such reliance would be unjustified. Only the Board has the function of deciding on what information it will rely.

RULES OF PRACTICE: WORK PRODUCT DOCTRINE

Drafts of testimony are not covered by the attorney work product privilege.

RULES OF PRACTICE: RESPONSIBILITIES OF PARTIES

External factors such as the threat of a lawsuit will not relieve a party of its duties toward the Licensing Board.

RULES OF PRACTICE: RESPONSIBILITIES OF COUNSEL

If counsel have any doubts whether they have a duty to disclose to the Licensing Board particular facts, those facts must be disclosed.

RULES OF PRACTICE: PREPARED WRITTEN TESTIMONY

Prepared testimony should be the work of the witness, not of his counsel. The words should be those of the witness although counsel may suggest clarifications or omissions of totally irrelevant material.

TECHNICAL ISSUE DISCUSSED

Uranium fuel cycle (radon 222).

APPEARANCES OF COUNSEL

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- William C. Potter, Jr., Esq.** of Fischer, Franklin, Ford, Simon and Hogg, Detroit, Michigan
- R. L. Davis, Esq.,** Michigan Division Legal Department, Midland, Michigan
For the Intervenor, Dow Chemical Company
- William J. Olmstead, Esq., Richard Hoefling, Esq., William D. Paton, Esq. and Dennis Dambly, Esq.** of the Office of the Executive Legal Director, U.S. Nuclear Regulatory Commission, Washington, D.C.
For the Nuclear Regulatory Commission Staff
- Myron M. Cherry, Esq.,** Chicago, Illinois
For the Intervenors Other Than Dow

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**PARTIAL INITIAL DECISION
(Remand Proceeding)**

I. REMANDED ISSUES

This proceeding results from a Memorandum and Order concerning remanded issues, entered by the Commission November 6, 1978. The Commission had previously (April 10, 1978) requested the parties to state their views as to what issues, if any, remained for consideration at a reopened Midland proceeding in light of the Supreme Court's decisions reversing the Court of Appeals in *Vermont Yankee Nuclear Power Corp. v. NRDC* and *Consumer Power Co. v. Aeschliman*, 435 U.S. 519 (1978). The Commission stated in pertinent part:

"we conclude that in light of the Supreme Court's decision, current Commission practice, and the presently expected initiation of the operating license proceeding, the only issue identified above which remains as framed for consideration by the Licensing Board is the airing and resolution of the charges relating to Consumers' conduct. However, the Licensing Board will also address the issue of the environmental effects of radon as required by subsequent Commission actions."¹

A. Radon Releases

The environmental effects of radon are in issue only because this proceeding was pending when the Commission deleted the radon term from Table S-3, and provided for reopening the record to hear evidence on radon releases in all pending proceedings.² The Memorandum and Order of November 6, 1978 further provided:

However, the generic nature of this issue leads us to conclude that the interests of the parties will best be served by structuring the Licensing Board's review of this issue in accordance with the procedure set out by the Appeal Board in ALAB-480 [*Philadelphia Electric Company* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-480. 7 NRC 796 (1978)]. The radon evidentiary record and decision in the *Perkins* [*Duke Power Company* (Perkins Nuclear Station, Units 1, 2 and 3), Docket Nos.

¹ Unpublished Memorandum and Order, dated November 6, 1978, slip opinion p. 2.

² 43 *Fed. Reg.* 15613, 15616 (1978).

STN 50-488, 50-489, 50-490] proceeding will be served on the parties to this proceeding. Within 21 days after service, the parties may request in writing that the Licensing Board (a) receive additional written evidence on the radon question; (b) call for a further hearing on the *Perkins* record; or (c) consider objections to any aspect of the *Perkins* radon proceeding. The request shall set forth with specificity the respects in which the *Perkins* record is deemed to be incomplete, inaccurate, or objectionable, as well as precisely how such defects should be remedied.

"Within the same 21 days a party may file a memorandum with the Licensing Board addressed to two questions: (a) whether the *Perkins* evidentiary record supports the generic findings and conclusions of the *Perkins* Licensing Board respecting the amount of the radon emissions in the mining and milling process and resultant health effects; and (b) whether the radon emissions and resultant health effects are such as to tip the NEPA balance against continued construction of the Midland plant." (Slip Opinion, pp. 3-4)

As directed by the Commission, the *Perkins* radon evidentiary record and decision were served on the parties to this proceeding on November 17, 1978. Within 21 days, the Staff (December 8, 1978) filed its response. The Staff took the view that this Licensing Board need not receive additional written evidence on the radon question and need not call for a further hearing on the *Perkins* record. It considered that the *Perkins* evidentiary record supported the generic findings and conclusions of that licensing board respecting radon emissions in the mining and milling process and the resultant health effects. The findings were deemed to be equally applicable to the effects of the fuel cycle supporting the Midland facility. The Staff further stated that given a clear case of need for the Midland facility, the cost-benefit balance in this proceeding would not be tipped by the tiny increments associated with radon release from the uranium fuel cycle.³

The Applicant, Consumers Power Company (Consumers), also filed a memorandum in response to the Commission's Order on December 8, 1978. That response included an affidavit by G. Hoyt Whipple, Professor of Radiological Health at the University of Michigan. Consumers did not request that additional evidence be received on the radon question, or that further hearings be held on the *Perkins* record. It concluded that radon releases and the resulting impacts were insignificant in striking the cost-

³NRC Staff Response, pp. 3-6.

benefit balance, and that the *Perkins* evidentiary record supported the generic findings and conclusions of the Board. Consumers further urged that a consideration of the effects of radon in the Midland plant cost-benefit balance would not tip that balance against continued construction of the nuclear facility, and that the impacts associated with radon emissions are so *de minimis* that the balance is altered imperceptibly at most.

None of the Intervenor in this proceeding has responded to the Commission's Order, or the *Perkins* evidentiary record and decision or the NEPA balance on continued construction of the Midland plant.

We find, for the reasons described in Section III, *post*, that the radon effects from uranium fuel supply are negligibly small compared to the effects of natural radon emissions, and are therefore not significant.

B. Charges Relating to Conduct of Parties and Counsel

In late 1972 the Licensing Board awarded Consumers construction permits for the two-unit Midland nuclear facility.⁴ That award was affirmed by the Appeal Board several months later.⁵ Construction of the facility had actually begun in 1970, under a special exemption Consumers had obtained from the Commission. Certain Intervenor sought judicial review in the U.S. Court of Appeals for the District of Columbia Circuit, but did not ask for an interim stay of construction. Consequently, construction of the plant went forward while appeals were pending in the Courts.

In mid-1976 the Court of Appeals held that the administrative proceedings had been defective in certain respects.⁶ The Court of Appeals directed the Commission to consider certain specific issues not involved here, and then stated:

“As this matter requires remand and reopening of the issues of energy conservation alternatives as well as recalculation of costs and benefits, we assume that the Commission will take into account the changed circumstances regarding Dow's need for process steam, and the intended continued operation of Dow's fossil-fueled generating facilities.”⁷

⁴LBP 72-34, 5 AEC 214 (1972).

⁵ALAB-123, 6 AEC 331 (1973).

⁶*Aeschliman v. NRC*, 547 F.2d 622 (D.C. Cir. 1976); *rev'd and remanded sub nom. Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519 (1978).

⁷547 F.2d at 632.

The Commission thereupon reconvened a Licensing Board to consider whether the Midland construction permits should be continued, modified, or suspended as a result of the Court of Appeals' mandate.⁸ That suspension proceeding Licensing Board scheduled a hearing, opened discovery, and set November 5, 1976, as the date for all parties to file written direct testimony.⁹ Although it intended to hold a prehearing conference, certain delays caused the Board to reschedule the hearing, which commenced on November 30, 1976 without a prehearing conference having been held. After taking evidence for some 30 hearing days from November 1976 to May 1977, the Licensing Board issued a decision on September 23, 1977, declining to suspend the construction permits pending its decision on the merits.¹⁰ That decision was affirmed by the Appeal Board on February 14, 1978, subject to future hearings on certain issues by the Licensing Board.¹¹

The major issue which the Appeal Board directed to be considered by the instant Licensing Board was the "full airing and resolution" of certain charges relating to the conduct of Consumers and its counsel in the prior construction permit suspension proceeding. Those allegations were described by the suspension proceeding Licensing Board in paragraph 10 of its September 23, 1977 decision as follows:

"There is evidence in this record that Licensee has considered conducting its share of this proceeding in such a way as to not disclose important facts to the Board. Notes taken by a Dow attorney of meetings with Consumers' attorneys indicate the desire of the latter to 'finesse' the dispute with Dow if no Intervenor appeared (Intervenor Ex. 25, page 2, paragraph B). The same notes reflect the exploration by a Consumers' attorney of the possibility of using Dow witnesses unfamiliar with the facts relating to the Dow-Consumers dispute to testify at the hearing; they further disclose a proposed strategy by Consumers to 'drag feet' in the hearing process because as long as construction continues, Consumers 'has lever' (page 3, paragraph 4). Assuming that the proposals set out here were made and acted upon, none were successful. Aggressive Intervenor did appear and the Dow-Consumers matter was aired; the Dow witnesses furnished were highly knowledgeable men (Mr. Temple headed the Michigan Division of Dow); and Licensee has not slowed the suspension hearing. Of course there remains the suspicion raised by the

⁸ CLI-76-11, 4 NRC 65 (1976).

⁹ Memorandum and Order dated October 21, 1976.

¹⁰ LBP-77-57, 6 NRC 482 (1977).

¹¹ ALAB-458, 7 NRC 155 (1978).

disclosure of these instances, that there may have been similar ploys which were successful." (6 NRC at 485-86)

In ruling upon a subsequent petition by Consumers to reconsider paragraphs 9, 10 and 11 of its Order of September 23, 1977, the suspension proceeding Licensing Board in its November 4, 1977 Order further stated:

"Licensee and Staff are fearful that the language we used in the paragraphs indicated might be considered to constitute findings of fact on some items which we had indicated would not be considered as part of the suspension decision. One of these is the preparation of the testimony of the witness Joseph Temple which was the subject of controversy during the suspension hearing. Though we made no reference to the preparation of the Temple testimony in the paragraphs complained of, there is concern that they may be interpreted to constitute findings against the Licensee on that controversy. No such findings were made nor intended. Nor have we concluded that there was any misconduct on the part of attorneys in this proceeding in the questioned paragraphs. Like the Temple testimony, we have put aside the question of attorneys' conduct to be treated separately.

"Paragraph 9 is merely an attempt to summarize that part of *Seabrook* under consideration and we think it fairly does so.

"Paragraph 10 is a comment on Midland Intervenors' Exhibit 25. It begins by reciting that the exhibit relates that certain suggestions were made. It seems to us beyond doubt that it relates what we have said that it relates. The Board followed that recital with a sentence which reads: 'None of these proposed stratagems were successful.' This may be understood to imply that we have finally concluded that the suggestions were made and, further, acted upon. We did not mean to so imply and the sentence should be amended to make that clear. The next-to-last sentence in the paragraph is a recitation of events with which we assume Licensee does not quarrel and on which we stand. The final sentence is to the effect that the disclosures of Exhibit 25 raise a suspicion of 'similar ploys.' Of course they do. That is not to say that we will act on suspicion, or that it will not be dispelled, or that rules relative to burden of proof and preponderance of evidence will be disregarded." (Order of November 4, 1977, pp. 2-3)

The suspension Licensing Board further provided by its Order of November 4, 1977, that its prior Order of September 23, 1977, be

amended so that the sentence which appeared in its entirety on line five of page eight, would now read: "Assuming that the proposals set out here were made and acted upon, none were successful." (Order, p. 5)

The Appeal Board further directed the present Hearing Board to make a full airing and resolution of such charges, "whether or not the parties are themselves otherwise interested in pursuing these matters." (ALAB-458, 7 NRC 155, at 177, footnote 87)

Finally, the Commission in its Memorandum and Order of November 6, 1978, removed many of the original remanded issues from our consideration. This action was taken by it in light of the Supreme Court's reversal of the Court of Appeals decision. However, the Commission left standing the Appeal Board's direction in ALAB-458, 7 NRC 155, 177, for this Licensing Board to explore further the party and attorney conduct issues, stating:

"The only other matter remaining for Commission consideration is the airing and resolution of charges arising from the alleged attempt by Consumers to prevent full disclosure of the facts relating to Dow's intentions with regard to its contract. The *Vermont Yankee* decision had no effect on this matter because the charges arose from Consumers' alleged actions at the post-*Aeschliman* suspension proceeding before the Licensing Board. Furthermore, nothing has happened since the Appeal Board's decision in ALAB-458 which would warrant our modifying its instructions to the Licensing Board to further explore the charges at a future hearing. Thus, there is no reason for us to reverse our earlier decision not to review ALAB-458 on this matter." (Slip Opinion, p. 6) (Footnote omitted).

In our Prehearing Conference Order issued May 3, 1979, the Board adopted the following ultimate issues to define the matters in controversy:

1. Whether there was an attempt by parties or attorneys to prevent full disclosure of, or to withhold relevant factual information from the Licensing Board in the suspension hearings?
2. Whether there was a failure to make affirmative full disclosure on the record of the material facts relating to Dow's intentions concerning performance of its contract with Consumers?
3. Whether there was an attempt to present misleading testimony to the Licensing Board concerning Dow's intentions?
4. Whether any of the parties or attorneys attempted to mislead the Licensing Board concerning the preparation or presentation of the Temple testimony?

5. What sanctions, if any, should be imposed as a result of affirmative findings on any of the above issues.

The Board allowed discovery prior to the commencement of hearings on the above issues, and pursuant to notice¹² hearings were held from July 2 to July 31, 1979. All of the fourteen witnesses who appeared and testified were called as Board witnesses, subject to appropriate cross-examination by all counsel. In addition, at the Board's request the NRC Staff reviewed the underlying record as to all contentions, charges or allegations which had been previously made by the Intervenor other than Dow. The NRC Staff reported the results of its review in a letter to the Board dated June 1, 1979, which was admitted as Board Exhibit 4.

At the conclusion of the evidentiary hearings, the parties were requested to file briefs and proposed findings of fact and conclusions of law. These documents as well as appropriate responses to the filings of other parties were served by Consumers, Dow, and the Staff.¹³ However, the Intervenor Other Than Dow did not file any brief or proposed findings. These Intervenor had not participated in the remand hearing in July, 1979, although the Board caused copies of all transcripts of testimony, exhibits, motions and other papers to be served contemporaneously on their counsel, Myron M. Cherry, Esquire.

On January 11, 1980, Mr. Cherry wrote a detailed five-page letter to the Board setting forth his views and arguments regarding the matters in controversy. This letter described its purpose as being "in the nature of our post-trial memorandum" (Letter dated January 11, 1980, p. 4). The Board entered an Order Granting Intervenor Other Than Dow An Opportunity to File Proposed Findings on November 14, 1980.

By this Order, these Intervenor and their counsel were "given to and including December 29, 1980, to file written briefs and proposed findings which cite the record with specificity in support of the conclusions and arguments set forth in their letter dated January 11, 1980. However, no briefs or proposed findings were ever filed in this proceeding by the Intervenor Other Than Dow.

II. LEGAL PRINCIPLES REGARDING DUTY OF DISCLOSURE

The principal issue in this remand proceeding concerns the questions involving full disclosure to the suspension proceeding Licensing Board of the facts relating to Dow's intentions regarding its contract with the

¹²44 Fed. Reg. 35061 (June 18, 1979).

¹³The Staff filed a Brief on Issues Identified in Board's May 3, 1979 Order, but it did not elect to file reply briefs.

Applicant. The Appeal Board's instructions, confirmed by the Commission,¹⁴ are as follows:

"We have eschewed any comment on the significance of the events which led the Board below to include in paragraphs 9-11 of its decision (6 NRC at 485-86, as amended by order of November 4, 1977) comments relating to an alleged, albeit unsuccessful, attempt by the applicant to prevent full disclosure of the facts relating to Dow's intentions with regard to its contract. That matter was not put to rest by the November 4th order. Nor was it dealt with—indeed it was specifically excluded from consideration—in another order the board issued that same day, referring certain attorney misconduct charges to a special licensing board pursuant to 10 CFR Section 2.713(c). That Board has since been told by the Commission to attempt to settle those charges, failing which it will be dissolved (January 30, 1978, letter from the Chairman of the Commission to the Chairman of the Special Licensing Board). The reasons the Commission gave for dissolving the special board do not apply to the entirely different type of charges involved here. And it is important that they be fully aired and resolved. Consequently, we fully expect both that matter and the merits of the ACRS's 'unresolved safety issues' to be explored further at future hearings before the Licensing Board. This must be done whether or not the parties are themselves otherwise interested in pursuing these matters."¹⁵

The nature and extent of the duty concerning affirmative disclosure of facts to NRC licensing boards must be analyzed in exploring the conduct of parties and counsel in this proceeding. In describing the standards expected to be followed in the instant case, the Appeal Board further said:

"Insofar as the integrity of the proceedings or the good faith of the parties is concerned, there is no parallel between zealous advocacy in support of an arguable legal position and, *e.g.*, the *withholding of relevant factual information*. We note that in the latter regard *we fully expect both clients and lawyers to adhere to the highest standards*. See, *e.g.*, *Vermont Yankee Nuclear Power*

¹⁴Commission's Memorandum and Order, dated November 6, 1978, pp. 2 and 6.

¹⁵Consumers Power Company (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 177, fn. 87 (1978).

*Corp. (Vermont Yankee Station), ALAB-138, 6 AEC 520, 533 (1973).*¹⁶ (Emphasis supplied)

In the *Vermont Yankee* case alluded to above, the calculated peak cladding temperature to be attained by a certain nuclear reactor in the event of a loss-of-coolant accident was incorrectly described in an Appeal Board decision. Counsel for the Applicant immediately notified the Appeal Board of the correct information. In commending counsel's forthrightness, even though it might have cut against his client's position, the Appeal Board said:

"Before discussing the 2298° figure, we should mention that Mr. Dignan displayed highly commendable candor in calling the Board's attention to the existence of a fact which could detract from the validity of the position he was advocating. While we would expect no less from any member of the bar appearing before us, Mr. Dignan's conduct nevertheless is worthy of acknowledgement, for it reflected his full adherence to the principles which should govern those who by their advocacy participate in the adjudicatory process."¹⁷

Virginia Electric and Power Company (North Anna Power Station, Units 1 and 2), CLI-76-22, 4 NRC 480 (1976), was the first case in which a licensee was charged with making material false statements in connection with a license application. The Commission was therefore called upon to resolve basic policy questions concerning an applicant's obligation to provide information to the Commission. The question involved allegedly inaccurate information concerning seismic conditions furnished by the Applicant in the course of seeking its construction permits. The allegations involved both affirmative representations concerning geologic faults, and omissions including failures to present evidence about suspected faulting at the licensing board construction permit hearings (*Id.*, at 481-83, 491-92).

The Commission carefully considered the proper definition of a "material" statement in NRC proceedings. It held that "materiality is judged by whether a statement is capable of influencing a decision-maker, not whether the statement would, in fact, have been relied on. The weight to be accorded relevant information is, in the end, the job of the indepen-

¹⁶*Id.*, at 172, fn. 64.

¹⁷ *Vermont Yankee Nuclear Power Corp. (Vermont Yankee Nuclear Power Station), ALAB-138, 6 AEC 520, 533 (1973). See also Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station), ALAB-655, 14 NRC 809 (1981); fn. 14; Hamlin Testing Laboratories, Inc., 2 AEC 423, 428 (1964). Cf. Duke Power Company (Oconee Nuclear Station and McGuire Nuclear Station), ALAB-651, 14 NRC 313, (1981), rev'g. LBP-80-28, 12 NRC 459, 469-71 (1980).*

dent regulatory commission, not the applicant" (*Id.*, at 487). Materiality was also deemed to be dependent in part on the stage of the proceeding involved. It was held that at the hearing stage "where agency decision-making is imminent, arguably relevant data must be promptly furnished if the agency is to perform its function" (*Id.*, at 488).

On the issue of "omissions" constituting material false statements, the Commission disagreed with both the applicant and the Appeal Board.¹⁸ It held that "full disclosure by applicants and licensees of all relevant data is vital" to the Commission fulfilling its duties (4 NRC at 488). It was further stated:

"We think rather that 'material false statement' may appropriately be read to insure that the Commission has access to true *and full* information so that it can perform its job. Nor is 'material false statement' such an unlikely choice of language for reaching acts of omission as well as commission . . . The point of a statement is to express something. Silence can be remarkably expressive, a fact recognized in literature, in the law of evidence, and in ordinary usage" (*Id.*, at 489; emphasis in original; footnote omitted).

The courts likewise have viewed the nondisclosure of material facts or data as constituting false and misleading statements where affirmative disclosure is necessary to effectuate the purpose of particular statutes.¹⁹ It is generally accepted that "the failure of a person to include material information in a necessary document can just as surely result in a false and misleading statement as would the inclusion of incorrect information."²⁰

Materiality as defined by the courts generally refers to the probative weight of evidence in the decisionmaking process, as judged by the facts and circumstances in the particular case. It has been stated:

"The term 'material' is used in many fields of law; for example, insurance law, bankruptcy, agency, motions for new trial upon the ground of newly discovered evidence, and in respect to perjury . . . The meaning of the word appears to be consistent in these various fields. The test is whether the false statement has a natural

¹⁸ Virginia Electric and Power Company (North Anna Power Station, Units 1 and 2), ALAB-324, 3 NRC 347, 360-63 (1976).

¹⁹ SEC v. Capital Gains Research Bureau, 375 U.S. 180, 186, 198-99 (1963); Securities and Exchange Commission v. Texas Gulf Sulphur Co., 401 F.2d 833, 849 (2nd Cir. 1968).

²⁰In re Caesar's Palace Securities Litigation, 360 F. Supp. 366, 386, fn. 1^c (SDNY 1973).

tendency to influence, or was capable of influencing, the decision of the tribunal in making a determination required to be made."²¹

Under this formulation it need not be shown that there was actual reliance upon the false statement. The test is whether the statement has a natural tendency or capability to influence, not whether it does so in fact.²² The basic question is whether the representation could conceivably or was potentially capable of influencing or affecting a decision-maker.²³

The Commission's Rules of Practice provide that "[o]nly relevant, material, and reliable evidence which is not unduly repetitious will be admitted. Immaterial or irrelevant parts of an admissible document will be segregated and excluded so far as is practicable" (10 CFR §2.743(c)). The courts have had occasion to analyze the distinctions involved in defining these concepts. Thus it has been stated:

"'Material' when used in respect to evidence is often confused with 'relevant', but the two terms have wholly different meanings. To be 'relevant' means to relate to the issue. To be 'material' means to have probative weight, i.e., reasonably likely to influence the tribunal in making a determination required to be made. A statement may be relevant but not material. Professor Wigmore depicts with some acerbity the difference between relevancy and materiality, 'the inaccuracy of our usage' of the terms, and 'the harmfulness of this inveterate error.' Materiality, he maintains, is a matter of substantive law and does not involve the law of evidence. He does not include 'materiality' in the topics treated in his volumes on Evidence."²⁴ (Footnotes omitted).

The Federal Rules of Evidence, enacted January, 1975, contain the following definition of relevant evidence:

"'Relevant evidence' means evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more probable or less probable than it would be without the evidence" (Rule 401).

²¹ *Weinstock v. United States*, 231 F.2d 699, 701-02 (D.C. Cir. 1956), citing numerous decisions at fn. 6. See also *United States v. Krause*, 507 F.2d 113, 118 (5th Cir. 1975); *Poulos v. United States*, 387 F.2d 4, 6 (10th Cir. 1968).

²² *Blake v. United States*, 323 F.2d 245, 247 (8th Cir. 1963); *Gonzales v. United States*, 286 F.2d 118, 121 (10th Cir. 1960), cert. denied, 365 U.S. 878 (1961); *Robley v. United States*, 279 F.2d 401, 404 (9th Cir. 1960).

²³ *United States v. McGough*, 510 F.2d 598, 602 (5th Cir. 1975).

²⁴ *Weinstock v. United States*, *supra*, 231 F.2d at 701.

The concept of materiality is not defined or used in the Federal Rules of Evidence. The Advisory Committee's note to Rule 401, *supra*, states the reason:

"The rule uses the phrase 'fact that is of consequence to the determination of the action' to describe the kind of fact to which proof may properly be directed. The language is that of California Evidence Code §210; it has the advantage of avoiding the loosely used and ambiguous word 'material.'" (Fed. R. Evid. 401, 28 USCA. *See also United States v. Madera*. 574 F.2d 1320 1322 (5th Cir. 1978) and cases cited therein; 10 Moore's Federal Practice. §401.01 *et seq.*)

The Appeal Board has recognized the mandatory duty of prompt and affirmative disclosure to licensing boards of either new information, or of changes in factual matters during the course of adjudication. Where an applicant had modified its QA organization (which actually constituted an improvement over the old one), but a board was not promptly notified, it was stated:

"In all future proceedings, parties must inform the presiding board and other parties of new information which is relevant and material to the matters being adjudicated. To avoid any misunderstanding, we do not mean that necessary administrative actions by the regulatory staff should not go on while a proceeding is being adjudicated (see 10 CFR 2.717(b)). But this does not mean that the staff or applicant can be permitted to leave the presiding body and the other parties to the proceeding in the dark about any change which is relevant and material to the adjudication.¹⁵ Changes may take place but they must be disclosed. If the presiding board and other parties are not informed in a timely manner of such changes, the inescapable result will be that reasoned decision-making would suffer. Indeed, the adjudication could become meaningless, for adjudicatory boards would be passing upon evidence which would not accurately reflect existing facts. *The disclosure requirement we impose is not the product of any overly procedural formalism on our part—it goes to the very heart of the adjudicatory process. Its sacrifice for the sake of expediency cannot be justified and will not be tolerated.*"²⁵

²⁵ Duke Power Company (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-143, 6 AEC 623, 625-6 (1973). *See also* Georgia Power Company (Alvin W. Vogtle Nuclear Plant, Units 1 and 2), ALAB-291, 2 NRC 404, 408-12 (1975), wherein the interpretation of the above-quoted McGuire disclosure requirement was discussed at length.

Footnote 15: "Any uncertainty regarding the relevancy and materiality of new information *should be decided by the presiding board.*" (Emphasis supplied)

In a later Duke Power Company case,²⁶ it was again stressed that prompt disclosures to boards of changing circumstances are mandatory. In *Catawba* the applicant had represented that it needed a nuclear facility on line by a certain date in order to satisfy its power requirements. A supplemental partial initial decision was then issued, authorizing a limited work authorization (LWA). An intervenor then called the licensing board's attention to public announcements by the applicant's president, outside the NRC hearing process, that a slowdown in the growth of power demand led it to defer completion of that plant by two years. This was a possibility that had existed, but which the applicant's witnesses had not mentioned, during the evidentiary hearing. The Appeal Board held that the licensing board's decision to reopen the record was fully justified under these circumstances because "it cannot be overemphasized that it is of utmost importance for parties to keep the board abreast of changing circumstances bearing on their cases" (4 NRC at 406 n.26). The *McGuire* disclosure requirement statement set forth *supra* was quoted approvingly, and it was then stated:

"In Commission proceedings as in judicial ones, the tribunal 'must rely on counsel to present issues fully and fairly, and counsel have a continuing duty to inform the Court of any development which may conceivably affect an outcome,' *Fusari v. Steinberg*, 419 U.S. 379, 391 (1975) (concurring opinion of Ch. J. Burger). We find it disconcerting that this is not the first time this applicant and counsel have had to be reminded of this obligation. See *McGuire*, *supra*, 6 AEC at 625. We trust that it will be the last." (*Id.*)

*Seabrook*²⁷ involved a request to reopen the record because of alleged inconsistencies between statements made by a company official before a licensing board and before the Federal Power Commission and a State legislature. The Appeal Board held that the statements did not undercut the conclusions it reached based on the NRC record. In these circumstances, a reopening of the record to consider the claimed testimonial dis-

²⁶ Duke Power Company (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 401, 406 (1976).

²⁷ Public Service Company of New Hampshire (Seabrook Station, Units 1 and 2), ALAB-422, 6 NRC 33, 80-82 (1977).

crepancies would not effect a different result on the issue of financial qualifications. However, it was further stated:

“That is not to say that we are insensitive to the vice inherent in different stories being told to different legislative or regulatory bodies. At least in the absence of changed circumstances or other substantial cause, such a practice is worthy of condemnation even if, as seems to be the case here, perjury is not involved.” (6 NRC at 82, n. 53).

In *Black Fox*,²⁸ intervenors filed a motion with the Appeal Board seeking a stay of the effectiveness of a partial initial decision that permitted the issuance of a limited work authorization (LWA). The Applicants told the Appeal Board that “the intervenors not merely waited 80 days after the rendition of the July 24 partial initial decision before filing their stay papers but, in addition, did not first seek stay relief from the Licensing Board. According to the applicants, these considerations warrant our summary rejection of the motion.” (*Id.* at 531). However, the record showed a somewhat different state of facts. On September 5 one of the intervenors, by a letter to the Licensing Board, requested it to revoke the LWA on the precise ground later assigned in support of the stay motion. The Licensing Board treated the letter as a motion for reconsideration of the July 24 decision, and it entered an order on September 29 denying such relief. That order was served on October 2, and the stay motion was filed less than 15 days thereafter. The Appeal Board castigated this conduct as follows:

“In short, contrary to the implication left by the applicants’ papers, it turns out that one of the intervenors¹³ had sought what was tantamount to stay relief from the Licensing Board and, further, that the intervenors came to us promptly once that relief had been denied.¹⁴ Without pausing to consider whether the request to the Licensing Board was timely (and if not, what significance that might have respecting the timeliness of the stay motion now in hand),¹⁵ this much can be said: the failure of the applicants to have referred to these developments was inexcusable. Counsel appearing before this Board (as well as other NRC adjudicatory tribunals) have a manifest and iron-clad obligation of

²⁸ Public Service Company of Oklahoma (Black Fox Station, Units 1 and 2), ALAB-505, 8 NRC 527 (1978). See also Tennessee Valley Authority (Hartsville Nuclear Plant, Units 1A, 2A, 1B and 2B), ALAB-409, 5 NRC 1391, 1395-96 (1977).

candor. That obligation is hardly fulfilled when, as here, there is a failure to call attention to facts of record which, at the very least, cast a quite different light upon the substance of arguments being advanced by counsel.¹⁶ We shall expect that, in the future, applicants' counsel will take pains to avoid this kind of conduct."

Footnote 13: "It appears from the Licensing Board's September 29 order that the September 5 letter was deemed by the Board to have been submitted on behalf of all of the intervenors."

Footnote 14: "Although the word 'stay' may not have been employed in the September 5 letter, what was being sought (*i.e.*, a lifting of the limited work authorization) was in essence the same relief which a formal stay motion would have requested. Further, as should have been perfectly obvious to the applicants, given the Licensing Board's September 29 order any further attempt to obtain lifting of the limited work authorization by that Board would have been futile. Thus, even if the September 5 letter were not regarded the equivalent of a stay motion, the applicants still could not have fairly argued (without reference to the letter) that the intervenors should have formally moved for a stay from the Licensing Board before filing their motion with us."

Footnote 15: "As we have seen, the stay motion is being denied on grounds other than its purported tardiness."

Footnote 16: "Indeed, in this instance there might well be more involved than simply a failure to mention relevant facts. In their stay motion (at p. 2), the intervenors stated, without elaboration, that the Licensing Board had refused 'to grant the relief requested.' The applicants' response to this assertion (at p. 3) was that the intervenors 'are simply wrong. Intervenors provide no citation in support of their assertion and, based on [their] review of the pleadings filed in this case, Applicants can find none.' Even giving the applicants the benefit of all doubt with respect to the import of the intervenors' September 5 letter, we nonetheless find that statement misleading in the extreme." (*Id.*, at 531-32.)

III. ENVIRONMENTAL EFFECTS OF RADON EMISSIONS

On April 14, 1978, the Commission determined that the radon value in Table S-3 of 10 CFR Part 51 relating to uranium fuel cycle environmental data was incorrect and deleted it from the Table. The Commission deferred any decision on a new rulemaking until the completion of the generic

environmental impact statement on uranium milling. The radon question was to be litigated in individual licensing proceedings. The Licensing and Appeal Boards were to reopen the records in pending cases to receive new evidence on radon releases and on health effects resulting from radon.²⁹

In an Order Concerning Remanded Issues in the instant proceeding, dated January 4, 1979 (Order), the Board discussed the remaining issue of environmental effects of radon as directed by the Commission. The Board offered the parties an opportunity to file a memorandum with the Licensing Board as to whether the *Perkins*³⁰ evidentiary record supports the generic findings and conclusions of the *Perkins* Licensing Board regarding (1) the amount of radon emissions from the uranium mining and milling process and the resultant health effects; and (2) whether the radon emissions and resultant health effects are such as to tip the NEPA³¹ balance against continued construction to the Midland plant.

It was the Staff's position in its December 8, 1978 filing, that the Board need not (a) receive additional written evidence on the radon question; and (b) need not call for a further hearing on the *Perkins* record, in the absence of an appropriate showing that the instant record is incomplete in some significant way. The Staff took the view that the cost-benefit balance in this proceeding would not be tipped by the very small increments associated with radon release from the uranium fuel cycle.

In its filing of December 8, 1978, Consumers did not request that additional evidence be received on the radon question or that additional hearings be held on the *Perkins* record. This Applicant did not have any objections to any aspect of the *Perkins* radon proceeding. None of the Intervenors in this proceeding responded to the Commission's Order, or to the *Perkins* evidentiary record.

The Appeal Board on May 30, 1978, established a procedure to use the *Perkins* Licensing Board record and decision for the parties in seventeen other separate licensing proceedings, in order to frame a position regarding the radon issue.³² The instant Board concluded that the radon question should be taken under advisement, and the decision on that issue was deferred until the Appeal Board acted in its pending *Perkins*-related reviews (Order at 6).

²⁹43 Fed. Reg. 15613 (April 14, 1978).

³⁰Duke Power Company (*Perkins* Nuclear Station, Units 1, 2 and 3), LBP-78-25, 8 NRC 87 (1978).

³¹National Environmental Policy Act, 42 U.S.C. §§4321 *et seq.*

³²Philadelphia Electric Company (*Peach Bottom Atomic Power Station, Units 2 and 3*), ALAB-480, 7 NRC 796, 804-06 (1978).

Radon emissions during active mining and milling are expressed as a finite release in terms of curies per AFR (Ci/AFR). An AFR is the amount of fuel required to operate a 1,000 MWe model light water reactor at 80 percent capacity for one year. Long term, continuing releases after the mines and mills have shut down are expressed as an annual release rate for each AFR produced during active mining or milling; that is, in terms of curies per AFR per year (Ci/AFR/yr).

In its decision on the environmental consequences of the uranium fuel cycle, the *Perkins* Licensing Board adopted a figure of 4060 Ci/AFR calculated from an estimate of the concentration of radon in the ventilating air from an underground mine.³³ The total amount of radon from open-pit mining depends upon the period of time that the walls and floor of the pit remained open to the atmosphere and the concentration of uranium on the soil of the mined-out pit. That Licensing Board assumed that the amount of radon released from mining could be as high as 200 Ci/yr/AFR and that half of the uranium for the *Perkins* plant would be from open-pit mines. This resulted in a figure of 100 Ci/yr/AFR from unreclaimed open-pit mines. If an open-pit mine produces enough ore to supply one nuclear plant and the pit is refilled or otherwise stabilized at the end of 20 years of operation, then some 4,000 Ci of radon would be released per AFR. This is the same as that estimated for underground mining, so it would not matter whether the uranium came from underground or open-pit mines.

The uranium ore is delivered to a mill after the mining operation for separation of the U_3O_8 . The radon emission from milling was estimated at 30 Ci/AFR. The residual material remains in tailings piles which continue to give off radon. The amount depends largely on how well the tailings piles are covered to reduce future radon emission. Licensing activities provide increased regulation and protection. The *Perkins* Licensing Board was of the opinion that tailings piles stabilized to NRC criteria will emit only 1 Ci/yr/AFR, so that the amount of radon from tailings piles associated with the fueling of the *Perkins* plant would be about 110 Ci/yr.

The Appeal Board subsequently issued a decision on the radon issue in the other *Perkins*-related cases on May 13, 1981.³⁴ The radon release values adopted by the Appeal Board for a model 1,000 MWe plant and three nuclear stations are summarized in that decision on pp. 586-42 of the Opinion in ALAB-640. It leaves open, for future ruling, the question of health effects of those emissions.

³³ 8 NRC at 90.

³⁴ Philadelphia Electric Company (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-640, 13 NRC 487 (1981). See also ALAB-654, 14 NRC 632 (1981).

Representative radon release rates for the uranium fuel cycle are shown in Table 3 of ALAB-640 for a model 1,000 MWe nuclear plant (*Id.*). Total emissions consist of a finite release of 6,600 Ci/AFR from active mining and milling. The continuing, long term release rate after the mines and mills have been shut down were considered for three cases. Case 1 assumed that the mines are sealed and reclaimed and the tailings are covered. This resulted in a release rate of 21 Ci/AFR/yr. Case 2 involved unsealed and unreclaimed mines, and tailings stabilized in accordance with Commission regulations. It resulted in a release rate of 91 Ci/AFR/yr. Case 3 included unsealed and unreclaimed mines together with uncovered tailings, giving a higher release rate of 230 Ci/AFR/yr (*Id.*).

The above-described values for radon release adopted by the Appeal Board are somewhat higher than the *Perkins* Licensing Board findings of 1978. However, they may be considered to be in the same ball park, the order of 10,000 Ci/yr, when compared to the natural emission of radon from the soil, some 100,000,000 Ci/yr.

The *Perkins* Licensing Board decision devoted several pages to a discussion of cancer effects due to low concentration of radioactivity in the air. The radon releases from mining and milling uranium, the order of 10,000 Ci/yr, are very small compared to the natural background emission of radon from the soil in the U.S. of some 100,000,000 Ci/yr.³⁵ People live in this environment. Indeed, people who live in houses with concrete floors, block walls or stone fireplaces are exposed to much higher radon concentrations than people in the open air.

In essentially agreeing with the *Perkins* Licensing Board's above-described discussion of cancer effects, two of the five Appeal Board Judges (Dr. Buck and Dr. Johnson) in a dissenting opinion to ALAB-640 wrote:

"In circumstances such as this, in which the addition to a natural environmental substance (*i.e.*, radon) caused by human activities is extremely small compared with the existing natural concentration (it is small even compared to fluctuations in that concentration), we believe that any assignment of environmental impact to the incremental addition could only be characterized as remote and speculative. We conclude that this impact may properly be ignored in the assessment of the overall environmental impact of a nuclear power plant."³⁶ (Footnotes omitted.)

³⁵8 NRC at 95-100.

³⁶ ALAB-640, *supra*, 13 NRC 546-49. Subsequently, in ALAB-654, *supra*, the Intervenor was given an opportunity to prove the contrary. However, they were placed under a heavy burden of making "a concrete threshold showing that there is a difference in competent expert opinion on the health effects issue" in order to obtain a further hearing on those questions. 14 NRC 634-36.

In the instant proceeding, as noted above, the Applicant and the Staff accepted the *Perkins* Licensing Board result and did not request additional hearings on the radon issue. The Intervenors did not request any additional hearings. This Board can find no reason to disagree with the conclusion that the radon effects from uranium fuel supply to nuclear plants are negligibly small compared to the effects of natural radon emissions, and are therefore not significant. Accordingly, we adopt the finding of the *Perkins* Licensing Board, that:

“Based on the record available to this Board, we find that the best mechanism available to characterize the significance of the radon releases associated with the mining and milling of the nuclear fuel for the *Perkins* facility is to compare such releases with those associated with natural background. The increase in background associated with *Perkins* is so small compared with background and so small in comparison with the fluctuations in background, as to be completely undetectable. Under such a circumstance, the impact cannot be significant.” (8 NRC at 100)

IV. LACK OF CANDOR IN EVIDENCE CONCERNING DOW'S INTENT

When the Court of Appeals remanded the orders granting construction permits to the Commission, it “assumed” that the Commission would consider in its proceedings the “changed circumstances” relating to Dow’s need for process steam from the nuclear facility.³⁷ At the suspension hearing, which commenced November 30, 1976, written direct testimony was presented by Joseph G. Temple, the General Manager of the Michigan Division of Dow which has a contract with Consumers Power to buy process steam. In the final version of his prepared testimony, the witness stated that Dow’s intention at the time of the testimony was “to purchase process steam from Consumers beginning the first year of operation (1982).”³⁸ The testimony mentioned a review of the contracts which Consumers conducted between August and September of 1976 which concluded that:

³⁷ The Court stated that since a remand and reopening of the issues of energy conservation alternatives and a recalculation of costs and benefits was required, it “assume[d] that the Commission will take into account the changed circumstances regarding Dow’s need for process steam . . .” *Aeschliman v. NRC*, 547 F.2d 622, 632 (D.C. Cir. 1976); *rev’d and remanded sub nom. Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519 (1978).

³⁸ Temple Test. at 8, following p. 220 of Suspension Transcript.

“Although the difference in cost between the nuclear alternative and the coal-fired alternative has narrowed appreciably due to the numerous delays already incurred and the consequent cost increase of the nuclear plant, Dow’s latest analyses show that the nuclear alternative still retains some cost advantage, assuming that Dow would require a return on investment of greater than 15% before taxes.”³⁹

While this witness was on the stand in the suspension hearing, counsel for Intervenor Other Than Dow presented evidence by cross-examination that the Michigan Division of Dow had recommended to a corporate group (Dow USA) performing a requested review, that it find that the Consumers contracts and the use of nuclear steam from the Midland plant were no longer advantageous to Dow.⁴⁰ Notes of meetings indicating that Consumers had threatened Dow that it would bring a substantial lawsuit against Dow if Consumers felt Dow had breached its contract through lack of adequate support for Consumers, and that Consumers had suggested “finessing” its disputes with Dow at the hearing, were also produced.⁴¹ These disclosures led to the hearings in July, 1979 to investigate the preparation and presentation of the Temple testimony relating to the Dow-Consumers relationship and to determine whether all significant information had been presented at the earlier suspension hearing.

Events occurred in the preparation of written testimony concerning Dow’s intention to buy process steam which demonstrate an incorrect view of a party’s duty of affirmative disclosure to the Licensing Board. As the Appeal Board stated, the Licensing Board has to probe “to determine what [Dow’s] intention truly is” with respect to purchasing steam from Consumers.⁴² Dow and Consumers argue that the only information necessary for the Board to make such a determination was the testimonial conclusion of Dow USA that Dow intended to purchase steam from Consumers if Consumers were able to sell steam from the Midland plant on schedule. This argument overlooks the fact that intentions may be more complicated and more qualified than would be expressed through a simple statement. “Yes, we intend to purchase steam.” The evidence developed in this hearing and in the suspension hearing makes it apparent that Dow’s

³⁹ *Id.* at 5.

⁴⁰ Tr. 250, 406-10; Board Ex. 1. The Michigan Division of Dow reports to Dow USA. Dow USA is treated as a corporation in internal structure although it is not, in fact, incorporated. Above Dow USA on the corporate ladder is Dow Chemical Company, the only actual corporation in the Dow structure. The Michigan Division made its recommendation to the Chairman of the so-called Operating Board of Dow USA. Tr. 50,574-77; Dow Ex. 2.

⁴¹ Tr. 2,396-99; Staff Ex. 3 Doc No. 26.

⁴² See ALAB-458, 7 NRC 155, 167 n. 45.

intentions in this situation were, indeed, a great deal more qualified than that.⁴³ In fact, Dow stated that its real position with respect to the contract would not be known, even to Dow, until modifications to the contract had been negotiated and signed, and that until there were such modifications, Dow's position was subject to change.

Failure to include the recommendation of the Michigan Division of Dow in Temple's direct testimony could have created an unwarranted impression on the part of the Licensing Board that there was very substantial, perhaps even unanimous, satisfaction within Dow with the purchase arrangement. In fact, the Michigan Division recommendation that there was "no longer the possibility or probability that the nuclear plant would be good for Dow's Midland plant"⁴⁴ would have disclosed deepseated unhappiness with the arrangement. Evidence that Dow had seriously considered bringing suit against Consumers for breach of the contract and had drafted complaints for declaratory judgment emphasized the extent of this unhappiness.⁴⁵ The strength of Dow's commitment to buy steam under its contract with Consumers could be accurately evaluated only with knowledge of this substantial internal disagreement. Since Dow continued to consider suing Consumers as an option available to it,⁴⁶ Dow's intent to take steam from Consumers could appear to be questionable.⁴⁷

Consumers and Dow recognized the potential impact that knowledge of the disagreement might have on the Licensing Board, but they carefully constructed rationalizations for not including it. Specifically, one counsel for Consumers explained to Dow that he had not included in a draft of Temple's direct testimony information that Dow was concerned about Consumer's reliability, or that Dow was seeking a date after which it would be relieved of all contractual obligations if steam was not forthcoming, because such information would cause Consumers to "lose the case."⁴⁸ Dow expressed concern that if information relating to ongoing

⁴³ See Tr. 50,994-95; Staff Ex. 5 Doc. No. 17 (September 29, 1976 draft of Temple Testimony) at No. 4.

⁴⁴ Staff Ex. 3 Doc. No. 4 at 9; Staff Ex. 3 Doc. No. 5 at 5; Staff Ex. 3 Doc. No. 6 at 2; Dow Ex. 3 (notes of October 12, 1976 meeting) at 10.

⁴⁵ Staff Ex. 4 Doc. No. 11 See also Staff Ex. 3 Doc. No. 12; Staff Ex. 15; Tr. 2,524, 52,457 and 50,772.

⁴⁶ Tr. 2,730, 50,985 and 52,511.

⁴⁷ See LBP-77-57, 6 NRC 482, 488.

⁴⁸ Dow Ex. 3 (Notes of November 1, 1976 meeting) at 3. See also Tr. 50,762.

negotiations and the Michigan Division review were provided to the Board, the Board could find that Dow and Consumers had a "tenuous" relationship.⁴⁹

Willingness to keep this information from the Board evinces a disturbing tendency on the part of the two companies to keep from the Licensing Board any information which they felt could be argued should not to be relied upon by the Board. Indeed, one attorney testified that he had a duty not to present the Board with information on which it might erroneously rely.⁵⁰ Clearly such a determination should be made by the Board and not arrogated to itself by any party or its counsel (pages 1779 and 1782, *supra*).

The position taken by Dow and Consumers completely misstates the duty of parties and their attorneys before the Board. It is not the function of attorneys to decide on what information the Board may properly rely. If there is any question as to whether disclosure of a particular piece of information might be required, that information must be disclosed. The attorney may then argue that the information is irrelevant or immaterial,⁵¹ but he cannot foreclose the Board from receiving the evidence.

Other incidents which occurred during preparation for the suspension hearing reinforce our finding that Dow and Consumers contemplated as little disclosure as possible. Notes from one meeting between attorneys for Dow and Consumers show that a Consumers' attorney suggested that if Intervenor Other Than Dow were not present at the suspension hearing, it would be possible "to finesse Dow-Consumers continuing dispute."⁵² Two witnesses who attended the meeting agreed that this either was or could

⁴⁹ Dow Ex. 3 (notes of September 29, 1976 meeting) at 7-8; (notes of November 1, 1976 meeting) at 2 and 7. Contrary to the fears of Consumers' counsel, Dow Ex. 3 (notes of November 1, 1976 meeting) at 7, inclusion of Dow's intention to review its position and keep its options open did not alert the Board to the tenuousness of the relationship. There is no significance, in terms of the duty of disclosure to the Board, to the fact that certain counsel later felt this information would not have affected the Board's decision. *See* Tr. 50,763. The obligation to disclose turns on the possible or potential significance of information at the time disclosure must be made. *See* pages 1780-1782, *supra*.

⁵⁰Tr. 53,170.

⁵¹ Carolina Power & Light Co. (Shearon Harris Nuclear Power Plant, Units 1, 2, 3 and 4), LBP-78-2, 7 NRC 83, 88 (1978).

⁵²Staff Ex. 3 Doc. No. 26 at 2.

have been said.⁵³ The same notes indicate that Consumers suggested that the testimony relating to Dow's intentions be presented by someone who was not knowledgeable about the Michigan Division position.⁵⁴

Even after disclosure of the Michigan Division position, Consumers sought to assert claims of privilege with respect to various drafts of testimony on the issue of Dow's intent.⁵⁵ While such items as outlines of evidence prepared by attorneys might have a qualified work product privilege, there is no basis for claiming that testimony, ostensibly the work of a witness rather than an attorney, is privileged. Yet, even in the face of disclosures raising serious questions about the testimony's preparation,⁵⁶ the attorneys sought not to disclose these materials.

The work product privilege was delineated by the Supreme Court in *Hickman v. Taylor*.⁵⁷ The Supreme Court, recognizing that lawyers require a certain degree of privacy to seek relevant facts, develop legal theories and plan strategy, held that materials such as interviews, statements, memoranda, correspondence, briefs, mental impressions and personal beliefs were not discoverable unless denial of such discovery would unduly prejudice the case of the party seeking discovery or cause him unreasonable hardship.⁵⁸ No credible argument can be made that the privilege applies here. Drafts of testimony, if they are properly prepared, reveal mental impressions of the witness rather than those of the attorney. The

⁵³ Tr. 50,757 and 52,009-10. Since this testimony confirms notes which were recorded contemporaneously with the meeting, we find that the statement was made. See Tr. 52,267 and 53,622.

⁵⁴ Staff Ex. 5 Doc. No. 26 at 3. The individual involved denied having made such a statement (Tr. 51,423), but the individual who made the notes quite clearly recalled the comment (Tr. 50,678). One other witness also recalled the statement (Tr. 52,349). In any case, even Dow officials not present at the meeting had heard of such a statement (Tr. 53,443), and Consumers was informed that Dow believed an unknowledgeable witness had been requested (Tr. 52,655; Dow Ex. 3 (notes of November 1, 1976 meeting) at 6). Consumers did not deny making such a request, as it would be expected to do if no such request had been made. The same notes containing the "finesse" and unknowledgeable witness remarks also mention a remark by Consumers that if the licenses were not suspended, they would "drag feet in hearing on merits." Staff Ex. 5 Doc. 26 at 3. We do not determine if such a remark was, indeed, made because it does not bear on the disclosure questions at issue here. We merely note in passing that we do not approve of stalling tactics by any party.

⁵⁵ Tr. 388-96.

⁵⁶ *Id.*

⁵⁷ 329 U.S. 495 (1947).

⁵⁸ *Id.* at 510-11.

testimony, after all, is to be the sworn statement of the witness, not the attorney.⁵⁹ Material is not privileged simply because it is an attorney's possession.⁶⁰ Moreover, both work product and attorney-client privilege are waived as to material disclosed to a third party unless the third party's interests are substantially the same as those of the party claiming the privilege.⁶¹ Dow, a third party, had seen, even helped to prepare these materials. Yet Consumers pursued its claim of privilege for materials disclosed to a third party it had threatened to sue and who had threatened to sue it. This Board does not understand how Consumers could genuinely believe that the materials were privileged. In addition, in light of the disclosures which had already been made and the broad duty of disclosure to a Licensing Board, the Board believes that these materials should have been voluntarily and affirmatively disclosed by Consumers, even if they had not been the subject of a discovery request.⁶²

Apparently in an effort to discourage Dow from making negative statements about the project in the suspension hearing,⁶³ Consumers informed Dow several times that it had a contractual duty to support Consumers in the hearing, and further threatened that if it believed that the duty was arguably breached, Consumers would bring suit.⁶⁴ A figure of \$600 million was suggested as the magnitude of the suit.⁶⁵ Although there was general agreement among those present that the statement was not intended to require perjury,⁶⁶ it nevertheless was clearly intended to and

⁵⁹ This serves to distinguish cases as *In re Grand Jury Subpoena Dated November 8, 1979*, 622 F.2d 933 (6th Cir. 1980), which hold that drafts of submissions to an agency are covered by the work product privilege. Most submissions, unlike testimony, are not the sworn statement of a witness. They are more likely to be briefs or argument.

⁶⁰ See *Hickman v. Taylor*, 329 U.S. at 511; *Zucker v. Sable*, 72 F.R.D. 1, 3 (S.D.N.Y. 1975).

⁶¹ See *Duplan Corp. v. Deering Milliken, Inc.*, 397 F. Supp 1146, 1172-75 (D.S.C. 1974); *Burlington Indus. v. Exxon Corp.*, 65 FRD. 26, 37 (D. Md. 1974); *Stix Prods. Inc. v. United Merchants & Mfrs., Inc.* 47 F.R.D. 334, 338 (S.D.N.Y. 1969); *D'Ippolito v. Cities Servs. Co.*, 39 F.R.D. 610 (S.D.N.Y. 1965); *Stanley Works v. Haeger Potteries, Inc.*, 35 F.R.D. 551, 554-55 (N.D.Ill. 1964); *Transmirra Prods. Corp. v. Monsanto Chemical Co.*, 26 F.R.D. 572, 576-78 (S.D.N.Y. 1960).

⁶² Cf. *Burlington Indus. v. Exxon Corp.*, 65 F.R.D. 26, 42 (D.Md. 1974) (work product privilege cannot be used to shelter materials when parties have a legal duty to produce them to patent office).

⁶³ Tr. 2,399; 50,764; 50,864-65; 51,070; 51,144; 52,420 and 52,426-28.

⁶⁴ See Staff Ex. 3 Doc. No. 26 at 3; Staff Ex. 3 Doc. No. 34 at 4; Staff Ex. 4 Doc. No. 6 at 3; Staff Ex. 4 Doc. No. 10 at 3, Staff Ex. 4 Doc. No. 11 at 2 Staff Ex. 4 Doc. No. 17 at 2; Consumers Ex. 1 Doc. No. 7 at 2; Consumers Ex. 1 Doc. No. 8 at 3; Tr. 2,395; 51,140; 51,144; 51,447; 52,015; 52,049; 52,168; 52,185 and 52,347.

⁶⁵ Tr. 359, 50,893; 52,275; 52,370 and 54,133.

⁶⁶ Tr. 3,703; 51,239; 52,423 and 53,819.

did influence Dow.⁶⁷ Dow representatives felt threatened by it,⁶⁸ although they were not certain what Consumers expected from them in the event Dow honestly concluded that the contract was not advantageous to it.⁶⁹

Dow conducted itself through the remaining preparation and hearing with this perceived threat in mind.⁷⁰ By forcing Consumers to decide what evidence would be presented, Dow sought to avoid charges that it had been the cause of a licensee suspension or revocation.⁷¹ Dow has argued to the Licensing Board that, in light of the danger of such a suit by Consumers, its actions were entirely understandable and proper.⁷² However, an externality such as a threatened lawsuit does not relieve a party of its duties toward the Board. The public interest in informed licensing decisions must take priority over private interests whether that private interests involve obtaining a license or avoiding a suit. Dow's private interest and pervasive concern about not providing Consumers with grounds for a suit in no way relieved it of its duty of affirmative disclosure to the Licensing Board.

The product of this attitude favoring limited disclosure to the Board was the written prepared testimony of Joseph G. Temple, General Manager of the Michigan Division of Dow. Mr. Temple on cross-examination admitted that:

"If the goal was to tell in complete detail, everything that was going on at that point, that [my] testimony was, as judged by that criteria, not open, not honest, and not consisting of all the relevant information." (Tr. at 2,307)

⁶⁷ Tr. 2,707; 50,764; 51,745; 52,017 and 52,271. Those statements did, in fact, play a large part in the decision by the Dow USA Board. Tr. 2,311; 2,699; 2,713 and 54,141.

⁶⁸ Tr. 2,394; 54,362; 52,987 and 54,191. Consumers' witnesses testified it was not *intended* as a threat. Tr. 53,816 and 54,055. The detail Consumers went into concerning the extent of Dow's liability and the conditions which cause Consumers to bring suit did, however, go beyond the usual bounds for asserting that contractual rights will be pursued.

⁶⁹ Tr. 52,423 and 52,427.

⁷⁰ In this respect we agree with Intervenor Other Than Dow that Dow's intent to abide by the contracts was "highly tenuous and temporary", motivated by desire to avoid Consumers suit. See Memorandum of Intervenor Other Than Dow Chemical Company, Pending Issues (December 31, 1976) at 2-3.

⁷¹ Tr. 50,900-01; 52,504; 52,536-8; 52,548 and 52,579. This included taking such actions as not having a Dow employee write testimony, Tr. 51,018; allowing Consumers to choose the witness from Dow, Tr. 52,512-13; and requiring that all discovery requests go through Consumers, Staff Ex. 5 Doc. No. 10.

⁷² Brief of the Dow Chemical Company Incorporating Findings of Fact and Conclusions of Law at 44-48.

He stated that he did feel he had given complete answers to the questions asked.⁷³ No question, however, addressed the recommendation of the Michigan Division or the reasons why it was not adopted at that time by Dow USA. At no time did Dow want the Michigan Division position, the reasons for it, or the reasons for the Dow USA decision discussed.⁷⁴ Eventually Consumers and Dow agreed not to include these matters in testimony.⁷⁵ They concluded after private consideration that these matters were either irrelevant or immaterial.⁷⁶ We find it significant, however, that Consumers' counsel found the question of materiality sufficiently close to hold a meeting specifically to address the issue.⁷⁷ If counsel have any doubts whether disclosure of particular material is required, as they obviously had here, that information should be disclosed. That Consumers' counsel found it necessary to hold this meeting sufficiently demonstrates that counsel had such doubts. Moreover, counsel recognized that disclosure might affect the Board's decision.⁷⁸ Clearly, this is sufficient to require affirmative disclosure under the standards set forth in Part II of this opinion, at page 1777 *et seq.* above.

As the Temple testimony evolved through five drafts by the lawyers, even the conditions that the Dow USA Board had placed on its decision were phrased in a manner progressively less likely to alert the Licensing Board to the implications of Dow's complete official position. The first draft, prepared by Dow on September 29, 1976 stated the decision of the Dow USA Board to be:

“[P]utting all the facts, circumstances and opinions together, the proposed nuclear project continues to be the best alternative. But again, as I have stated, this is ‘at the present time’ and any changes of significance necessarily must result in another review of this position, and, quite possibly, even probably, a reversal of this

⁷³Tr. 2,306.

⁷⁴Dow Ex. 4 (notes of September 29, 1976 meeting) at 6, 8-9, (notes of October 12, 1976 meeting) at 8-10; Tr. 52,739 and 52,923-24.

⁷⁵Tr. 51,907 and 53,384. The Dow attorneys referred to this as a Consumers decision, Tr. 51,341 and 53,005, but since it was the position they had advocated originally, they would clearly have agreed with it.

⁷⁶Tr. 50,265; 50,411; 51,113; 51,511; 51,523; 51,787; 51,827 and 52,109.

⁷⁷Tr. 51,545; 51,597-98 and 53,164; Staff Ex. 3 Doc. Nos. 31 and 32.

⁷⁸Dow Ex. 4 (notes of September 29, 1976 meeting) at 7; Tr. 50,762 and 51,554.

position, depending of course upon how the myriad factors add up at this new point in time." (Staff Ex. 5 Doc. No. 17 (September 29, 1976 draft of Temple testimony) at No. 5)⁷⁹

In the second (October 6, 1976) draft, also by Dow, this had become:

"There are clearly a great variety of opinions and projections, with many of the differences as yet unresolved. However, the Board reached the conclusion that at the present time, circumstances have not changed sufficiently to call for any modification of Dow's commitment to the nuclear produced steam, and electricity to be supplied by Consumers Power in March of 1982, but in the event that there were to be any significant changes of any kind from the present projections furnished by Consumers Power, Dow was to reserve all of its rights of recourse and keep all of its options open." (Staff Ex. 5 Doc. No. 17 (October 6, 1976 draft of Temple testimony) at IV-4)

This draft added that the Michigan Division was to support Consumers in the hearing and make fully informed Dow personnel available as witnesses. It included a statement that any significant change would lead to another review and quite possibly a change of position.

⁷⁹ There was no formal written motion or decision by the Dow USA Board (Tr. 52,518). Notes of the meeting by the President of Dow USA (who participated in the decision-making) say "Dow will say: Still o.k., but any further delay makes it unattractive." Staff Ex. 12. A memorandum by a Dow attorney prepared the same day as the meeting, which he attended without participation in the decision, states:

"[A]lthough there clearly were a great variety of opinions and projections and that many differences had not yet been resolved, Dow had reached the positive conclusion that the circumstances have not changed sufficiently to call for any modification of its commitment to nuclear produced steam, and electricity . . . [I]n view of this conclusion, it was my instruction to do whatever was proper and possible to support the Consumers' position in the pending proceeding . . . I did not in this initial discussion outline the balance of the Dow Board's conclusion, to the effect that if there was any significant delay beyond the present projections furnished by Consumers, Dow was reserving its rights of recourse and intended fully to keep its options open." Staff Ex. 4 Doc. No. 18 at 1.

The drafts of Temple testimony were the next statements of this decision.

The next (October 22, 1976) draft was prepared by Consumers. It stated that Dow's current position was that the Midland Nuclear Plant was Dow's best alternative if placed in service on schedule and that Dow had concluded that it could rely on Consumers to supply steam on schedule.⁸⁰ The only mention it made of any possible change was that:

"Suspension of construction would require Dow to review the question of whether a later availability date and higher capital costs and consequent higher costs to Dow, would so change the situation that Dow should make other arrangements for its needed power and steam supplies." (Staff Ex. 5 Doc. No. 17 (October 22, 1976 draft of Temple testimony) at 6.)

An attached outline of material not planned for use in direct testimony indicated that Dow was reserving its rights of recourse and its options in the event of significant deviations from Consumers' projections.⁸¹ This material included the Michigan Division recommendation and indicated that the Dow USA Board had instructed the Division to support Consumers in the hearing and provide informed witnesses, while maintaining that any significant changes would call for a further review.

Although Dow complained that Consumers' draft was "misleading and disingenuous,"⁸² it provided the basis for the next Dow draft.⁸³ In this draft (October 28, 1976), the conclusion of the Dow USA Board was stated to be that "at the present time circumstances have not changed sufficiently to call for any modification of Dow's commitment to nuclear produced steam to be supplied by Consumers Power in March of 1982."⁸⁴ This draft noted that Dow was reserving its rights of recourse and keeping its options open. Bringing suit against Consumers was not among the options listed. Nor was any mention made of instructions to support Consumers, provide a knowledgeable witness, or conduct a further review if circumstances changed.

This draft was followed (November 1, 1976) by one prepared jointly by attorneys for Dow and Consumers which, with minor alterations, became the filed testimony. The Dow position was then stated as follows:

"[A]t the present time circumstances have not changed sufficiently to call for a modification of Dow's commitment to nuclear produced steam to be supplied by Consumers Power in March of

⁸⁰Staff Ex. 5 Doc No. 17 (October 22, 1976 draft of Temple testimony) at 6.

⁸¹ Staff Ex. 5 Doc. No. 17 (Outline of Detail of Last Review Conducted not currently planned as part of Direct Testimony) at 4.

⁸²Staff Ex. 20; Staff Ex. 5 Doc No. 26; Tr. 50,998; 51,002; 51,008-15 and 51,762-88.

⁸³Staff Ex. 4 Doc. No. 34.

⁸⁴Staff Ex. 5 Doc. No. 18 at 2.

1982. Under the present circumstances as known to Dow, the nuclear alternative remains the most attractive one economically. Further, the matter will be kept under continuous review and Dow will keep all of its options open." (Staff Ex. 5 Doc. No. 20 at 3)

Not only is no mention made of instructions to the Michigan Division to support Consumers and to provide knowledgeable witnesses, but there is no wording akin to that in earlier statements of the Dow USA position indicating that changes in circumstances might "possibly, even probably" lead to a reversal by Dow. After counsels' repeated redrafting of the testimony, the Licensing Board was not provided with complete or candid direct written testimony concerning Dow's intent to enable it to achieve "sufficient probing to determine what that intention truly is," as contemplated by the Appeal Board.⁸⁵

The so-called Temple testimony was prepared and massaged primarily by the lawyers.⁸⁶ Although Temple reviewed the drafts and may have had a minor role in phrasing some parts,⁸⁷ he felt his role to be editing and stylizing testimony written by the attorneys.⁸⁸ This is the reverse of the proper procedure for preparing written testimony. The words should, at a minimum, be those of the witness although the attorney may suggest clarification of vague or confusing parts or may suggest omission of totally irrelevant material. Questions to be answered by the witness may, of course, be selected by his attorney as they would be if he were examined orally at the hearing, keeping in mind the duty of disclosure to the Licensing Board. However, the situation should never arise, as it has here, where one could question whether in fact the testimony is uttered by the witness or negotiated by the attorneys.⁸⁹

Factually, the circumstances in this case also differ significantly from the situation where testimony is the joint product of multiple input, such as

⁸⁵ ALAB-458, 7 NRC 155, 167 n. 45. There was also an effort on the part of counsel to smooth over a disagreement between Dow and Consumers concerning the price of coal. See Dow Ex. 4 (notes October 12, 1976 meeting) at 7, (notes on November 1, 1976 meeting) at 2, (notes on November 8, 1976 meeting) at 4-5, (notes on November 15, 1976 meeting) at 4; Staff Ex. 5 Doc. No. 33; Tr. 2,293-96.

⁸⁶ Counsel for Intervenors Other Than Dow characterizes the testimony as having been prepared by counsel for Consumers. Letter from Myron M. Cherry to Marshall E. Miller, Esq., Dr. J. Venn Leeds, Jr. and Dr. Emmeth A. Luebke (January 11, 1980) at 2. However, the authorship of the drafts clearly shows that counsel for both Dow and Consumers were involved.

⁸⁷ Dow Ex. 4 (notes on November 1, 1976 meeting) at 4; Tr. 306; 476-501; 51,285-86 and 51,299-51.

⁸⁸ Tr. 2,281.

⁸⁹ *Cf. Geders v. United States*, 425 U.S. 80, 90, n.3 (1976) (an attorney must distinguish between discussing testimony and seeking to influence it).

that prepared by a panel of technical witnesses. This is also different from responses to written interrogatories addressed to a party under the provisions of 10 CFR §2.740b, where the party is expected to draw upon various sources of information available to it in order to make full and responsive answers. Here, the witness Joseph G. Temple was a high ranking executive of Dow. His personal knowledge encompassed the original contract with Consumers, its problems and negotiations over the years, the "changed circumstances" relating to Dow's need for process steam from the nuclear facility to which the Court of Appeals had alluded, the review which his Michigan Division undertook after that Court of Appeals remand, the somewhat negative recommendations that the Michigan Division made, his own request for a separate corporate review by Dow USA, the nature and extent of that review, and whatever limitations there were on the continuing relationship between Dow and Consumers. Under these circumstances, Mr. Temple was clearly qualified to be primarily involved in the preparation of the entire spectrum of his own sworn testimony, and no script committee should have injected itself to the extent disclosed by the record.

V. CONCLUSION

In conclusion, we find that in developing testimony on the issue of Dow's intentions concerning the purchase of steam, the parties and their lawyers took an improperly narrow view of their duty affirmatively to disclose significant information to the Board. This arose from an attitude which sought to justify and rationalize keeping certain information from the Board. It also led to direct testimony being prepared largely by lawyers rather than the witness, which failed to convey the true nature and quality of Dow's intentions at the time. The Temple prefiled direct testimony should have included the Dow Michigan Division's recommendation, as well as a fair and candid description of the true relations between Dow and Consumers. The Board should not have been subjected to gamesmanship between or among lawyers, and the parties had a nondelegable duty to adhere to the highest standards of disclosing relevant information.⁹⁰

⁹⁰ Consumers Power Company (Midland Plant, Units 1 and 2), ALAB-458, 7 NRC 155, 177, fn. 87 (1978); Vermont Yankee Nuclear Power Corp. (Vermont Yankee (1973); Virginia Electric and Power Company (North Anna Power Station, Units 1 and 2), CLI-76-22, 4 NRC 480, 487-89 (1976). See also Section II, *supra*.

The final issue concerns the question of what sanctions, if any, should be imposed as a result of our findings. The Board has given careful consideration to the entire record and it has concluded that under all the circumstances, sanctions are neither necessary nor appropriate.

In the first place, most of the deficiencies in disclosure identified above resulted from counsels' excessive preoccupation with the supposed interests of their respective clients, and insufficient sensitivity to the high level of voluntary disclosure required in NRC cases. However, there was no conspiracy to countenance perjury or to commit fraud upon the Board. There is no evidence that any attorney deliberately intended to engage in unethical conduct, or to willfully deceive the Board.

Next, the high standards of affirmative disclosure and other conduct which the Board has described herein, have not previously been specifically addressed by the NRC Appeal Board or the Commission. Such standards of conduct may not necessarily have been recognized or followed in other administrative proceedings. Fairness to the parties and counsel would require some advance notice to them of the standards of conduct to be required in NRC proceedings. We note also that in the 1979 evidentiary hearing on remand, all counsel and witnesses scrupulously followed our request that there be no advance preparation of witnesses or discussions of their testimony. All witnesses were called as Board witnesses, and they testified fairly and fully in developing a factual record in this inquiry.

Finally, we observe that all of the factual information described above was ultimately included in the record of the suspension proceedings. That fact would not serve to condone deliberate misconduct, but it is a mitigating factor since we have found no such deliberate intent in this case. Accordingly, we conclude that the questions raised as to the conduct of parties and counsel in the original suspension proceedings have now been "fully aired and resolved", in compliance with the Appeal Board's mandate herein.⁹¹

It is further Ordered, in accordance with 10 CFR 2.70, 2.762, 2.764, 2.785 and 2.786, that this Partial Initial Decision shall be effective immediately and shall constitute the final action of the Commission thirty (30) days after the issuance thereof, subject to any review pursuant to the above-cited Rules of Practice. Exceptions to this Partial Initial Decision may be filed within ten (10) days after service of this Partial Initial Decision. A brief in support of any such exceptions must be filed within

⁹¹ALAB-458, 7 NRC 155, 177, fn. 87.

thirty (30) days thereafter (forty (40) days in the case of the NRC Staff). Within thirty (30) days of the filing and service of the brief of the Appellant (forty (40) days in the case of the NRC Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

**THE ATOMIC SAFETY AND
LICENSING BOARD**

**Dr. Emmeth A. Luebke
ADMINISTRATIVE JUDGE**

**Dr. J. Venn Leeds, Jr.
ADMINISTRATIVE JUDGE**

**Marshall E. Miller, Chairman
ADMINISTRATIVE JUDGE**

Dated at Bethesda, Maryland
this 22nd day of December, 1981.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Peter B. Bloch, Chairman
Michael A. Duggan
Robert M. Lazo
Ivan W. Smith, Alternate

In the Matter of

Docket No. 50-389-A

**FLORIDA POWER & LIGHT
COMPANY
(St. Lucie Plant, Unit No. 2)**

December 30, 1981

On motion of the Applicant the Board modified the procedural schedule it had issued in its December 11, 1981 Order (LBP-81-58).

**MEMORANDUM AND ORDER
(Concerning Motion for Extension of Time)**

On December 22, 1981, Florida Power & Light Company (FPL) filed a Motion for Modification of Procedural Schedule, to which Florida Cities (Cities) and the regulatory staff of the Commission (staff) have already responded pursuant to an expedited schedule ordered at FPL's request.

FPL's motion is, at bottom a motion for extension of time. It argues that the procedural schedule promulgated by the Board in its December 11, 1981 Order was too restrictive to permit FPL a fair opportunity to present its arguments and assemble its evidence. Although Cities opposed the FPL motion, it set forth a motion of the scheduled February 9 conference which is consistent with FPL's request. In particular, it argued that

At hearing on February 9, the parties could present arguments on the scope of further discovery. Thus, on February 9, the parties would have a clear idea as to the exact nature of all outstanding discovery, and would be prepared to proceed rapidly to its conclusion following the Board's Order on objections; with trial plans

filed, the parties would be ready to proceed to hearing immediately upon completion of discovery (if any is required).

Response at 8.

The only real argument between the principal parties relates to whether or not discovery should be reopened immediately with respect to matters related to the parties' objections. FPL supports this. Cities opposes.

The Board is grateful to the parties for arguing these procedural points, which were resolved in the December 11 order without benefit of argument by the parties. We have decided to exclude any possibility that the February 9 hearing will include an evidentiary hearing on relief issues. Instead, that hearing will be limited to argument on objections (one hour per side) and on further scheduling (one half hour per side).

Due to the altered nature of the hearing, the Trial Plans to be submitted by the parties may be limited only to those issues arising under the December 11 order. FPL's Trial Plan should be filed by February 1, 1982. Both trial plans should contain an appendix outlining discovery, if any, which must be concluded prior to trial on relief issues.

Since it is likely (but not certain) that relief issues will remain part of the case regardless of the Board's ruling on objections, this procedure should contribute to a fair and expeditious determination of the case. The advantage in time saved is worth the possibility that the preparation might not be entirely useful.

On the other hand, the Board does not think the parties should continue to incur discovery expenses with respect to issues that have been ruled out of the case but may be reinstated if the Board accepts objections filed by the parties. Consequently, the request to reopen discovery with respect to objections should be denied.

ORDER

For all the foregoing reasons and based on consideration of the entire record in this matter, it is this 30th day of December, 1981,

ORDERED

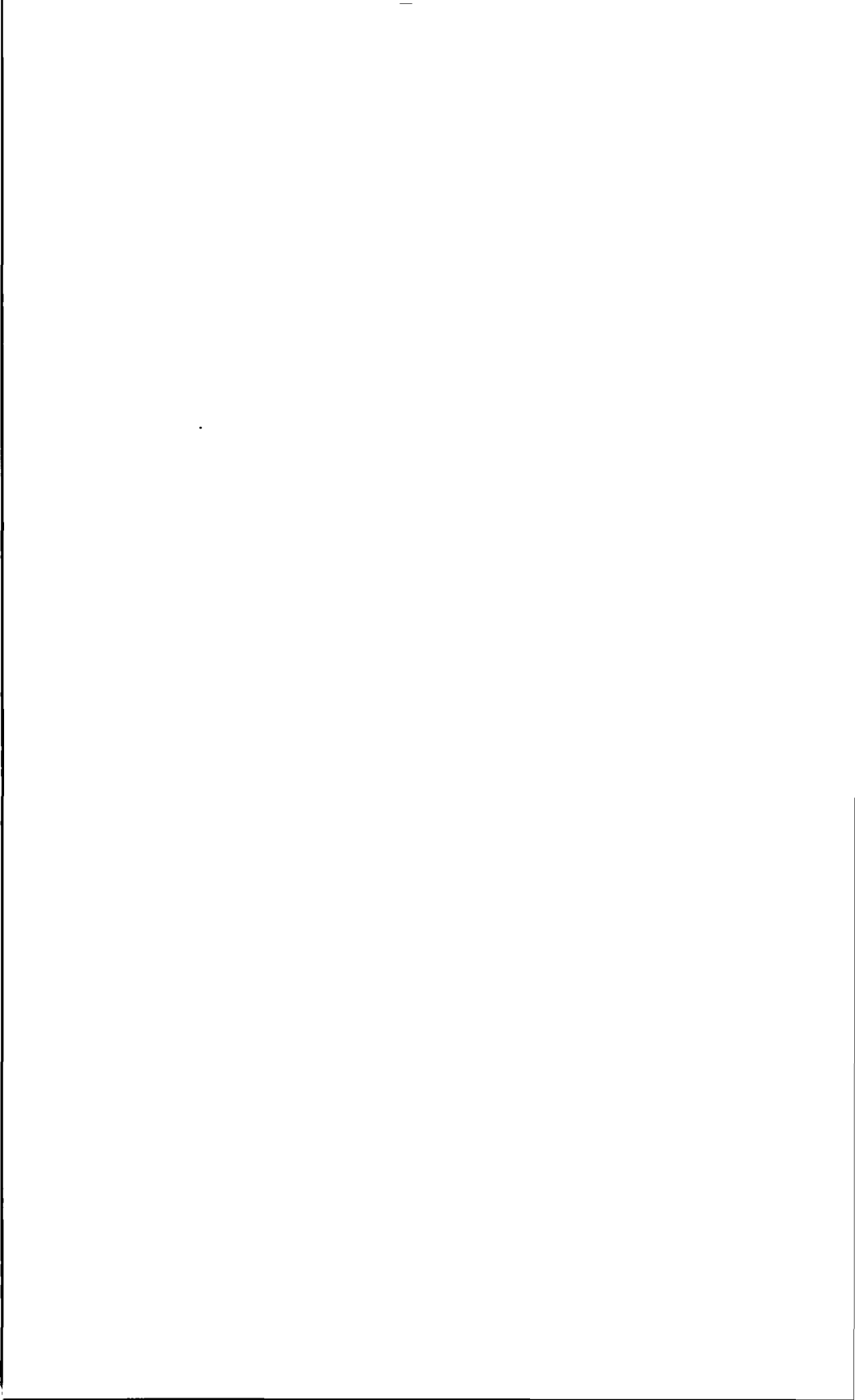
(1) On January 13, 1982, the parties shall file their objections, and the Cities shall file their proposed license conditions. Replies should be filed on January 22, 1982;

(2) Cities shall file its Trial Plan by January 13, 1982, pursuant to this memorandum and FPL shall file its Trial Plan by February 1, 1982, also pursuant to this memorandum.

**FOR THE ATOMIC SAFETY AND
LICENSING BOARD**

**Peter B. Bloch, Chairman
ADMINISTRATIVE JUDGE**

**December 30, 1981
Bethesda, Maryland**



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Harold R. Denton, Director

In the Matter of

**PETITION CONCERNING
FINANCIAL QUALIFICATIONS OF
NUCLEAR POWER PLANT
LICENSEES**

10 C.F.R. 2.206

December 4, 1981

The Director of Nuclear Reactor Regulation denies a petition under 10 C.F.R. 2.206 which requested issuance of orders to show cause to all commercial power plant licensees to require a demonstration of their financial capability to absorb the costs of on-site property damage resulting from plant accidents.

**TECHNICAL ISSUES DISCUSSED: FINANCIAL
QUALIFICATIONS**

As part of an applicant's demonstration of its financial qualifications for an operating license, the Commission has not required a specific demonstration of an ability to absorb the costs of severe accidents or to obtain the necessary funds to clean up after an accident.

RULES OF PRACTICE: SHOW CAUSE PROCEEDINGS

Where the Commission has taken steps to generically consider an issue by rulemaking, the Director will generally not institute individual proceedings to modify or suspend licenses in the absence of a compelling reason for such action that cannot await the outcome of the generic proceeding.

DIRECTOR'S DECISION UNDER 10 C.F.R. 2.206

John Abbotts of Seattle, Washington, has petitioned the Commission pursuant to 10 C.F.R. 2.206 for issuance of a "generic show cause order"

on the financial qualifications of commercial nuclear power plant licensees. The petition has been referred to the Director of the Office of Nuclear Reactor Regulation for action. Notice of receipt of the petition was published in the *Federal Register*, 46 Fed. Reg. 17686 (Mar. 19, 1981). Mr. Abbotts submitted additional comments pertaining to his petition and a rulemaking action by a letter dated October 12, 1981.

Mr. Abbotts believes that the NRC should order licensees of operating plants and plants under construction to show cause why their operating licenses or construction permits should not be revoked, "because licensees have not demonstrated financial capability of paying for the costs of the Three Mile Island accident, similar accidents, or more serious nuclear power plant accidents, and thereby fail to comply with the Commission's regulations at 10 C.F.R. 50.33(f) and 10 C.F.R. 50 Appendix C." Petition at 1. In Mr. Abbotts' view, an order requiring licensees to demonstrate their ability to finance the decontamination of a damaged plant is necessary to "uphold the integrity of [the Commission's] own regulations, and to protect taxpayers from the hidden costs of atomic power . . ." Petition at 8.

The Commission's rules on financial qualifications derive from section 182a of the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2232(a), which provides in pertinent part:

Each application for a license hereunder shall be in writing and shall specifically state such information as the Commission, by rule or regulation, may determine to be necessary to decide such of the technical and financial qualifications of the applicant, the character of the applicant, the citizenship of the applicant, or any other qualifications of the applicant as the Commission may deem appropriate for the license.

Section 182a authorizes, but does not mandate, the Commission to require information regarding the financial qualifications of applicants for Commission licenses. A federal court of appeals has stated that the Atomic Energy Act "gives the NRC complete discretion to decide what financial qualifications are appropriate." *New England Coalition on Nuclear Pollution v. NRC*, 582 F.2d 87, 93 (1st Cir. 1978).

With respect to commercial power reactors, 10 C.F.R. 50.33(f) and 10 C.F.R. Part 50, Appendix C, implement the Commission's authority to require information concerning financial qualifications and to set standards for review of an applicant's financial qualifications as part of the licensing review of applications for construction permits and operating licenses. Applicants for a construction permit must show that they possess "the funds necessary to cover estimated construction costs and related fuel cycle

costs or that the applicant has reasonable assurance of obtaining the necessary funds, or a combination of the two.” 10 C.F.R. 50.33(f)¹ To obtain an operating license, an applicant must make a similar demonstration that it “possesses or has reasonable assurance of obtaining the funds necessary to cover estimated operating costs for the period of the license or for 5 years, whichever is greater, plus the estimated costs of permanently shutting the facility down and maintaining it in a safe condition.” 10 C.F.R. 50.33(f).

The Commission has defined the “reasonable assurance” standard of 10 C.F.R. 50.33(f) to mean that an “applicant must have a reasonable financing plan in the light of relevant circumstances.” *Public Service Company of New Hampshire* (Seabrook Station, Units 1 & 2), CLI-78-1, 7 NRC 1, 18 (1978). This standard “does not mean a demonstration of near certainty that an applicant will never be pressed for funds . . .” *Id.* at 18. The regulations “do not require an applicant to have cash on hand to cover all possible contingencies of costs higher and revenues lower than estimates.” *Power Reactor Development Co.*, 1 AEC 128, 153 (1959), *aff’d sub nom. Power Reactor Development Co. v. International Union of Electrical Workers*, 367 U.S. 396 (1961), *cited in Public Service Company of New Hampshire* (Seabrook Station, Units 1 & 2), ALAB-422, 6 NRC 33, 79 (1977). Such factors as the prospect of future rate increases, future interest rates, credit and bond ratings, and the ability to generate revenues through the sale of electricity are relevant to a determination of an applicant’s financial qualifications. *See Public Service Company of New Hampshire, supra*, 7 NRC at 20-21.²

As part of an applicant’s demonstration of its financial qualifications for an operating license, the Commission has not required a specific demon-

¹ At the construction permit stage, the regulations do not require consideration of costs beyond those estimated for construction and for the first core of the nuclear fuel inventory as part of the review of an applicant’s financial qualifications. *See* 10 C.F.R. Part 50, App. C, §1.A.1; *Kansas Gas & Electric Co.* (Wolf Creek Generating Station, Unit 1), ALAB-462, 7 NRC 320, 334 n. 30 (1978). Thus, Mr. Abbotts’ petition may be denied with respect to his request for a show-cause order to all holders of construction permits, because the Commission’s regulations do not require a showing at the construction permit state of financial qualification with respect to operation and decommissioning.

² *See also Duke Power Co* (William B. McGuire Nuclear Station, Units 1 & 2) LBP-79-13, 9 NRC 489, 523-28 (1979) (application of relevant factors in an operating license review). Because state and federal ratemaking commissions by law must permit public utilities a fair rate of return, it is generally assumed that rational regulatory policies with respect to the setting of rates will enable a public utility to cover its operating costs. *See Public Service Co. of New Hampshire, supra*, ALAB-422, 6 NRC at 77-78; *Virginia Electric Power Co.* (North Anna Nuclear Power Station, Units 1 & 2), LBP-77-68, 6 NRC 1127, 1162 (1977), *aff’d*, ALAB-491, 8 NRC 245 (1978); *Public Service Co. of New Hampshire* (Seabrook Station, Units 1 & 2); DD-79-20, 10 NRC 703, 713 (1979).

stration under current regulations of an ability to absorb the costs of severe accidents or to obtain the necessary funds to clean up after a severe accident. The Commission is, however, taking steps to address the issue of ensuring availability of funds for cleanup costs in current and upcoming rulemakings. In August 1981, the Commission published a notice of proposed rulemaking to modify the current financial qualification requirements. 46 Fed. Reg. 41786 (Aug. 18, 1981). The Commission has proposed as part of these revisions that it adopt an interim rule which would require all licensees of operating power reactors to maintain the maximum amount of commercially available on-site property damage insurance or an equivalent amount of protection.³ At present, no such requirement is imposed on licensees. However, most licensees currently maintain the maximum available amount (approximately \$370-450 million at present) of insurance, though some utilities do not purchase the maximum amount and the Tennessee Valley Authority insures itself for property losses. The proposed rule "is intended to serve as an interim requirement until the Commission has an opportunity to conduct a rulemaking to determine what level of protection is necessary to cope with the on-site radiological hazards resulting from an accident." 46 Fed. Reg. at 41788.

In view of the Commission's pending and intended rulemaking actions to address matters related to Mr. Abbotts' petition, issuance of an order to show cause to all power reactor licensees is not warranted. Mr. Abbotts asks in effect that the Commission require on a *generic* basis a showing of an ability to pay to cleanup costs of an accident. The Commission has proposed an interim measure to deal with this issue and has indicated that it intends to consider the need for assurance of funds for cleanup costs in an upcoming rulemaking proceeding. While Mr. Abbotts requests the institution of individual adjudicatory proceedings against all licensees, he does not provide any reasons that would indicate individual adjudications are appropriate under the circumstances. All licensees holding construction permits or operating licenses have been found to be financially qualified in licensing proceedings in accordance with existing requirements, and Mr. Abbotts does not indicate that the specific determinations were improper in any particular licensing proceeding. Mr. Abbotts is arguing essentially that, in view of the financial burdens on General Public Utilities as a result of the Three Mile Island accident, the Commission should use its financial qualifications regulations to extract additional assurances from all licensees that cleanup costs of potential accidents can be covered. This issue concerns the question of the general standard that the Commission

³ The proposed rule also would eliminate entirely financial qualifications requirements for construction permit applicants and, for operating license applicants, either would eliminate them entirely or would retain them only to the extent they concern decommissioning costs.

should apply to all power reactor licensees. This determination does not depend on the factual issues in particular situations as much as it depends on establishing a common standard for all licensees.

The Commission has wide latitude to determine the appropriate means of administering, applying, and enforcing the regulatory standards under the Atomic Energy Act. See *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 543 (1978); *Porter County Chapter of the Izaak Walton League, Inc. v. NRC*, 606 F.2d 1363, 1369 (D.C. Cir. 1979). Generic issues, such as the one raised here by Mr. Abbotts, are addressed more appropriately in rulemaking than in individual adjudicatory proceedings. As a general proposition, "[w]here factual issues do not involve particularized situations, an agency may proceed by a comprehensive resolution of the questions rather than relitigating the question in each proceeding in which it is raised." *State of Minnesota v. NRC*, 602 F.2d 412, 416-17 (D.C. Cir. 1979). On other occasions, the staff has declined to initiate individual adjudicatory proceedings in response to petitions under 10 C.F.R. 2.206 for the reason that the same matters were being addressed by the Commission on a generic basis. See *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), DD-80-20, 11 NRC 913, 914 (1980); *Public Service Electric & Gas Co.* (Salem Nuclear Generating Station, Units 1 & 2), DD-80-19, 11 NRC 625, 627-28 (1980). In this instance, the Commission has indicated that it intends to address the matter raised in the petition in a rulemaking proceeding.

Moreover, no other considerations would indicate that issuance of orders to all licensees is necessary pending the Commission's generic treatment of this issue by rulemaking. Mr. Abbotts does not request an immediate suspension of all operating licenses and construction permits, nor does public health and safety require such drastic action pending the conclusion of the Commission's rulemaking actions.⁴ As noted earlier, most plants already carry the maximum amount of available insurance to cover on-site property damage. And, though the possibility of accidents cannot be ruled out entirely, the types of severe accidents which would pose the most significant financial burdens are occurrences of relatively low probability.

⁴ Issuance of an order to show cause does not itself effect an immediate suspension of a license in the absence of a finding of "willful" violations of requirements or a finding that public health, safety, or interest requires an immediate suspension. Administrative Procedure Act 9(b), 5 U.S.C. 558(c); Atomic Energy Act §186b, 42 U.S.C. 2236(b); 10 C.F.R. 2.202(f) & 2.204. See *Consumers Power Co.* (Midland Plant, Units 1 & 2), CLI-73-38, 6 AEC 1082, 1083 (1973). While proceedings on an order to show cause may eventually result in suspension of a license, there is no actual suspension until the conclusion of proceedings unless either the criterion of willfulness is met or the criteria of public health, safety, or interest are met.

Again, it should be noted that the Commission is not under a mandatory obligation to impose any particular financial qualifications requirements, but is essentially free to determine whether and to what extent such requirements are necessary to its regulatory program. *See New England Coalition on Nuclear Pollution v. NRC*, 582 F.2d 87, 93 (1st Cir. 1978)

For the foregoing reasons, Mr. Abbotts' request for a "generic show cause order" is denied. Mr. Abbotts' comments attached to his October 12th letter will be considered with other comments that were filed in response to the notice of proposed rulemaking published at 46 Fed. Reg. 41786 (Aug. 18, 1981). Mr. Abbotts is invited, of course, to participate in any future rulemaking related to the matter of cleanup costs, and the staff will inform Mr. Abbotts of the issuance of the applicable notice of proposed rulemaking. A copy of this decision will be referred to the Secretary for the Commission's review in accordance with 10 C.F.R. 2.206(c). As provided in 10 C.F.R. 2.206(c), this decision will become the final action of the Commission 25 days after issuance unless the Commission institutes review of this decision within that time.

Harold R. Denton, Director
Office of Nuclear Reactor Regulation

Dated at Bethesda, Maryland
this 4th day of December, 1981

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