

NUCLEAR REGULATORY COMMISSION ISSUANCES

OPINIONS AND DECISIONS OF THE NUCLEAR REGULATORY COMMISSION WITH SELECTED ORDERS

May 1, 1985 - June 30, 1985

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PREFACE

This is Book II of the twenty-first volume of issuances (1043 - 1786) 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 May 1, 1985 to June 30, 1985.

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.

The hardbound edition of the Nuclear Regulatory Commission Issuances is a final compilation of the monthly issuances. It includes all of the legal precedents for the agency within a six-month period. Any opinions, decisions, denials, memoranda and orders of the Commission inadvertently omitted from the monthly softbounds and any corrections submitted by the NRC legal staff to the printed softbound issuances are contained in the hardbound edition. 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' Decisions--DD, and Denial of Petitions 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

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Thomas M. Roberts
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In the Matter of

Docket Nos. 50-247-SP
50-286-SP

CONSOLIDATED EDISON COMPANY
OF NEW YORK
(Indian Point, Unit No. 2)

POWER AUTHORITY OF THE STATE
OF NEW YORK
(Indian Point, Unit No. 3)

May 7, 1985

Petitioner requested shutdown of Indian Point Units 2 and 3. In response, the Commission initiated a discretionary Licensing Board proceeding designed to gather information on whether to shut down the units or to take other enforcement action. The Commission concludes that the record developed by the Licensing Board shows that neither shutdown nor imposition of additional remedial actions beyond those implemented voluntarily by the Licensees is warranted at this time. The Commission, however, directs the Staff, *inter alia*, to confer with FEMA and report to the Commission on the current status of emergency planning and on whether deficiencies identified by the Board and Commission in this proceeding have been corrected.

**NUCLEAR REGULATORY COMMISSION: AUTHORITY
(IMPOSITION OF LICENSE REQUIREMENTS)**

The Atomic Energy Act provides ample legal authority for NRC to impose customized requirements designed to minimize risk to public health and safety (*see, e.g.*, Atomic Energy Act, § 161(b), 42 U.S.C. § 2201(b)), and there is no constitutional problem with doing so.

**NUCLEAR REGULATORY COMMISSION: AUTHORITY
(IMPOSITION OF LICENSE REQUIREMENTS)**

The Atomic Energy Act does not preclude prudent risk reduction measures, provided it is rational to conclude that risk will be reduced. Consequently, the Commission could impose special requirements for plants in densely populated areas.

TECHNICAL ISSUES DISCUSSED

Probabilistic Risk Assessments (PRAs).

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DECISION

I. INTRODUCTION

A. Background

In a petition of September 1979, the Union of Concerned Scientists (UCS) requested the Commission to decommission Indian Point Unit 1, and to shut down Units 2 and 3. In a 1980 decision, the Director of Nuclear Reactor Regulation ruled on the petition, granting it in part and denying it in part. DD-80-5, 11 NRC 351. On May 30, 1980, the Commission issued an order (unpublished) establishing a four-pronged approach for resolving issues raised by the UCS petition: the initiation of a special adjudicatory proceeding; an informal proceeding to determine both the issues for the adjudicatory proceeding and the criteria to be used in the decision on that proceeding; a direction for the NRC regulatory staff to generically consider reactor operation in areas of high population density; and lastly, the establishment of a task force to review the advisability of interim operation of the Indian Point nuclear units during the pendency of the adjudication.¹ The May 30, 1980 order was supple-

¹ The Task Force on Interim Operation of Indian Point reported to the Commission in July 1980 (NUREG-0715). The Task Force concluded that overall risk of the Indian Point reactors is about the same as the typical reactor on a typical site. Based upon this report and the Director's previous decision, the Commission concluded on July 15, 1980, that the risk posed by the operation of the Indian Point facilities did not warrant the suspension of the operating licenses during the adjudicatory proceeding. CLI-81-1, 13 NRC I (1981).

mented and explained further in a Commission decision dated January 8, 1981 (CLI-81-1, 13 NRC 1) and in a Memorandum and Order dated September 18, 1981 (CLI-81-23, 14 NRC 610).

The Commission made clear in its orders initiating the special proceeding that the purpose of the "discretionary" adjudication² was to gather information and to make recommendations to the Commission for enforcement action for Indian Point.³ The Atomic Safety and Licensing Board which was appointed by the Commission to preside over the special proceeding was not itself empowered to impose enforcement action. Rather, if the Licensing Board conducting the discretionary adjudication decided that enforcement action was appropriate, it was to recommend such action to the Commission. If the Commission agreed with the recommendation, a formal enforcement order would be issued, and Licensees would be entitled to a formal hearing under § 189 of the Atomic Energy Act to challenge the order. Thus the special adjudicatory proceeding was for the purpose of gathering information, and was not for the purpose of satisfying any § 189 hearing requirements.

The Board hearings commenced in June 1982. On April 29, 1983, following 55 days of hearings with 20 parties participating and over 200 witnesses testifying, the hearing record was closed. In addition to the transcript, which exceeded 15,000 pages, there were nearly 3,000 pages of prefiled testimony and about 170 exhibits. The Board issued its opinion and recommendations on October 24, 1983. LBP-83-68, 18 NRC 811 (hereinafter "Opinion"). Comments on the Board opinion and recommendations, received during the period November 1983 to February 1984, were submitted by the Licensees, NRC Staff, the Intervenors,⁴ New York's Lieutenant Governor DeBello, and the Federal Emergency Management Agency. The present Decision is based on: consideration of the hearing record; the Board Opinion; the parties' comments on that Opinion; briefings to the Commission by its regulatory staff on July 23,

² "Because the proceeding . . . is not mandated by the Atomic Energy Act, it is not an 'on the record' proceeding within the meaning of the Atomic Energy Act." CLI-81-1, *supra*, 13 NRC at 5 n.4.

³ In this regard, the Commission explained:

The purpose of the proceeding will be to take evidence and make recommended findings and conclusions on disputed issues material to the question whether the Indian Point Units 2 and 3 plants should be shut down or other action taken. The record of the proceeding, together with recommendations, will then be forwarded to the Commission for the final agency decision on the merits of the proceeding.

May 30, 1980 Order at 3.

⁴ Union of Concerned Scientists, New York Public Interest Research Group, Parents Concerned About Indian Point, West Branch Conservation Association, Rockland Citizens for Safe Energy, Greater New York Council on Energy, Friends of the Earth, New York City Audubon Society, Westchester People's Action Coalition, and Honorable Richard L. Brodsky.

August 16; September 5, and October 2, 1984; and the parties' comments on the NRC Staff briefings. We have also considered the parties' and the NRC Staff's responses to our Order of July 30, 1984 (unpublished), requesting comments on Board Chairman Gleason's dissenting views on the Board's Opinion.

The Commission's primary concern in initiating this proceeding was and is to determine the extent to which the population around Indian Point affects the risk posed by an accident at Indian Point, as compared to the spectrum of risks posed by other nuclear power plants. Further, the Commission was concerned with both the total risk to persons and property, and the risk to individuals living in the vicinity of the Indian Point site, including that resulting from possible difficulties associated with evacuation in an emergency. See CLI-81-1, *supra*, 13 NRC at 6. To develop a suitable record responding to these concerns, the Commission directed the Board to address seven specific questions:

1. What risk may be posed by serious accidents at Indian Point 2 and 3, including accidents not considered in the plants' design basis, pending and after any improvements described in [Commission Questions] (2) and (4) below?
2. What improvements in the level of safety will result from measures required or referenced in the Director's Order to the licensees, dated February 11, 1980 [or from other measures]?
3. What is the current status and degree of conformance with NRC/FEMA guidelines of state and local emergency planning within a 10-mile radius of the site and, to the extent that it is relevant to risks posed by the two plants, beyond a 10-mile radius?
4. What improvements in the level of emergency planning can be expected in the near future, and on what time schedule, and are there other specific offsite emergency procedures that are feasible and should be taken to protect the public?
5. Based on the foregoing, how do the risks posed by Indian Point Units 2 and 3 compare with the range of risks posed by other nuclear power plants licensed to operate by the Commission?
6. What would be the energy, environmental, economic or other consequences of a shutdown of Indian Point Unit 2 and/or Unit 3?
7. Does the Governor of the State of New York wish to express an official position with regard to the long-term operation of the units?⁵

The responses to the Commission's questions are discussed below. Responses to Questions 1, 2 and 5 are discussed in § II, responses to Questions 3 and 4 in § III, and those to Question 6 in § IV.⁶

⁵ The Governor of New York did not express his views in response to the Commission's invitation.

⁶ The Commission's questions were not the only ones litigated. To obtain information relevant to the Commission's questions, the Board also allowed litigation of a number of issues posed by the Intervenor and the Board itself.

B. The Indian Point Site

The Indian Point site is unlike most nuclear power plant sites in its proximity to densely populated areas. In terms of cumulative population and population density within a distance up to 50 miles from the plant site, Indian Point is well above the average. See Table 1. Within a radius of 5 miles, the cumulative population and population density values for Indian Point are exceeded by one site and are approached by a few other sites; for a 10-mile radius and beyond, Indian Point has the highest population density of any site.

The Indian Point site satisfies the NRC's reactor siting criteria, 10 C.F.R. Part 100, with respect to low population zone and population center distance. However, since late 1974, a guideline value for limiting population density near power reactor sites has been used in considering applications for construction permits. Under this guideline, if the population density averaged over any radial distance out to 30 miles from the reactor equals or exceeds 500 persons per square mile (persons/mi²), construction permit applicants are required to consider less densely populated alternative sites. NUREG-0800, Rev. 2 (July 1981) at 2.1.3-3. The average population density for radial distances of 0 to 2 miles or more from the Indian Point Plant exceeds the guideline threshold. It should be noted that the Indian Point site was originally selected 25 years ago for the Indian Point Unit 1, a 265-MWe plant that operated from 1962 to 1974. Unit 2 (873 MWe) and Unit 3 (965 MWe) were approved by the AEC regulatory staff for construction at the site in 1966 and 1969, respectively. Unit 2 was in operation before the guideline threshold of 500 persons/mi² was adopted by the Staff.⁷

The numbers of persons, and their distribution around the plant, are such that the Board in this special proceeding concluded that a severe release of radioactive materials at Indian Point could have more serious consequences than that same release at virtually any other NRC-licensed site. Opinion, 18 NRC at 1032. However, as summarized in § V, p. 1091, of this Order, discussed below, the Commission concludes that the record shows that neither shutdown of Indian Point Unit 2 or Unit 3, nor imposition of additional remedial actions beyond those implemented voluntarily by the Licensees, is warranted at this time.

⁷ Although the population density around the Indian Point site is substantially higher than that of the average site, it is not unusually greater, for distances up to 30 miles, than the density of several other sites. See NUREG-0348, at T37 to T44. The Board also observed that there are other sites with comparably high population densities. See Opinion, 18 NRC at 891-93, 1081-82.

TABLE 1
INDIAN POINT POPULATION DISTRIBUTION*

	Cumulative population (in thousands) within radius of				
	5 miles	10 miles	20 miles	30 miles	50 miles
Indian Point	53	220	890	4,000	17,000
Avg. Site	7.9	37	180	530	1,700
Max. Populated Site	67	220	890	4,000	17,000
	Population density (persons/mi²) within radius of				
	5 miles	10 miles	20 miles	30 miles	50 miles
Indian Point	670	700	710	1,400	2,200
Avg. Site	101	120	140	190	220
Max. Population Density Site	860	700	710	1,400	2,200

*Data (rounded out to two figures) from NUREG-0348, "Demographic Statistics Pertaining to Nuclear Power Sites" October 1979. Based on 1970 Census, 1979 revision. Includes resident but not transient population. The Indian Point site data are from pages T2 and T12, the other population data are from pages T21-T28, and the population density data are from pages T37-T44. The "average site" data are the average populations and population densities of the 111 sites considered in NUREG-0348. The "maximum site" data are the maximum populations and population densities of all the sites considered in NUREG-0348.

II. RISK POSED BY SERIOUS ACCIDENTS AT INDIAN POINT UNITS 2 AND 3

A. Commission Question 1: Indian Point Risk

The first question which we posed was:

What risk may be posed by serious accidents at Indian Point 2 and 3, including accidents not considered in the plants' design basis, pending and after any improvements described in [Commission Questions] (2) and (4) below?

To clarify the scope of the question and the response we sought, we provided the following supplementary instructions:

Although not requiring the preparation of an Environmental Impact Statement, the Commission intends that the review with respect to this question be conducted consistent with the guidance provided the staff in the Statement of Interim Policy on "Nuclear Power Plant Accident Considerations under the National Environmental Policy Act of 1969;" 44 FR 40101 (June 13, 1980).*

*In particular, that policy statement indicates that:

Attention shall be given both to the probability of occurrences of releases and to the environmental consequences of such releases;

The reviews "shall include a reasoned consideration of the environmental risks (impacts) attributable to accidents at the particular facility or facilities";

"Approximately equal attention should be given to the probability of occurrence of releases and to the probability of occurrence of the environmental consequences"; and

Such studies "will take into account significant site and plant-specific features"

Thus, a description of a release scenario must include a discussion of the probability of such a release for the specific Indian Point plants.

CLI-81-23, *supra*, 14 NRC at 612.

To help it answer Commission Question 1, the Board considered one intervenor contention and one question which the Board itself framed for litigation:

Contention 1.1

The probabilities and consequences of accidents at Indian Point Units 2 and 3 combine to produce high risks of health and property damage not only within the plume exposure EPZ but also beyond the plume exposure EPZ as far as the New York City metropolitan area.

Board Question 1.1

What are the consequences of serious accidents at Indian Point and what is the probability of occurrence of such accidents? In answering this question the parties shall address at least the following documents: (a) the *Indian Point Probabilistic Safety Study* (IPPSS) prepared by the Licensees; (b) the Sandia Laboratory "Letter Report on Review and Evaluation of the Indian Point Probabilistic Safety Study" (Letter Report), dated August 25, 1982; and (c) any other reviews or studies of the

IPPSS prepared by or for the Licensees, the NRC Staff, or the Intervenors, or any other document which addresses the accuracy of the IPPSS.

The Board considered Commission Question 1, Contention 1.1, and Board Question 1.1 together. The Board also heard testimony on three additional Board questions.

Summary of Commission Conclusions on Commission Question 1

The Commission agrees with the Board's conclusion that the quantitative estimates of the risks to the public resulting from serious accidents at Units 2 and 3 are a small fraction of the competing nonnuclear background risk to which the population around Indian Point is exposed. The Board pointed out that the risk estimates had uncertainties, such as those attributable to the omission of certain potential contributors to risk and to the limitations of the assumed models. To account for these uncertainties, the Board adopted a subjective Staff judgment that the quantitative risk estimates presented by NRC Staff might have underestimated the true risk by as much as a factor of 40. In light of the Board's discussion of uncertainties, we feel it is reasonable to consider this added conservatism above the best estimates of risk.

We note that the Board's quantitative risk estimates do not purport to *prove* the acceptability of the Indian Point risk. However, when considered as one factor in the evaluation of the public risk posed by the operation of Indian Point Units 2 and 3, along with engineering judgments of plant safety and careful evaluation of the risk-reduction effectiveness of plant safety systems, the estimates are consistent with a finding that the units do not impose an undue risk to the public health and safety.

In the following sections we address the principal issues raised in the proceeding during consideration of Commission Question 1, Contention 1.1 and Board Question 1.1.

1. Definition of Risk

Our first question was intended to reach a judgment as to the risk imposed on the surrounding population by a serious accident at Indian Point Units 2 and 3. To clarify our definition of the term "risk," we emphasized in our January 1981 Order that risk included both probabilities and consequences associated with potential accidents. We also noted what we considered useful measures of individual and societal risks. CLI-81-1, *supra*, 13 NRC at 5-6. Despite our efforts, the parties differed on the proper definition of risk.

a. Board's Conclusions and Recommendations

The Board noted that the conventional definition of risk as the product of both probability and consequences can make the calculated risk of a low-probability high-consequence accident equivalent to that of a high-probability low-consequence accident, even when the societal significance of the accidents would be substantially different. As the Board put it,

For example, consider an accident having a probability of 0.1 per year which results in 10 fatalities; this accident has the same expected risk, one death per year, as an accident having a probability of 1×10^{-4} per year which results in 10,000 fatalities. Risk estimates tell us that the accidents are mathematically equivalent. But are they societally equivalent?

Opinion, 18 NRC at 892.

The Board recommended that the Commission "factor into its deliberations the potential consequences of a low probability accident at Indian Point as well as the expected risk values that we have accepted in this report . . ." *Id.* at 893. The Chairman of the Board dissented from this recommendation and pointed out that it would amount to "considering consequences without their associated probabilities," which, he stated, "we have been restricted from doing by the Commission." He noted that "the Board appears to be recommending a new standard exclusively for Indian Point." *Id.* at 1080. In response to Judge Gleason's dissent, the members of the Board majority pointed out they did not propose to change the method of determining risks; rather, with regard to Commission Question 1, they wished to "caution the Commission against any uncritical interpretation" of the Board's best quantitative estimates of expected risk values. *Id.* at 1082-83.

b. Commission Evaluation

On July 30, 1984, we requested the NRC Staff and the other parties to the proceeding to comment on Judge Gleason's dissent. Unpublished Commission Order. In response, the NRC Staff agreed with Judge Gleason "that it is not necessary for the Commission to factor low-probability high-consequence accidents in its decision to any greater extent than already appears in the analyses performed by the parties to this proceeding." Comments at 9 (Aug. 14, 1984). The Staff stated that its analysis did treat such accidents and that Staff use of cumulative complementary

distribution function (CCDF) curves acknowledged the existence of such accidents and indicated their place in the risk profile of the Indian Point units. Moreover, in reaching conclusions on the safety of the Indian Point units, Staff noted that it did not rely only on numerical risk estimates but also considered specific design and operational features of the units that reduced the public risk.

The Licensees also agreed with Judge Gleason's dissent, arguing that, despite the low level of risk, the Board majority had overemphasized the need for risk-reducing measures, such as a filtered vented containment. Power Authority of the State of New York, the Unit 3 Licensee, asserted that the Board majority was "unlawfully and unconstitutionally" singling out Indian Point for special treatment despite its own findings on Indian Point risk and contrary to the Commission's policy on backfitting.

The Intervenor asserted that the Commission should disregard Judge Gleason's dissent. They pointed out that the Board majority's "rather modest" recommendation was "eminently reasonable" since there is far greater uncertainty in the probability component of the risk equation than in the consequence component.

We emphasized in our January 1981 Order clarifying the scope of the proceeding that serious accidents at Indian Point Unit 2 or Unit 3 were to be considered with "equal attention" to both probabilities and consequences. We interpret the Board majority's recommendation as reminding us to beware of uncritical reliance on the quantitative estimates of risk and to take into account the possibility that a low-probability accident at Indian Point may result in greater consequences than the same accident at another site. We do not interpret it as a recommendation for us to consider consequences without regard to probabilities. Nor is it a recommendation that a "risk aversion" factor be introduced into the definition of risk.

It is true that the Commission has already considered and rejected the possibility of giving greater weight to a single, very severe accident than to a number of smaller accidents with the same total consequences. See Commission Policy Statement on Safety Goals for the Operation of Nuclear Power Plants, 48 Fed. Reg. 10,772 (Mar. 14, 1983); NUREG-0880, Rev. 1 for Comment, May 1983, at 84, 104. However, our rejection of the introduction of a risk aversion factor into the quantitative design objectives of the safety goals should not be understood as a decision to consider risk estimates with total disregard for consequences. In fact, the Commission believes that the entire risk picture, including probabilities, consequences, and CCDF curves, should be considered in its decisionmaking. At Indian Point, where the population density is

high, the estimated societal risk is more sensitive to uncertainties in the accident probability estimates than at other less densely populated sites. Focusing exclusively on overall numerical risk estimates is not appropriate in general and, in the case of Indian Point, is particularly inappropriate.

In addition to recommending consideration of low-probability, high-consequence accidents, the Board pointed out that, because the population around Indian Point is exposed to risk by two units, risks should be expressed in terms of the cumulative risk to the surrounding population of operating both plants until expiration of their current operating licenses. Opinion, 18 NRC at 885. In commenting on the Board's decision, the Licensees objected to this manner of expressing risk because it was contrary to the Commission's preliminary safety goals, where societal risk is expressed in different terms, i.e., per plant and per year. We do not object to the Board's presentation of risk values in terms which it believed better express the risk to the public posed by the Indian Point units. We do depart from the Board's approach, however, insofar as it compared cumulative (reactor lifetime) societal risk for Indian Point with per-site-year values for other plants. *See id.* at 886.

2. *Validity of Risk Estimates*

a. *Board Conclusions and Recommendations*

The Board adopted risk estimates calculated by the NRC Staff/Sandia National Laboratory rather than those calculated in the Licensees' Indian Point Probabilistic Safety Study (IPPSS) because (1) the Board considered estimates obtained (by Staff and Sandia) based on the Maximum Likelihood Principle more realistic and less intuitive than those obtained (by Licensees) using Bayes' Theorem, and (2) the Board found the Staff/Sandia modeling more closely represented the Indian Point plants than the IPPSS modeling. The Board was particularly critical of the use of Bayes' Theorem, noting that "it would be justifiable to reject the Bayesian methodology on statistical grounds alone . . ." *Id.* at 855-56. *Cf.* NUREG-0492, at X-30, X-39.

The Board itemized the risks of a potential accident at Indian Point, finding that: the risk of fatalities (sum of early fatalities and delayed cancer fatalities) was at least 0.35 person per site-year (person/site-yr); the risk of nonfatal radiation injuries was at least 0.13 person/site-yr; the risk of genetic effects was at least 1 case/site-yr; the risk of population exposure was at least 4000 person-rem/site-yr; and the financial risk (property damage without monetizing health effects) was at least \$6 million/site-yr. Opinion, 18 NRC at 893-94. The Board concluded that

the *cumulative* risk to society of operating both plants until expiration of their current operating licenses, a period of 23 years for Unit 2 and 26 years for Unit 3, was between about one-half and one early fatality, about eight late fatalities (from latent cancers), and at least twenty-three cases of genetic effects. The cumulative financial risk was estimated as more than \$147 million.

The Board noted that these risks will be incurred mainly by the population of about 15.5 million people who live within 50 miles of Indian Point. The Board also concluded that the risk of fatalities (including those from latent cancers) and nonfatal radiation injuries resulting from an accident at Indian Point was a very small fraction of the competing nonnuclear background risk to which the population around Indian Point is exposed. *Id.* at 894-95.

In commenting on the Board's Opinion, the Staff did not object to the risk estimates adopted by the Board, although the Staff did have reservations about the validity of some of the Board's rationale. Comments at 7, 12. In contrast, the Licensees argued that the Board's estimates of risk were unreasonably high because they were based on unrealistic assumptions, including those concerning the appropriate source term, containment capability to prevent releases, evacuation times, and the effect of evacuation on risk. Comments at 12-15, 17-20, 23.

Disagreeing with both Staff and Licensees, the Intervenors asserted that the uncertainties associated with the calculated risk estimates precluded accurate assessment of risk of release, leaving only the assurance that catastrophe is unlikely but possible. Comments at 3. UCS compared the Board's estimates with the 1980 estimates of the Task Force on Interim Operations, observing that a core melt accident at Indian Point is now estimated as roughly 35 times more likely than the 1980 estimates, early fatalities range from about the same likelihood to about half of the 1980 estimates, early injuries are roughly 300-450 times more likely, latent cancer fatalities are roughly 450-600 times more likely, and offsite property damage is roughly 300 times greater than the 1980 estimates. UCS concluded that the difference of more than 5 orders of magnitude between the major risk estimates by Licensees and the Board's estimates shows that no more is known now about the risk of accidents than was known before the probabilistic risk assessments (PRAs) were done. Comments at 6, 7, 20.

The parties differed about the validity of the methodology of the Indian Point Probabilistic Safety Study. The Board considered IPPSS's Bayesian approach unreliable. Opinion, 18 NRC at 856. Licensees argued that the Board erred, pointing out that the validity of the IPPSS methodology is evidenced by Staff's risk assessment which, though

employing a different methodology, reached the same basic conclusions. Licensees' Comments at 16. Lt. Governor DelBello and UCS argued that there is no assurance that any probabilistic risk assessments are accurate because they are incapable of independent, empirical verification. UCS contended that the Board correctly rejected the Bayesian approach used by Licensees, but wrongly accepted the Staff's PRA without addressing the question of whether any PRA is sufficiently reliable for using the bottom-line results in decisionmaking. UCS also pointed out that Sandia did not explore the issue whether the IPPSS assessment of risk-dominant accident sequences was correct. Lt. Governor DelBello's Comments at 4-5; UCS Comments at 2, 14-16. The Staff pointed out that the Board was inconsistent in finding the Licensees' risk estimates unreliable because they were based on Bayesian methodology. As the Staff observed, the Board accepted the Sandia/Staff point estimates, which have a Bayesian component. Comments at 13.

b. Commission Evaluation

We agree that the quantitative estimates of public risk obtained by PRAs are not empirically verifiable. Nonetheless, PRAs are a helpful supplement to engineering judgment. They should not be ignored, as UCS and Lt. Governor Del Bello argue. As the Board observed, PRAs are "very powerful tools for identifying strengths and weaknesses in reactor safety." Opinion, 18 NRC at 854 n.19. If properly used, we agree.⁸ We agree with the Staff remark (Comments at 13) that the Board's generalizations about the validity of Bayesian methodology (Opinion, 18 NRC at 855-56) appear to exhibit "some confusion." Nevertheless, we believe that the Board was correct in not relying on the IPPSS overall quantitative risk estimates and, instead, adopting the Staff's risk estimates. The Staff estimates were based on IPPSS as modified and corrected by Staff and Sandia and, as noted by the Board, were calculated with more realistic models. *Id.* at 857-59. The Commission accepts the Board's recommended quantitative risk estimates. The values are based on application of the then-existing (circa 1981) state of the art of risk assessment techniques. We do not, however, (nor did the Board) consider the quantitative risk estimates to be a *proof* that the risk to the public from the operation of Indian Point Units 2 and 3 is acceptably low. Rather they do not show Indian Point risk to be unacceptably high.

⁸ The Board's reliance on PRA is also consistent with the Commission's policy guidance on the use of risk assessment, as stated in the Commission's 1984 Policy and Planning Guidance. NUREG-0885, Issue 3, § VIII.C.

In other words, it is not in itself sufficient for the probabilistic risk assessments to yield acceptably low risk estimates. We believe that a sufficient showing of acceptably low risk must be based as well on engineering judgments of plant safety as developed in thorough probing of the Indian Point units and in careful evaluation of the risk reduction effectiveness of plant safety systems. We believe that there has been such probing and evaluation and that, as discussed below, the safety improvements which were implemented voluntarily by the Licensees further assure that the continued operation of the units does not impose an undue risk to the public health and safety.

3. *Evacuation Assumptions*

a. *Board Conclusions and Recommendations*

Three basic models for offsite emergency response were delineated during the proceeding: the "evac reloc," the "early reloc," and the "late reloc" models.⁹ Because the capability of the surrounding population to respond to an accident initiated by a severe external event, such as an earthquake or hurricane, would differ significantly from the capability to respond to other accidents, the Board considered a combination of two of the basic models as "reasonable." *Id.* at 875, 887. This model, the "evac reloc and late reloc" model, assumes the "late reloc" model for accidents initiated by a severe earthquake or hurricane and the "evac reloc" model for accidents initiated by all other causes. *Id.* at 876.

The Board concluded that the actual risks posed by Indian Point operation could be higher than those estimated by the Staff in its assumed "evac reloc and late reloc" emergency response model because the Staff failed to consider severe winter storms in estimating evacuation times. *Id.* at 888-89. Staff argued that failure to consider winter storms does not significantly affect risk because one of the Staff's evacuation models, the "late reloc" model, assumes that, in the event of a severe external

⁹ The evacuation-relocation ("evac reloc") model envisions evacuation of the area within 10 miles of the plant (at speeds and with delay times developed by Licensee and FEMA contractors, and reviewed by the Staff) and relocation of people within highly contaminated areas more than 10 miles from the plant 12 hours after plume passage.

The early relocation ("early reloc") model assumes that evacuation prior to plume passage is not possible and that people within 10 miles of the reactor and in the path of the plume leave 8 hours after plume passage. People more than 10 miles from the reactor relocate 12 hours after passage.

The late relocation ("late reloc") model assumes the occurrence of an external event more severe than considered in each plant's design basis. This impedes evacuation and also makes sheltering difficult so that people are without shelter, leaving highly contaminated areas 24 hours after plume passage. The Staff concluded that even in this case the early and latent fatality risk is increased by less than 4% over what it would be under the Staff's "early reloc" model, where evacuation from highly contaminated areas is assumed to take place within 8 hours after plume passage. Opinion, 18 NRC at 886, 875.

event, people will not be sheltered and relocated from highly contaminated areas until 24 hours after plume passage. Comments at 17, 18. The Board considered that the "late reloc only" was "pessimistic." The Board concluded that the societal risks of Indian Point were somewhere between risk estimates based on the "evac reloc and late reloc" and "late reloc only" models and probably nearer risk estimates based on the former. Opinion, 18 NRC at 887.

b. Commission Evaluation

We believe the Board's conclusions regarding the evacuation models are reasonable. We agree with the Board's increase of the Staff's evacuation time estimates to account for the possibility of severe winter storms. The effect of severe winter storms in impeding evacuation should be factored into the emergency response scenarios assumed for all severe accidents, whether internally initiated or resulting from the "severe external event" assumed in the "late reloc" model. We also agree with the Board that, although pessimistic, the "late reloc" emergency response model is not unrealistic and should bound consideration of severe winter storms.

In commenting on the Board's conclusions, the Licensees contended that, because "the structural integrity of the containment was so high that it could withstand any earthquake which could be experienced at the Indian Point site," there would be no containment failure following a postulated worst-case seismic event and, therefore, the Staff's "late reloc" emergency response model was unrealistic. Comments at 17-20. However, there is not an adequate basis in the record to accept the Licensees' characterization of containment strength. See discussion of containment reanalyses below. With respect to the realism of assuming containment failure, we note that our Question 1 specifically requested consideration of the risk posed by serious accidents, "including accidents not considered in the plants' design basis." In any case, we find the information in the record to be sufficient for us to reach our conclusions without requiring further investigation of this aspect of potential containment failure.

4. Uncertainty of the Quantitative Risk Estimates

a. Board Conclusions and Recommendations

The Board categorized the uncertainties in probabilistic risk assessment as:

(1) statistical uncertainties, originating in the fact that it is impossible to measure input parameters, such as component failure probabilities or human error probabilities, with precision; (2) modeling approximations that have to be introduced to make the predictive models tractable; (3) errors of completeness, or errors of omission, resulting from the fact that some failure mechanisms or accident scenarios are left out entirely; (4) computational errors in assembling the models.

Opinion, 18 NRC at 878.

The Board found that the uncertainties attributable to erroneous assumptions in modeling, modeling approximations, or omissions in modeling are likely to be far greater than statistical uncertainty, and their effect on the bottom-line risk estimates could not be formally calculated. *Id.* at 878-81. The Board pointed out that a major omission in the Indian Point risk assessment, as in all PRAs, is omission of the risk of sabotage. The Board concluded that this factor is of "unknown quantitative significance" and is cause for concern. *Id.* at 890. The Board also found another error of omission in Staff's and Licensees' failure to consider equipment aging as a factor bearing on risk. The Staff failed to convince the Board that the increasing understanding of reactor safety during the plant's operating lifetime would outweigh the effects of aging. Consequently, the Board concluded that equipment aging and wear-out constituted "another error of omission, of unknown significance, and . . . not accounted for in our risk estimates . . ." *Id.* at 891.

The Board considered the various contributors to the uncertainty of the risk estimates, including the errors of omission, and adopted Staff's subjective judgment that the Staff's risk figures were "unlikely, but not very unlikely," to underestimate the true risks by a factor of 40 or more. The Board was candid in emphasizing the subjective nature of its opinion:

We have not been inclined to accept other estimates based heavily on subjective judgment, and we have no basis for believing that Rowsome's [the Staff witness] intuition is any better or any worse than that of other witnesses who have presented subjective testimony in this proceeding. Therefore, we cannot give great weight to the high estimates. But we found Rowsome to be a competent and thoughtful witness; since he would "not be very surprised" to find Staff's estimates too low by a factor of 40, we are not inclined to dismiss the high estimates altogether. We think it possible that Staff could, in fact, have underestimated the risks by as much as a factor of 40. . . . In any case, we consider it prudent to consider the high estimates [*id.* at 881-82] as possible values which the parameters, the true risks, could assume. We recommend that the Commission do likewise.

Id. at 891.

Staff did not contradict the Board's opinion that because of omissions in Staff's analysis, including the effects of sabotage and plant aging

(wearout), risk may be higher than actually estimated. Even so, Staff argued that it treated each of these areas of uncertainty in its testimony and in its proposed findings. Comments at 19.

Regarding aging, the Staff's witness testified that increasing understanding of reactor safety and future improvements in the plants will outweigh the effects of aging, and so lead to declining risk. Direct Testimony of Rowsome at 14, following transcript page 8777 (hereinafter cited as Tr. 8777 at 14). In comments on the Board Opinion, the Licensees stated that the failure rates used in IPPSS were based on industry-wide and Indian Point failure rates, and thus accounted for aging effects. Further, they argued that equipment aging is not a significant contributor to risk because more than 90% of containment overpressurization accidents result from common-cause events such as earthquakes, fires and winds. Thus the impact of aging is limited to those overpressurization sequences which lead to containment failure, i.e., 10% of overall risk. Comments at 14.

Regarding sabotage, the Staff stated that it "[did] not believe that the state of PRA methodology can account for the likelihood of sabotage attempts." Proposed Finding 1-204, Staff Proposed Findings at 191. The Staff believed that sabotage has little effect on risk because a potential saboteur needs both to initiate a core melt and keep all containment safeguard features inoperable for a long period of time. Staff's testimony concerning other omissions was pessimistic:

We have not yet mastered the art of including the contributions to reactor accident susceptibility made by those design errors that are not revealed by either design documents, surveillance tests or reactor operations. We are not very good at predicting the likelihood that operators might misdiagnose an incident, and so employ the wrong procedures.

Tr. 7169 at 12.

The Intervenor's asserted that the Staff's and Licensees' PRAs were entitled to no weight because they failed to account for the uncertainties flowing from sabotage, equipment aging effect, human errors, design/construction errors, and equipment failure attributable to environmental causes. Furthermore, they continued, not only does the record contain no credible estimate of the range of uncertainties for the PRAs, but the Staff even took the position that a comprehensive uncertainty analysis cannot yet be performed. UCS Comments at 15-16.

b. Commission Evaluation

When we first posed the question about the risk imposed by Indian Point on the surrounding population, we noted "the uncertainty that is associated with risk assessment estimates of the absolute values of accident probabilities and consequences." CLI-81-1, *supra*, 13 NRC at 6-7. Although the record of the proceeding clarifies the nature of the uncertainty and provides somewhat subjective or judgmental estimates of the uncertainty, the record also shows a significant, probably irreducible, residual uncertainty which has not been rigorously quantified and which we must consider in our decisionmaking.

While recognizing the limitations of uncertainty analyses in probabilistic risk assessment, the Commission finds the Board's treatment of uncertainties adequate for the Commission to reach its decision in this case.

5. Containment Reanalyses

The Board did not admit Licensees' containment reanalyses into the record. The Board indicated, however, that if the analyses' conclusions were accepted, the risk of early health effects from Unit 2 may be reduced by a large fraction. Opinion, 18 NRC at 858. The Licensees argued that because the Indian Point containments have greater strength and capability than previously assumed, the Board was wrong in failing to find that several factors were insignificant contributors to public risk, including core-melt frequency, operator error, steam explosions, hydrogen detonation, and aging of equipment. The Licensees stated that, if the Board had taken these into account, the quantitative risk estimates which the Board adopted would have been reduced.¹⁰

Because the Licensees' containment reanalyses were not admitted into the record, nor were they evaluated by NRC Staff, the Commission cannot assess the validity of the Licensees' claims.

¹⁰ In an April 16, 1984 Board Notification (BN-84-073), the Staff stated that recent scale-model tests by Sandia National Laboratories indicate that the conditional probability of early containment failure (resulting from rapid heating of containment atmosphere) following a core melt accident at high primary system pressure may be higher than previously determined. Initial Staff evaluation indicates that the test results are not directly applicable to pressurized water reactor (PWR) and nuclear steam supply system (NSSS) containment response. The information is being analyzed to determine how it affects estimates of the risk associated with core melt and early containment failure. *Id.*, Enclosure at 3.

6. Source Term Assumptions

a. Board Conclusions and Recommendations

The Board accepted the use of WASH-1400 (the Reactor Safety Study) source terms in making quantitative estimates of risk. The Board agreed that the use of these source terms provided conservative (i.e., overestimated) predictions of radiological releases and that calculation and use of reduced source terms would be "premature." The Board agreed with the NRC Staff position and noted, "[r]esearch is in progress to develop new models and to compile better data, and a decision on reduced source terms should await the outcome of that effort." Opinion, 18 NRC at 865.

The Licensees argued that the Board was wrong in its findings on risk because it failed to accept Licensees' estimates of source terms smaller than Staff's. Licensees alleged that testimony of their witnesses established without contradiction that the source terms used in IPPSS and in Staff's PRA are overly conservative. The Board's failure to account for reduced source terms, Licensees argued, is arbitrary and thus unlawful in disregarding uncontradicted and entirely probable testimony of Licensees' witnesses whose qualifications and judgment have not been discredited. Comments at 23.

b. Commission Evaluation

If Licensees' characterization of the record regarding the source terms were accurate, they would have a legitimate complaint. Staff's testimony on this issue, however, was not an endorsement of Licensees' source-term testimony; rather, Staff testified that it was likely that the source terms would be reduced, but that the extent of reduction had not yet been established. *See* Tr. 12,581. We conclude that the Board was justified in not accepting the Licensees' use of reduced source terms. The Commission notes, however, that by adopting the Staff's subjective estimate of uncertainty in the quantitative risk estimates (possibly underestimated by a factor of 40 or overestimated by a factor of 400), the Board appears to take credit for conservatism in the source-term assumptions by lowering (from 125 to 40) the factor by which risks could have been underestimated.

7. Risks to New York City

Contention 1.1 alleges "high risks of health and property damage" beyond the plume exposure Emergency Planning Zone (EPZ) as far as

the New York City metropolitan area. Opinion, 18 NRC at 845. The Board did not consider these risks to be high, although it did note that, "under certain meteorological conditions, delayed fatalities from cancer appear to be possible almost anywhere in the city." *Id.* at 894. The Board concluded:

We agree with the Staff that there are risks as far away as New York City, but the adjective "high" is not warranted. We also agree that the average annual early fatality risk and delayed cancer fatality risk, as calculated by PRA, are very small fractions of the competing background nonnuclear risks. . . . Therefore, we reject Contention 1.1.

Id. at 895 (citation omitted).

The Licensees and Staff did not dispute the Board's conclusions. We agree with the Board's conclusions.

B. Commission Question 2: Measures to Reduce Indian Point Risk

The second question which we posed was:

What improvements in the level of safety will result from measures required or referenced in the Director's Order to the licensees, dated February 11, 1980?

To clarify the intent and scope of our second question we added that:

A contention by a party that one or more specific safety measures, in addition to those identified or referenced by the Director, should be required as a condition of operation would be within the scope of this inquiry if, according to the Licensing Board, admission of the contention seems likely to be important to resolving whether (a) there exists a significant risk to public health and safety, notwithstanding the Director's measures, and (b) the additional proposed measures would result in a significant reduction in that risk.

CLI-81-23, *supra*, 14 NRC at 612-13.

The Board also considered three contentions and one Board Question relating to Commission Question 2.

Contention 2.1(a) stated:

A filtered vented containment system for each unit must be installed.

Contention 2.1(d) stated:

A separate containment structure must be provided into which excess pressure from accidents and transients can be relieved without necessitating releases to the

environment, thereby reducing the risk of containment failure by overpressurization.

Contention 2.2(a) stated:

The cooling system at the plants should be changed so that it no longer uses brackish Hudson River water. This change is needed to combat safety-related corrosion problems.

Board Question 2.2.1 asked:

Should any of the requirements proposed at the July 29, 1982 meeting of the NRC Staff and members of the SGOG [Steam Generator Owners Group] be required for Indian Point Units 2 and/or 3, considering the risk of a steam generator tube rupture in this high population area?

Summary of Commission Conclusions on Commission Question 2

We agree with the parties in this proceeding that the measures imposed on Indian Point by the February 1980 Order of the Director of Nuclear Reactor Regulation have a small positive effect on risk reduction. However, because the risk reduction effect is not sufficient to be termed "substantial," we believe the Director's measures should be rescinded unless they are required to fulfill generic requirements applicable to similar types of power reactors or are required to meet other license requirements for the Indian Point units. We also conclude that it is undesirable to require the Licensees to implement certain accident-mitigating design features (glow-plug igniters, a passive containment building heat removal system, a reactor cavity flooding system) and a "Safety Assurance Program." Further, discontinuing the use of brackish coolant (Hudson River water) at Indian Point is not necessary. Similarly, neither a filtered vented containment nor a separate containment system should be required for Indian Point Unit 2 or Unit 3. However, in view of the vulnerability of the Unit 2 diesel generator and control buildings to high winds, the NRC Staff should undertake a study of the capability of these buildings to withstand high winds and the possibility that these buildings and the condensate storage tank could be damaged by missiles created by failure of nearby structures.

1. Measures Required or Referenced by the Director's Order

The Director's Decision sought to: (1) change the conduct of operations, surveillance testing, and maintenance to reduce transient frequency, increase reliability of certain safety systems, and improve emergency

response; (2) change plant staffing practices; (3) require more response team training for severe accidents and normal operations; (4) increase ECCS margin for limiting core temperature excursions during large LOCAs; and (5) induce Licensees to conduct specific studies on the susceptibility of the plants to severe accidents in order to increase Licensees' understanding of risk and to provide a basis for exploration of additional risk reduction measures. DD-80-5, *supra*. See Opinion, 18 NRC at 907.

a. Board Conclusions and Recommendations

The Staff was unable to quantify the extent to which compliance with the Director's Order reduced risks but estimated the reduction as less than a factor of 3. The Licensees did not quantify the risk reduction; they noted that overall risk was not significantly affected because the measures required by the Order were directed towards internal events, whereas Indian Point risks are dominated by external events.

On the basis of uncontroverted testimony of the Licensees and Staff, the Board found that the measures required or referenced by the Director's Order of February 1980 had a small, positive effect on risk reduction, and that the effect is not amenable to quantification, but is probably considerably less than an order of magnitude. Opinion, 18 NRC at 908.

In commenting on the Board's decision, UCS stated that if operation continues, it makes good sense to continue in effect the measures imposed on Indian Point in 1980 by the Director of Nuclear Reactor Regulation and to implement the Board's recommendations for risk reduction measures. UCS argued that, nevertheless, neither the recommended measures nor the 1980 requirements were shown to contribute significantly to a reduction of risk. Comments at 11. Licensees essentially agree with UCS on the effectiveness of the measures, but argue that, because of their voluntary implementation of new measures based on the IPPSS results,¹¹ the Commission should rescind the Director's 1980 Order "to the extent it has not been made generic." Comments at 33.

b. Commission Evaluation

On the basis of the record, the Commission finds it difficult to conclude that all of the measures imposed by the Director in 1980 provide

¹¹ To reduce risk from earthquakes, Licensees made modifications, including placement of rubber bumpers between adjacent buildings and strengthening control room ceilings. Fire vulnerability of both units was reduced by equipment modification. Unit 2 hurricane vulnerability was reduced by requiring anticipatory shutdown when hurricanes approach.

substantial, additional protection which is required to protect the public health and safety. First, the Board found no support in the PRAs or in the record generally for the proposition that the "fixes" contribute "substantially" to risk reduction or to protection of the public. Indeed, as all parties agreed, and the Board found, the Director's 1980 measures had a "small, positive effect on risk reduction." Opinion, 18 NRC at 908 (emphasis added). The Board specifically conceded that the 1980 requirements, while having a positive effect, did not significantly affect overall risk because they were addressed to internally initiated events, and "the dominant accident sequences stem from the rare external events."¹² Second, the special proceeding record contradicts the Director's previous conclusion that "[t]hese measures will significantly increase the level of safety at the Indian Point Station." DD-80-5, *supra*, 11 NRC at 357. Therefore, we have decided to rescind all of the requirements of the Order unless they are required to meet other license requirements for the Indian Point units or are required to fulfill generic requirements applicable to similar types of power reactors.

2. Risk Reduction Design Features Considered

The Board heard testimony from NRC Staff on "several potential design and operating changes intended to enhance the safety of these plants." These were three design features, a "Safety Assurance Program," and a tornado risk investigation. Opinion, 18 NRC at 908-15. The first is discussed below; the second and third are discussed separately in subsequent subsections.

The mitigative design features proposed were:

1. To control combustible gases: an ignition system to control burning using glow-plug igniters.
2. To control building overpressurization: a passive containment building heat removal system, such as heat pipes.
3. [To prevent] basemat penetration: a system to flood the reactor cavity.

Id. at 908.

The Staff investigated the potential effect of these systems in reducing early and delayed cancer fatalities. Because of the possible adverse conditions that could be created by the systems (feature #3 increases risk if not accompanied by a workable feature #2; feature #2 requires multiple

¹² It is unclear whether the Board was in effect recommending continuation of the Director's 1980 requirements, or even whether the Staff continues to believe they are justified. See Opinion, 18 NRC at 908.

additional penetrations of the containment barrier) and because of the uncertainties concerning the conditions the features are intended to mitigate, the Staff recommended against those design changes. The Board agreed (*id.* at 909-11) and we concur.

3. *Safety Assurance Program*

a. *Board Conclusions and Recommendations*

The Board heard NRC Staff testimony recommending a proposed "Safety Assurance Program." The Board in turn recommended that the Commission require the Licensees to develop and implement such a program "subject to the advice, consent, and oversight by the NRC Staff." *Id.* at 913.

The recommended Safety Assurance Program, as presented in Staff testimony before the Board (Tr. 12,834, Part C at 16-19), was described as entailing

1. Review, and when warranted, revision of procedures for maintenance, surveillance testing, operations, technical specifications, and personnel training to harvest the insights that can be obtained from the PRAs for better conduct of operations.
2. The use of the PRAs as an evaluation tool to identify the importance to risk of patterns in failure data obtained at Indian Point and to evaluate the relevance to Indian Point of severe accident precursors at other plants.
3. Continued maintenance and use of the IPPSS as an operations management and design evaluation tool, including the implementation of cost-effective risk-reduction concepts.
4. Integration of the Safety Assurance Program into the conduct of operations.

Opinion, 18 NRC at 911.

Licensees objected on several grounds to the Board's recommendation to impose a Staff-proposed "safety assurance program": the costs could be significantly higher than the costs estimated by NRC Staff; source-term reductions will reduce risk estimates; Indian Point risk is already low and in accord with the safety goal, and thus there is no particular reason for such a program; and, finally, imposition of such a program conflicts with 10 C.F.R. § 50.109 which permits backfits for operating plants only when they offer "substantial, additional protection which is required for the public health and safety," and with the interim policy statement on backfitting, 48 Fed. Reg. 44,173 (Sept. 28, 1983), which requires an evaluation of costs, benefits and effectiveness of such measures. Comments at 33. In contrast, UCS stated that "it makes good sense to implement such a program." Comments at 11.

b. *Commission Evaluation*

The Commission agrees with the Board that development and implementation of a Safety Assurance Program (SAP) along the general lines described by NRC Staff might improve Indian Point safety. However, the Commission must determine that imposition of such a program is *necessary* to provide substantial additional protection of the public health and safety in order to justify requiring such a program.

It is possible, as Staff argued, that this type of program could: reduce maintenance, surveillance, and operator errors; result in more effective plant management oversight; achieve additional assurance of safety from reexamination and improvement of procedures for operator actions; replace costly design "fixes" with less expensive, yet effective, procedural or operational changes; provide a framework for analyses of future mitigative actions at Indian Point; and provide a framework for analyses of the effect on safety of changes in equipment failure rates and plant aging, based upon operating data for this and other plants. The analyses would aid in reducing uncertainties in the risk estimates.

In addition to the advantages identified by the Staff, the Commission notes that the program could be used to assure that the IPPSS was based on accurate design and operations information; something which neither Staff nor Sandia checked rigorously in their reviews. The program could also provide a mechanism to assure that no changes are made to facility procedures or configurations which could increase risk. Finally, because externally initiated events dominate Indian Point risks, the program could be designed to focus on such events.

Against these advantages, the Commission has weighed a number of disadvantages. This would be the first time that the NRC required such a program. Before requiring such a program, criteria should be established for the use in a licensing environment of a program based on a full-scope PRA. The details of the program are ill-defined, as are its costs. While the NRC Staff estimated that the Safety Assurance Program will cost the Licensees approximately \$3 million initially, and a few hundred thousand dollars annually to maintain, the Licensees argued that the costs could be substantially greater. Tr. 12,834, Part C at 17. If the residual risks at Indian Point are as low as the Board concludes, then their complete elimination, valued at \$1000/person-rem on a yearly basis, for instance, would be comparable to the estimated startup cost of the Safety Assurance Program for the first year. Since we doubt that such a program could eliminate risks, and implementation of any risk reduction measure would not be without additional cost, the record does not persuade us that maintaining such a program would be cost-effective in subsequent years.

The program might create other problems as well. First, it has the potential for interfering with normal operational activities. Second, the program is focussed primarily on operations, and its effectiveness in reducing external-event contributors to risk — the major contributors — is not clear. Third, considering uncertainties and the potential that the probabilistic assessment is flawed, such a program could lead the Licensees to justify avoiding a safety-related action which should be taken, or to justify proceeding with an action which is unwarranted or perhaps even counterproductive. Finally, it could be argued that the Safety Assurance Program invites a piecemeal approach to revision of IPPSS, which might be less desirable than a systematic and integrated overhaul of the study.

We have considered the above-noted advantages and disadvantages and the Licensees' objections to requiring a Safety Assurance Program. On balance, although the program may have potentially beneficial effects which merit future generic consideration, we find that the record does not support the Board's recommendation to require the Licensees to develop and implement a program embodying the elements set forth in the Opinion (18 NRC at 911-13). We are not persuaded that such a program is needed to assure adequate protection of public health and safety, or that it will provide substantial, additional protection of the public health and safety. Therefore, we will not impose such a program at Indian Point Units 2 and 3.

4. Tornado Risk Inquiry

a. Board Conclusions and Recommendations

The Board, noting that Indian Point Unit 2 had been recognized as being more vulnerable to accidents initiated by high winds than was perceived by the Director of Nuclear Reactor Regulation (DD-80-5, *supra*), was concerned about tornadoes as accident initiators at Unit 2. After considering Staff testimony in response to Board questions, the Board concluded:

In view of the infrequent occurrence of tornado watches and tornado warnings in the Indian Point area, and in view of the large contribution of a tornado-initiated accident to the latent cancer fatality risk from Indian Point Unit 2, we believe that the risk reduction might offset the cost to the utility of taking protective action in the event of a tornado watch or warning. Therefore, we recommend that the Commission direct the Staff to investigate thoroughly whether Indian Point Unit 2 should be required to take appropriate protective action if the National Weather Service issues a tornado watch or a tornado warning for the Indian Point area. The

investigation should, in our view, distinguish tornado watches from tornado warnings.

Opinion, 18 NRC at 914-15 (footnote omitted).

Staff opposed the recommendation that it be directed to investigate whether Indian Point Unit 2 should be required to take protective action in the event of either a tornado watch or warning, arguing that: there is no evidence that such action would be cost-effective; tornado hazard is a substantially smaller risk than that of hurricanes; tornados are not a dominant contributor to core melt; and there is a very short warning time for tornados, diminishing the value of this action. Comments at 11, 12. UCS, though agreeing that there is little evidence that precautionary shutdowns are effective in reducing risk, would require them anyway if there is to be no permanent shutdown. Comments at 11, 12.

The Board's recommendation was based on consideration of Licensee and Staff testimony that the mean event probability of tornados was about 1/30 that of hurricanes, and that tornados are second to hurricanes as contributors to latent fatality risk. Staff has imposed on Licensees a requirement for anticipatory shutdown of Unit 2 in the event a hurricane approaches the New York coast. The Board recommended further study of anticipatory shutdown for tornado watches or warnings (which would be infrequent) in view of the large contribution of tornado-initiated accidents to the Unit 2 latent fatality risk, and the results of recent tornado research that contradicted the previous Staff conclusion that the sheltering provided by surrounding buildings and hillsides made Unit 2 less susceptible to high winds. Opinion, 18 NRC at 915.

b. Commission Evaluation

While the Board's recommendation is prudent in view of the dominance of externally initiated accidents in Indian Point overall risk, the Commission is not persuaded that a tornado study of the type recommended by the Board for anticipatory shutdown is needed. However, the Commission has decided to require an NRC Staff study of the wind resistance of the Unit 2 diesel generator and control buildings. In view of the concerns identified in Sandia's review and evaluation of the Indian Point Probabilistic Safety Study (NUREG/CR-2934, at p. 3-36), the Staff study should also consider the possibility of either the turbine building or the superheater building, or parts from these buildings, failing and falling on the control building, and the possibility of the superheater building failing and falling on the diesel generator building and the condensate storage tank.

5. Filtered Vented Containment System or Separate Containment Structure

a. Board Conclusions and Recommendations

Contention 2.1(a) stated that a filtered vented containment system must be supplied for Indian Point Units 2 and 3. Contention 2.1(d) stated that a separate containment system must be provided. The Board heard testimony from Licensees, Staff, and Intervenors. All parties agreed that such systems would do little to protect against rapid over-pressurization. The Board concluded:

Considering that such systems (especially the FVCS) can introduce sequences that would exacerbate an accident, that no systems of the sort are actually in operation, that no established standards exist for such systems, and that reasonably intensive study by the Staff has indicated that these are costly ways to reduce risk, we do not believe it necessary to require either filtered vented containment or a separate containment system at Indian Point, Units 2 and 3, as of this time.

Opinion, 18 NRC at 919-20 (citations omitted). The Board also noted that the Commission's Proposed Policy Statement on Severe Accidents may stimulate further evaluation of such systems, and it urged reexamination of this conclusion in the light of future developments. *Id.* at 920.

The Licensees, Staff, and Intervenors presented testimony on the safety benefits of a filtered vented containment. The UCS/NYPIRG position was that only core melt accidents are substantial contributors to public hazard and that despite efforts to reduce the probability of a core melt, that probability remains high. This led them to conclude that only an accident-mitigating feature such as a filtered vented containment system or a separate containment system could substantially reduce the risk to public health and safety.

Licensees and Staff countered that even though a filtered vented containment system might reduce the already low risk of latent cancer fatalities by as much as a factor of 5 at a cost ranging from \$12 million to \$32 million (excluding replacement power costs), installation of such a system at Indian Point was not warranted. First, there was no practical experience to rely on. No filtered vented containments are in place at any commercial nuclear power plant in the United States. Secondary containment systems have been installed in Canadian plants, but not of the type recommended by UCS/NYPIRG for Indian Point. Staff noted that the French are considering filtered vented containments for PWRs, but that they have done little work in analyzing degraded core accidents. Licensees' witness testified that at the Barseback plant in Sweden, the filtered vented containment design arose "out of a political decision rather

than an engineering one." Second, filtered vented containments are not effective for all overpressurization accidents. The NRC Staff examined their potential for three classes of overpressurization events: rapid overpressurization (e.g., hydrogen burn); moderate rate of overpressurization (e.g., from a primary system blowdown and molten core reaction); and gradual overpressurization (e.g., from core/concrete interaction or long-term decay heat). The NRC Staff concluded that, although a filtered vented containment could be designed to accommodate moderate and gradual overpressurization, it would be ineffective in preventing containment failure, in the event of rapid overpressurization. Finally, NRC Staff witnesses emphasized that a filtered vented containment could fail to function or, even when properly functioning, could cause failure of other safety features by adverse systems interaction; and Intervenor witnesses conceded this last point.

b. Commission Evaluation

The Commission agrees with the Board that the record does not demonstrate that such modifications would provide substantial additional risk reduction which is required to protect the public health and safety. We anticipate that the NRC's severe accident research program, particularly those elements pertaining to containment analysis and containment failure modes (see ch. 6 of NUREG-1080, Vol. 1, "Long Range Research Plan, FY 1985-FY 1989," September 1984) will yield the basic data required for further design studies, and a realistic evaluation of the risk reduction potential of both concepts. In addition, we expect the Staff to keep abreast of relevant research and engineering experience in other countries and to inform us of significant new developments in containment overpressurization prevention and mitigation.

6. Steam Generator Fixes and Primary Radioiodine Limit

a. Board Conclusions and Recommendations

Board Question 2.2.1 asked whether in view of the risk associated with steam generator tube ruptures, any of the requirements proposed at the July 24, 1982 meeting of the Steam Generator Owners Group should be imposed on Indian Point Units 2 and 3. The Board concluded that

the only significant differences between the proposed requirements and the present state at Indian Point are that Indian Point Unit 3 lacks a continuous loose parts

monitoring system for its steam generators, and Indian Point Unit 2 does not currently limit the iodine activity of its primary coolant as required by the proposed Standard Technical Specifications.

Opinion, 18 NRC at 928. Accordingly, the Board recommended that the Commission require: Power Authority of the State of New York (PASNY) to install a loose parts monitoring system at Indian Point Unit 3; Con Ed, for Indian Point Unit 2, to conform to the proposed Standard Technical Specification limit for primary system radioiodine. *Id.* at 929.

UCS and Staff agreed that there was no evidence of significant risk reduction either from compliance with the proposed radioiodine technical specification limit, or from installation of a loose parts monitoring system, as steam generator tube rupture (SGTR) accidents were not risk-dominant for Indian Point. UCS Comments at 11; Staff Comments at 10. The Licensees stated that they “are prepared to voluntarily implement” both steam generator tube rupture “fixes.” Comments at 32.

b. Commission Evaluation

The Commission finds that the record does not support the proposition that the specific additional steam generator tube rupture (SGTR) measures recommended by the Board are required at this time to reduce risk. The Board stated, in discussing the SGTR fixes, that “the contribution to the meltdown risk of SGTR incidents may be small” Opinion, 18 NRC at 928. The Staff would not require the steam generator fixes at this time because of the small contribution of steam generator tube rupture events to core melt risk. We note that the plant-specific findings based upon the Indian Point risk analyses are consistent with the Staff’s generic findings in the program for the resolution of steam generator Unresolved Safety Issues (USIs).

Thus, we conclude that decisions regarding the NRC imposition of the steam generator fixes recommended by the Board should await generic resolution of the steam generator USIs. The fixes recommended by the Board should not be imposed by the Commission on Indian Point at this time.

C. Commission Question 5: Indian Point Risk Compared to Other Plants

The fifth question which we posed was:

Based on the foregoing, how do the risks posed by Indian Point Units 2 and 3 compare with the range of risks posed by other nuclear power plants licensed to operate by the Commission?

CLI-81-1, *supra*, 13 NRC at 8.

Summary of Commission Conclusions on Commission Question 5

The Indian Point site, as well as a few other nuclear power plant sites in the United States, is in an area of relatively high population density. Consequently, a severe radioactivity release at that site could have more serious consequences than that same release at virtually any other NRC-licensed reactor site. Nevertheless, the Commission concludes that the risk posed by the operation of Indian Points Units 2 and 3 — which involves both the probability of a release and its potential consequences — is not greater, and may be less, than the risk to the public posed by other NRC-licensed nuclear power plants.

Even though we accept the Board's finding that no truly reliable overall risk comparison between the Indian Point plants and other similar plants can be made at this time, we do not believe Indian Point is a risk "outlier," that is, in a high-risk class all its own. This conclusion is based on design features of the Indian Point units that could lead to lower frequencies of severe leaks from the containments, and on risk-reducing modifications of structures, systems and procedures implemented by the Licensees. Further support for this conclusion is derived from the Indian Point quantitative risk estimates and, perhaps even more, from the increased assurance provided by the intensive and comprehensive probing of the safety of the Indian Point units which has taken place during recent years.

1. Board Conclusions and Recommendations

The Board drew four salient conclusions: (1) a severe release at Indian Point could have more serious consequences than that same release at virtually any other site licensed by the Commission; (2) the chance of a severe release at Indian Point is probably no greater, and may be less, than elsewhere; (3) no truly reliable overall risk comparison, be it of expected value (mean value), complementary cumulative

distribution function (CCDF), or other probabilistic standard, can be made between Indian Point and other plants in any comprehensive way; and (4) if earlier PRAs for other plants were reanalyzed with externally initiated events included, their calculated risks would be closer to the calculated Indian Point risk which already accounts for externally initiated events. Opinion, 18 NRC at 1032-33.

The Board noted that there were too few studies of nuclear power plant risks resulting from both internally initiated and externally initiated events to make meaningful comparisons with the Indian Point PRA. Because externally initiated events are the principal contributors to Indian Point risk, the Board commented that IPPSS appeared to offer a pessimistic appraisal of Indian Point's risk when compared to the results of other PRAs. Even so, the Board concluded that "these considerations . . . weigh in favor of implementation of the measures recommended herein for improving safety at Indian Point." *Id.* at 823.

From examination of CCDF curves for a number of sites, the Board also noted: "When one allows for the logarithmic scale of the ordinates, the early fatality curves show two sites lying clearly above the rest and the 'early injury' curves show two which are substantially above the others." The Board believed that these curves represented the Indian Point and Limerick sites and "was inclined to agree with Intervenor's witness that these two sites are 'outliers'." *Id.* at 1023.

In addition to the foregoing, the Board urged the Commission "to consider the potential consequences of low probability accidents at sites such as Indian Point, Zion, Limerick, and Salem, where the consequences of a severe accident would be greater than at most other sites." For Indian Point, "such accidents could . . . result in fatalities that number in the hundreds or thousands." *Id.* at 893-94. As noted in our earlier discussion of the definition of risk, the Chairman of the Board dissented from this recommendation.

2. Parties' Comments

UCS argued that the Board had no reasonable basis on which to conclude that the societal risks posed by Indian Point are probably average to above-average compared to other sites. First, UCS noted, the Board rejected the Licensees' probability estimates and concluded that there was no reliable basis for comparing risks of different plants. Second, comparing the 1980 findings of the Task Force on Interim Operation with the record developed before the Board, UCS noted — as found by both the Board and the Task Force — that the order-of-magnitude difference in consequences for Indian Point over the average site is ex-

plained by the presence of 10 times as many people around Indian Point as at the average site. The other conclusion of the Task Force — that there is a lesser risk of accidents at Indian Point than at the average plant — was contradicted by testimony of Staff witnesses Rowsome and Blond that the Indian Point units are roughly average for estimated frequency of severe releases of radioactivity. Thus, the Board's ultimate conclusion of average to above-average risk is illogical in light of these two subsidiary conclusions. Comments at 12-13.

Staff conceded that no truly reliable overall risk comparison can be made between Indian Point and other plants because the PRAs for other plants generally evaluate only internally initiated events, e.g., equipment malfunctions. Even so, Staff agreed with the Board that the chance of a severe release at Indian Point is probably no greater and may be less than elsewhere. Staff based this conclusion, in part, on comparisons of Indian Point risk estimates that include the major contributors to risk — *externally initiated* events such as hurricanes and earthquakes — with risk estimates for other plants where only *internally initiated* events — relatively minor contributors to risk — are considered. Even on the basis of this comparison, which is weighted against Indian Point, Indian Point appears to be average. Staff admitted that methodological and other differences among the PRAs limit the validity of intercomparisons but should not preclude their use in determining whether societal risk of Indian Point should be accepted. Comments at 19, 20.

The Staff criticized the Board's finding that a severe release at Indian Point could have more serious consequences than that same release at virtually any other site licensed by the Commission. Staff noted that though a release at Indian Point could cause more serious consequences than the same release at *most* sites, there are other sites in the country where the same release could have larger calculated consequences. Comments at 19. Further, Staff argued that no site studied represented a unique extreme "in the continuum of sites depicted by the family of CCDF curves." *Id.* at 20. The Staff also criticized the Board's selection of Indian Point, Zion, Limerick and Salem for special treatment, and stated that the record does not support "such singling out of these plants," as they are not risk outliers. Comments at 16-17.

Licenses also criticized the Board's recommendation for special treatment of densely populated sites. They argued that such "a new undefined safety standard" would unconstitutionally single out Indian Point and these other plants. Further, they argued, concentrating on low-probability, high-consequence scenarios would not permit a meaningful choice between competing alternatives and may result in an increase in overall risk. Comments at 30.

In contrast, the Intervenors argued that the Commission should endorse the Board's recommendation and consider the potential consequences of low-probability accidents at sites with high population densities. According to UCS, the Commission should adopt this reasoning and shut down Indian Point. Comments at 10.

3. Commission Evaluation

We formulated this question to bring together all the risk-related considerations (Commission Questions 1, 2, and 5) in order to determine whether Indian Point Units 2 or 3 were risk "outliers" that required shutdown or other remedial action. We conclude that the record does not show that either unit is a risk outlier. Therefore, neither shutdown nor imposition of additional remedial actions beyond those implemented voluntarily by the Licensees is warranted at this time.

In response to Licensees' objection to the Board's recommendation that we consider special treatment for Indian Point and other densely populated sites based upon the potential consequences of low-probability accidents at those sites, we note that the Atomic Energy Act provides ample legal authority for NRC to impose customized requirements designed to minimize risk to public health and safety (*see, e.g.*, Atomic Energy Act § 161(b), 42 U.S.C. § 2201(b)), and there is no constitutional problem with doing so. The Act does not preclude prudent risk reduction measures, provided it is rational to conclude that risk will be reduced. Consequently, the Commission could impose special requirements for plants in densely populated areas.

However, the record does not support applying our conclusions regarding Indian Point risks to Zion, Limerick and Salem. We reach this conclusion for the following reasons: (1) Licensees have modified the Indian Point plants to significantly reduce risk (Opinion, 18 NRC at 857-58); (2) the Indian Point units have eight "design features" that "could lead to lower frequencies of major releases from the Indian Point containment than from some others," with risk reduction of one or more orders of magnitude resulting from two of the eight design features — gas turbines and fan coolers (*id.* at 1027); (3) risks are plant-specific; and (4) risk assessments for these other plants were not litigated in this proceeding.

Nonetheless, we agree with the Board that a severe release at Indian Point could have more serious consequences than that same release at virtually any other site. Therefore, it is necessary to closely scrutinize the design and operation of Indian Point Units 2 and 3 in order to provide confidence that they compensate sufficiently for such consequences

in terms of public risk. In fact, we initiated this proceeding to thoroughly investigate whether or not the design and operation of the Indian Point plants assure adequate protection of the public health and safety.

The Commission believes that, at this time, the potentially severe consequences of a major accident at Indian Point have been adequately considered. We base this conclusion on the numerous Staff and Licensee analyses litigated at length during the Special Proceeding, on the design features of the plants which could make the frequency of severe releases less than at some other plants, and on the supplementary modifications implemented voluntarily by the Licensees as a result of the IPPSS. Therefore, considering both the consequences and probabilities for severe releases, the Commission concludes that continued operation of Indian Point Units 2 and 3 poses no undue or disproportionate risk to the public health and safety. The risk comparisons, even considering our reservations regarding their reliability, tend to support this conclusion.

Further, the Commission has decided that the additional backfits recommended by the Board for Indian Point Units 2 and 3 are not warranted at this time. The record does not support a finding that these measures would provide substantial risk reductions which are required to protect the public health and safety. We will continue to test the validity of this conclusion within the normal regulatory process by considering safety issues for Indian Point consistent with the treatment of these issues for any other power reactor licensed by the Commission.

In reaching this Decision, the Commission recognizes that the quantitative comparisons of risk are not sufficiently reliable to serve as the sole basis for the Decision. As we have indicated above, the quantitative risk estimates have been used as only one of the factors considered in reaching our conclusions.

III. INDIAN POINT EMERGENCY PLANNING

A. Commission Question 3: Status of Emergency Planning at Indian Point

The third question posed by the Commission was:

What is the current status and degree of conformance with NRC/FEMA guidelines of state and local emergency planning within a 10-mile radius of the site and, to the extent that it is relevant to risks posed by the two plants, beyond a 10-mile radius?

We are generally satisfied with the Board's Opinion in this area. As of the close of the record, the Board found that emergency planning at

Indian Point was inadequate in that the present plans did not meet several of the sixteen mandatory standards of 10 C.F.R. § 50.47(b), and were not in conformance with NRC/FEMA guidelines. 18 NRC at 954. The Board's findings on these standards for Licensees and for all counties except Rockland are summarized in Table 2 on the next page. We direct the Staff to report to us within 60 days on whether these deficiencies, and those detailed in our discussion below, have been corrected.

Regarding Rockland County, the Board concluded that planning and preparedness were generally deficient and that the (then-) draft Rockland plan that the State had adopted as a compensating measure had "substantial" omissions, including provisions for evacuating schoolchildren, for adequate training, and for implementation of public education requirements. The Board made clear that it had reached no conclusion as to the adequacy of the "new State Compensatory Plan," which was used during the August 1983 exercise; nor was the Board aware of planning progress in Rockland in the 5-month period between the close of the record and the issuance of its Opinion. *Id.* at 930-31, 954. The Commission directs the NRC Staff to confer with FEMA to determine whether the deficiencies have been corrected, and to report back within 60 days.

As noted above, we are generally in agreement with the Board's Opinion. Hence, in the following sections, we address only those Board conclusions which, in our view, merit special attention. Both the Intervenor and the Licensees submitted extensive comments challenging many of the Board's rulings and findings. In light of our disposition of this proceeding, we do not address the Licensees' comments; however, this should not be perceived as agreement with Licensees' opposition to the Board's rulings.

1. The Burden of Persuasion

a. Parties' Comments

The Commission instructed the Board that "[n]o party will have the 'burden of persuasion'." CLI-81-23, *supra*, 14 NRC at 611. NYPIRG, joined by the other Intervenor, argued that this instruction allowed the Board both to avoid deciding difficult issues and to allow continuation of the status quo. Comments on ASLB Recommendations to the Commission (hereinafter cited as NYPIRG Comments) at 3. The Board found the record inconclusive on the adequacy of: letters of agreement with reception and congregate care centers (Opinion, 18 NRC at 935); public notification (*id.* at 939); emergency communications (*id.* at 941-42); and protective response (*id.* at 947). In these instances, NYPIRG asserts,

TABLE 2

**BOARD FINDINGS ON ADEQUACY OF EMERGENCY
PLANNING (EXCLUDING ROCKLAND COUNTY)***

50.47(b)(1) NUREG-0654, Evaluation Criterion A	● no significant deficiencies
50.47(b)(2) Evaluation Criterion B	● no significant deficiencies
50.47(b)(3) Evaluation Criterion C	● record inconclusive as to existence of letters of agreement with reception and congregate care facilities
50.47(b)(4) Evaluation Criterion D	● no significant deficiencies
50.47(b)(5) Evaluation Criterion E	● no significant deficiencies, but record inconclusive with respect to the existence of or need for route alerting or other procedures in the event the siren system fails
50.47(b)(6) Evaluation Criterion F	● record inconclusive as to adequacy of capability to communicate with emergency workers
50.47(b)(7) Evaluation Criterion G	● Public information brochures and posters were not distributed in Westchester
50.47(b)(8) Evaluation Criterion H	● no significant deficiencies
50.47(b)(9) Evaluation Criterion I	● no significant deficiencies
50.47(b)(10) Evaluation Criterion J	● insufficient attention was given to protective actions during a severe winter storm ● plans for protection of schoolchildren were not finalized [The Board found the plans in "an unacceptable state of flux." 18 NRC at 946.]

TABLE 2 (Continued)

50.47(b)(10)	<ul style="list-style-type: none">● in Westchester (as in Rockland) insufficient attention was given to the identification of the non-institutionalized, mobility-impaired populace and assessment of their needs● no letters of agreement for Westchester County bus drivers● record inconclusive with respect to protective response planning in the ingestion pathway EPZ
50.47(b)(11) Evaluation Criterion K	<ul style="list-style-type: none">● no significant deficiencies, but record inconclusive as to adequacy of provisions for disposal of contaminated wastewater
50.47(b)(12) Evaluation Criterion L	<ul style="list-style-type: none">● no significant deficiencies
50.47(b)(13) Evaluation Criterion M	<ul style="list-style-type: none">● no significant deficiencies
50.47(b)(14) Evaluation Criterion N	<ul style="list-style-type: none">● no significant deficiencies
50.47(b)(15) Evaluation Criterion O	<ul style="list-style-type: none">● training of emergency workers was deficient — record inconclusive as to extent of this deficiency● training manual was deficient
50.47(b)(16) Evaluation Criterion P	<ul style="list-style-type: none">● no significant deficiencies

the Board was faced with insurmountable or unrebutted evidence unfavorable to the Licensees. The Board merely labeled the evidence “inconclusive” to justify continued operation.

b. Commission Evaluation of Comments

We agree with Intervenors that the Board’s findings of inconclusiveness are weak in some cases. We believe that in trying conscientiously to apply the Commission instruction that “[n]o party will have the ‘burden of persuasion,’ ” the Board may have overextended the instruction.

For example, the existence of letters of agreement for reception and congregate care facilities and route-alerting procedures are issues of fact for which there is no affirmative evidence in the record. Nonetheless, the Board found "only minimal support" for Intervenors' assertion that they were lacking. 18 NRC at 934. Although the Licensees' only evidence on this issue showed that they had done substantial planning for congregate care and reception centers in conjunction with the American Red Cross (Direct Testimony of Parsons, Brinckerhoff, Quade and Douglas, Tr. 11,773 at 11), their evidence did not clearly demonstrate the status of the planning. Further, though various schools were designated as reception centers or congregate care facilities and were notified of their designation, not all accepted the designations, and letters of agreement are missing for most of them. Tr. 11,919-23.

In requiring the Intervenors to establish that there are no letters, the Board placed too heavy a burden on them. Since FEMA found a deficiency in December 1982 based on the absence of these letters (Tr. 14,720; FEMA 1982 Update Report at 13) and the Board cited no evidence to cast doubt on the FEMA finding, we believe that the only reasonable conclusion based on the hearing record is that no such letters existed for most facilities. The results of FEMA's post-hearing review of county plans show similar omissions. FEMA found no letters of agreement with reception centers in Westchester, Putnam, and Orange Counties, and a single letter of agreement with a congregate care center in Westchester and Putnam. FEMA asked the State to incorporate or reference the agreements in the State plan. The State replied that the plan included only letters for congregate care centers. The lack of letters apparently remained a deficiency as of the time of FEMA's comments.

The Board also found the issue of public notification capability unresolved, citing FEMA's recommendation following the 1982 exercise that route alerting or other procedures be developed in the event of failure of the siren system. The Board apparently relied on the Staff's unsupported assertion that "a back-up route alerting system is provided in the emergency plans for each county." See Opinion, 18 NRC at 939. In our view, this capability should have been judged deficient rather than "unresolved." Finally, the Board was unable to conclude on the basis of the record whether the emergency communications capability with support personnel and facilities was adequate.

The Staff should confer with FEMA and report to us within 60 days on the status of compliance with these requirements.

2. Reopening the Record

a. Intervenors' Comment

NYPIRG argued that Intervenors offered additional evidence to overcome the Board's reluctance to make conclusions based on inconclusive evidence, but these offers were rejected. NYPIRG Comments at 4. For example, the Board rejected the Intervenors' request to conduct cross-examination concerning Argonne National Laboratory's verification analysis for FEMA of Indian Point emergency planning. Licensees argued in rebuttal that the Argonne analysis was irrelevant, as it addressed details of outmoded plans. Comments at 48.

b. Commission Evaluation

We conclude that the Board properly ruled on the Argonne analysis. Intervenors attempted to cross-examine FEMA witnesses using the Argonne analysis, and though the Board allowed them the opportunity to lay a proper foundation for its use, they were unable to do so.¹³ Thus, the Board was justified under the Federal Rules of Evidence in rejecting the attempted cross-examination. We are not aware of any attempt by Intervenors to properly introduce the analysis into evidence, e.g., as part of their direct case, with the authors of the analysis testifying at the hearing.

Although for purposes of a decision based on the adjudicatory record the Commission is not required to consider the Argonne analysis, the NRC Staff, if appropriate, may consider the analysis in the context of its informal enforcement process.

3. Public Education and Information

The Board concluded, based on FEMA's appraisal and its own review of the public information brochures, that the brochures were adequate. However, the Board could not find that the distribution of the brochures was adequate because the revised brochure and posters had not yet been distributed in Westchester or Rockland as of the close of the record. Opinion, 18 NRC at 943, 954.

Lt. Governor DelBello argued that there continued to be a need for more public information and participation in emergency planning and

¹³ See Tr. 15,042-53. The Board ruled that the Argonne Analysis was beyond the scope of the witness' direct testimony, they were not its authors, and they had not relied on it in coming to any conclusions related to their direct testimony. *Id.*

drills, and that there might be a need for NRC pressure to compel the State to provide adequate funding for offsite emergency planning.¹⁴ He also argued that there could be no effective emergency response without trust on the part of the public toward utility and public officials. Comments at 6. NYPIRG *et al.* criticized the Board's conclusion that "annual dissemination of the brochure is a reasonable way to make information available and should *eventually* lead to public awareness of emergency responses." (Emphasis added by NYPIRG.) They suggested that the response to notification of emergency measures be tested to determine whether people were sufficiently informed about emergency planning. NYPIRG Comments at 17.

The Commission believes the record suggests that the use of public information measures other than brochures may be desirable, and directs the Staff to confer with FEMA and report to us within 60 days on this matter.

B. Commission Question 4: Improvements in Emergency Planning

The fourth question posed by the Commission was:

What improvements in the level of emergency planning can be expected in the near future, and on what time schedule, and are there other specific offsite emergency procedures that are feasible and should be taken to protect the public?

During the evidentiary hearing, FEMA communicated its assessment of improvements in emergency planning directly to the Commission. Consequently, the Board decided not to assess the ongoing improvements in the level of emergency planning for Rockland County. Opin-

¹⁴ Lt. Governor DeBello submitted the following statement in this regard:

Chapter 708 of the laws of 1981 was enacted over the resistance of the utility companies in New York as legislation to create a \$1.5 million nuclear emergency planning and preparedness fund at the state level. It is also fair to say without pressure from the NRC, the Chapter 708 program would probably never have been enacted

Governor Cuomo recommended in his 1984 State of the State Address that these 708 Program fees be doubled this year via legislative action.

Another approach worth considering is to simply deregulate the 708 program. The fixed funding amount per reactor per year could be deleted in favor of bilateral negotiations between utilities and the state and local governments, to determine the exact amounts needed to bring emergency plans up to standard. All parties could then verify the budget requirements needed before funding is awarded. Each utility would pay only site-specific costs, plus a share for state coordination. In that way, funding would be truly fair and adequate, and the costs for emergency planning would be internalized within the nuclear industry on a site-specific basis. *Pressure from the NRC may again be necessary to obtain this necessary amendment.*

Comments at 9 (emphasis added).

ion, 18 NRC at 931. However, the Board did make findings and recommendations concerning several areas of future planning and preparedness, including the potential need for a State compensatory emergency plan for Rockland County (*id.* at 930), the coordination of evacuation planning for the plume exposure pathway Emergency Planning Zone (EPZ) with areas outside the EPZ (*id.* at 1003-05), and the lack of any need for predistribution of potassium iodide to the public (*id.* at 1008). We agree with these Board conclusions.

Two recommendations of the Board require further action. First, the Board found that a case had not been made for a shutdown of power operations in the event that adverse weather conditions degraded the road network. The Board suggested that the Commission consider whether the emergency plans needed modification to provide for alerting the public at the *site* emergency level instead of the customary *general* emergency level, when adverse weather conditions were likely to degrade the evacuation routes. *Id.* at 1010-12. We direct our Staff to confer with FEMA on the advisability of such a modification and to report to us its recommendations within 60 days.

Second, the Board recommended that, although there is no specific requirement for special measures to be undertaken to inform handicapped persons or those who are non-English speakers, additional assistance should be provided for communicating with handicapped persons in a densely populated area such as Indian Point, and that FEMA should review the need for better communication with the non-English-speaking population. The Board also recommended publication of brochures and posters in Spanish, if warranted. *Id.* at 1017. Licensees criticized the last Board conclusion, arguing that there were few "unsupported non-English speakers in the EPZ" and no single foreign language was predominant. Comments at 48. This comment, if correct, leads us to doubt that such measures are warranted, and the Staff should confer with FEMA to determine its validity. Concerning the Board's recommendation for additional measures to inform the handicapped, the Staff should confer with FEMA and provide its recommendations to us on this and on the preceding issue within 60 days.

C. Commission Evaluation of the Board's Conclusions on Questions 3 and 4

In response to Commission questions pertaining to the then-current status and degree of conformance of emergency planning and preparedness at Indian Point with NRC/FEMA guidelines, the Board identified

several deficiencies as well as "substantial omissions" in the draft Rockland County emergency response plan. Additionally, as noted above, the Board identified numerous inconclusive items and made suggestions with regard to further investigation by NRC and FEMA. While we note that many of the Board's findings have been overtaken by subsequent events, we believe the findings are generally reasonable, given the qualifications discussed above and the evidence introduced into the hearing by the parties at the time. Hence the Commission directs the Staff to report within 60 days as to whether all of the deficiencies identified by the Board in response to Questions 3 and 4 have been corrected.

Having said this, we are now faced with the decision whether or not to take enforcement action based on a record which is almost 2 years old. Considering the record as a whole, we have decided against taking enforcement action at this time. We believe that the Board's findings on emergency preparedness, generally speaking, support our decision insofar as the findings were based on the Board's subsidiary conclusions concerning absolute and comparative risk, on the financial and power supply costs of shutdown, and on the changes occurring in the preparedness situation. It is clear from the record and from the Board's Opinion that the emergency planning deficiencies had a relatively small effect on risk, and the Commission has repeatedly emphasized that risk is the heart of the proceeding. See CLI-81-1, *supra*, 13 NRC at 6. Indeed the Commission's questions at the outset of the proceeding indicate that the Commission was concerned with emergency planning problems at Indian Point. Addressing that concern, however, was not to be the end of the inquiry concerning the need for enforcement action. A decision on enforcement action was to be based primarily on the answers to the Commission's questions on risk.

Further, we note that, while concluding that there were deficiencies and inconclusive items in emergency planning and preparedness, the Board recognized that the dynamism of the preparedness situation made the hearing record obsolete. The Board observed, for example, that the Commission's October 4, 1983 "Notice to the Parties" noted the correction of two major emergency planning deficiencies, i.e., the availability of buses in Westchester County and the adequacy of the State compensatory plan for Rockland County. Opinion, 18 NRC at 844. However, the information on which the "Notice" was based is not in the hearing record.

Although our decision not to take enforcement action is based primarily on the responses to the risk questions, we have also decided that it would be unwise to initiate enforcement action on such a stale record,

especially when responsibility for many of the deficiencies cannot be attributed to the Licensees. We note that the mandate for the special proceeding allows the Commission to base its decision on both the Licensing Board record and other relevant information. See CLI-81-1, 13 NRC 1 (1981); CLI-81-23, 14 NRC 610 (1981). Thus, we recognize that a full-scale, integrated exercise of New York State and the four counties took place on November 28, 1984, to test emergency planning and preparedness in the 10-mile EPZ surrounding Indian Point. Although the initial indications showed continuing improvement, we were informed by FEMA on February 26, 1985, that their review of the November exercise revealed two Category A deficiencies, and that a remedial exercise is scheduled for April 10, 1985. We believe the remedial exercise is the appropriate action for the present. Should FEMA's final evaluation of the November exercise and the remedial exercise indicate continuing deficiencies in Indian Point emergency planning, we will revisit this issue at that time outside this proceeding.

IV. INDIAN POINT SHUTDOWN

A. Commission Question 6: Consequences of Indian Point Shutdown

The sixth question which we posed was:

What would be the energy, environmental, economic or other consequences of a shutdown of Indian Point Unit 2 and/or Unit 3?

CLI-81-1, *supra*, 13 NRC at 8.

Summary of Commission Conclusions on Commission Question 6

The Commission agrees with the Board's finding that in the near term, the effect of shutdown on energy reliability is not likely to be significant. However, the monetary costs of shutdown of either or both of the Indian Point units would be substantial. Shutdown would have no significant environmental impact, nor would it create a significant physical benefit to the population in the vicinity of the Indian Point site which would outweigh the costs of shutdown.

1. Board Conclusions and Recommendations

The Board found that a shutdown of Indian Point's nuclear-powered facilities would not jeopardize New York State's energy requirements or

its reserve margins, provided the State has a low economic growth rate and also has implemented its planned 25-year generation and transmission program. Opinion, 18 NRC at 1053, 1078. However, a shutdown would necessitate the payment by electric ratepayers of a significant economic penalty which totals \$4-6 billion in present-day costs. Over the next 6 years, this penalty would cause an estimated rate increase to the customers of Consolidated Edison of approximately 2% annually, and for the New York Power Authority's customers, approximately 13% annually. *Id.* at 1060. Although the Board was unable to accurately quantify indirect economic consequences of a shutdown, i.e., business and employment losses, government service reductions or tax rate increases, it concluded that the tax loss impact on governmental entities surrounding the Indian Point site would be substantial and highly significant to residents in the area. The Board also concluded that closing the facilities would produce no major environmental impact. *Id.* at 1061-62, 1067, 1078.

In addition, the Board found that the economic penalty which would result from closing Indian Point could not be mitigated by purchasing power from the Orange and Rockland Utility, Inc., or by substituting a mass program of more energy-efficient household appliances and small internal combustion power co-generators. *Id.* at 1063, 1077.

2. Parties' Comments

Though the Board estimated that shutdown would cause average annual rate increases with a substantial direct cost penalty and would be likely to cause further, substantial indirect costs such as losses of employment and tax revenue, the New York City Councilmembers argued that they were acceptable. NYPIRG *et al.* argued that the Board's conclusion was unwarranted in light of the fact that over half of Con Ed's customers live in New York City and their representatives concluded that those costs were preferable to continued operation. Comments at 8.

3. Commission Evaluation

The purpose of Commission Question 6 was to obtain information that would have been useful to the Commission in making a decision in the event that risks had been judged to be marginally acceptable. In such

a case, the information could have been useful in considering the desirability of mitigative strategies. However, the Commission agrees with the Board's finding that the costs of Indian Point Units 2 and 3 shutdown would be substantial.

The Board did not appear either to accept or reject the judgment of the New York City Councilmembers that the projected cost increases are acceptable, and there appears to be no basis in the record for either course. First, even if a majority of New York City residents may favor shutdown, the record does not show whether that majority constitutes more than a large *minority* of Con Ed's customers. Second, although over half of Con Ed's customers may live in New York City, the record says nothing about those whose rates would be more substantially affected among PASNY's customers: State agencies, municipal systems, and rural electric cooperatives. Indeed, the Board concluded that Indian Point shutdown would raise rates throughout the State, not just in New York City. Opinion, 18 NRC at 1060.

With respect to power supply reliability, the Board observed that although electric utility reserves would be adequate despite Indian Point shutdown as long as the State's energy plan is implemented — bringing on-line within 15 years over 5000 megawatts (MW) of new generation, and a 1000-MW pumped-storage hydro project — 2350 MW of capacity has been cancelled or indefinitely postponed. *Id.* at 1052-53. Also, reserve margins would be affected by actual growth, and the accuracy of even the best growth projections is questionable. Consequently, the Board concluded that although it is reasonable to assume that replacement energy could be provided if the Indian Point units were closed, that "assumption is subject to serious questions of uncertainty in areas of growth forecasting and the full implementation of New York State's Energy Master Plan." *Id.*

In effect, then, the Board found the record inconclusive as to the long-term effects of shutdown on reliability, but justifying continued operation for the short term. The Board found that the monetary and other costs of shutdown would be "substantial."

We do not argue with the Board's estimates of the monetary costs of shutdown, nor with the Board's concerns that, for the long term, depending on growth rates and implementation of the New York State Energy Plan, long-term shutdown *could* detract from power supply reliability.

B. Commission Question 7: New York Governor's Views

Does the Governor of the State of New York wish to express an official position with regard to the long-term operation of the units?

Board Conclusions and Recommendations

The Board, by letter dated April 23, 1982, invited former Governor Carey to express his position. By letter dated May 2, 1983, the Board invited the views of present Governor Cuomo. Neither, however, replied.

V. CONCLUSION

We conclude that neither shutdown of Indian Point Unit 2 or Unit 3, nor imposition of additional remedial actions beyond those already implemented by the Licensees, is warranted at this time. Our conclusion is based primarily on engineering judgment of plant safety, as demonstrated by thorough probing of the Indian Point units and by evaluation of the risk reduction effectiveness of plant safety systems. A secondary consideration is the fact that the quantitative risk assessments adopted by the Board indicate that the level of risk to the public health and safety is acceptably low.

We are not persuaded that the additional potential risk-reducing measures recommended by the Board should be imposed on the Licensees at this time. We are, however, directing our Staff to investigate the vulnerability of certain Unit 2 buildings to high winds and to keep abreast of relevant research and experience with filtered vented containments in order to assess their potential value as consequence-mitigating means for application to the Indian Point units.

We find that even though at this time there can be no truly reliable quantitative comparison of the risk imposed on the public by the Indian Point units and the risk imposed by other similar nuclear power plants, operation of Indian Point Units 2 and 3 does not impose a risk to the public significantly greater than that imposed by other NRC-licensed plants. We do not believe that Indian Point is a risk "outlier," i.e., in a higher risk class all its own.

Emergency planning at Indian Point was inadequate at the time of the conclusion of the hearings in this proceeding. However, we recognize that the situation has improved since that time, and direct our Staff to confer with FEMA, and report to us within 60 days of the issuance of this Decision on the current status of emergency planning at Indian

Point and on whether the deficiencies identified by the Board and by the Commission in this proceeding have been corrected. This Staff report, however, will be outside the context of this special proceeding, as with this Decision we terminate the proceeding.

Commissioner Asselstine dissents from this Decision. His dissenting opinion and the additional views of Chairman Palladino and Commissioners Roberts, Bernthal, and Zech are attached.

It is so ORDERED.

For the Commission

John C. Hoyle
Assistant Secretary of the
Commission

Dated at Washington, D.C.,
this 7th day of May 1985.

DISSENTING OPINION OF COMMISSIONER ASSELSTINE

I could not disagree more with the Commission's decision today in the Indian Point Special Proceeding. The severe accident risks dominate the risk to the public health and safety associated with the operation of the Indian Point plants. By its actions today, the Commission has decided to do nothing further to improve the ability of the Indian Point plants either to prevent the occurrence of a severe accident which has the potential to harm members of the public surrounding the plants or to minimize the public health and safety consequences of such an accident at the Indian Point site.

With the exception of the few measures which the Indian Point Licensees have agreed to continue on a voluntary basis, the Commission has now abandoned the interim measures adopted by the NRC at the outset of this proceeding to improve the level of safety of these plants. The Commission has rejected virtually every initiative proposed by the NRC Staff and adopted by the Indian Point Board in this proceeding for improving public protection, and the Commission has effectively ended further efforts to explore any additional accident prevention and mitigation measures for the Indian Point plants. Finally, the Commission has

chosen to defer action to address the continuing significant deficiencies in emergency preparedness at the Indian Point site.

Although I would not order the immediate shutdown of the Indian Point plants, I do not believe that the level of protection against serious accidents now afforded by the plants has been demonstrated to be adequate for the remaining operating lives of Indian Point Units 2 and 3. I would therefore continue in effect all of the interim safety improvements required by the NRC Staff at the outset of this proceeding. I would require the additional safety initiatives recommended by the NRC Staff and the Indian Point Board, including: (1) measures to reduce the vulnerability of the plants to steam generator tube rupture accidents and to damage from tornado risk; and (2) the Safety Assurance program. I would also require continued efforts to explore in greater detail further alternatives for safety improvements in the plants, including the possible installation of an additional decay heat removal system, a filtered vented containment or a separate containment system, all of which have the potential to improve either the plants' ability to prevent severe accidents or to mitigate their consequences. Finally, I would initiate enforcement action to ensure that the continuing significant deficiencies in emergency preparedness for the Indian Point site are corrected within the near future. If those deficiencies are not corrected promptly, I would take appropriate enforcement action until the deficiencies *are* corrected, as our regulations require.

When a previous Commission began this proceeding nearly 5 years ago, it took the unprecedented step of initiating the first reexamination of the safety of an operating nuclear power plant. In its May 30, 1980 order initiating this proceeding, and in subsequent orders defining the scope of the proceeding, the Commission promised a thorough reappraisal of the risks to the public posed by the two operating Indian Point units, of the adequacy of emergency preparedness at the Indian Point site, and of the need for safety improvements in, or shutdown of, the plants.

This reappraisal was to consist not only of a technical safety assessment by the Nuclear Regulatory Commission Staff, but also of a formal adjudicatory hearing before an independent Atomic Safety and Licensing Board. This hearing was intended to assure a full public airing of the relevant safety issues regarding the risk posed by the Indian Point plants. Members of the public were to be given the opportunity to present their evidence on these issues and to test through cross-examination the opinions, judgments and analyses of the Licensees and the NRC Staff. The Commission was then to reach its judgment on the need for shutdown

of, or safety improvements in, the Indian Point units based upon this hearing record.

All of these steps were taken by the Commission with the realization, in the aftermath of the Three Mile Island accident, that a serious accident at a nuclear power plant which has the potential to harm the health and property of the public surrounding the plant can in fact occur. This realization, and the Commission's willingness to undertake a public airing of the risk of such accidents at the plant with the largest number of people in its vicinity, indicated a possible change in the Commission's approach to safety. It seemed that the Commission was at last willing to forsake the complacent attitude toward safety that had contributed so much to the Three Mile Island accident. It seemed that the Commission was prepared to probe the adequacy of measures both to prevent serious accidents from occurring and to mitigate the consequences of such accidents should they occur.

This change in the Commission's attitude toward safety was well justified and long overdue, and the dangers associated with the past attitude of complacency were clear. As the President's Commission on the Accident at Three Mile Island put it:

After many years of operation of nuclear power plants, with no evidence that any member of the general public has been hurt, the belief that nuclear power plants are sufficiently safe grew into a conviction. One must recognize this to understand why many key steps that could have prevented the accident at Three Mile Island were not taken. The [President's] Commission is convinced that this attitude must be changed to one that says nuclear power is by its very nature potentially dangerous, and, therefore, one must continually question whether the safeguards already in place are sufficient to prevent major accidents. A comprehensive system is required in which equipment and human beings are treated with equal importance.¹

The first sign that the Commission's enthusiasm for this inquiry, as well as its new questioning attitude toward safety, was waning came shortly after the commencement of the adjudicatory hearings. On July 27, 1982, the Commission issued an order which redefined the ground rules for the proceeding, restricted the public's opportunity to obtain a hearing on new proposed safety measures for the plant, and erected new barriers to the public's ability to present evidence in the hearing on the risks posed by the Indian Point units. The Commission's July 27 order led to the

¹ Report of the President's Commission on the Accident at Three Mile Island at 9.

resignation from the NRC of the Chairman of the Indian Point Board and resulted in a delay of several months in resumption of the hearings.²

The Commission's decision today represents the final step in the Commission's return to the attitude of complacency towards safety which prevailed prior to the Three Mile Island accident and which was a significant contributor to that accident. This proceeding has demonstrated that the risks to the public from severe accidents at Indian Point are substantially higher than believed at the time the Commission instituted the proceeding. In the face of this knowledge, the Commission chooses to reject even the modest safety improvements recommended by the NRC Staff and the Indian Point Board, and to end any meaningful effort to explore more ambitious safety initiatives for the plants. Thus, the Commission has elected to ignore the warnings of the President's Commission on the Three Mile Island Accident. This return to complacency is most unfortunate in the case of the Indian Point plants and the other operating reactors located in densely populated areas of the country.

It is worth noting that the Indian Point site was first selected as an acceptable location for nuclear reactors based upon what turned out to be an erroneous judgment that containments would maintain their integrity given a core meltdown.³ The Commission in its decision, as did the Atomic Energy Commission in the mid-1960's, refuses forthrightly to face up to that misjudgment and rejects the adoption or further exploration of measures that could reduce the risk to the level that was perceived to be acceptable when the site was first selected.

The Risk Question at Indian Point

Although many aspects of the debate concerning the risk to the public posed by the Indian Point plants are quite technical, the central risk question, and the basis for my fundamental differences with the Commission majority, can be stated simply. The record of this proceeding establishes that a serious nuclear accident at the Indian Point site could result in thousands of near-term fatalities and thousands of later fatalities due to cancers caused by the exposure to radiation. Under certain weather conditions, delayed fatalities due to cancers caused by the accident appear to be possible as far away from the plant as almost anywhere in

² I opposed the Commission's July 27, 1982 order; as did Commissioner Gilinsky. My views opposing the Commission's order are published with that order. *Consolidated Edison Co. of New York* (Indian Point, Unit 2), CLI-82-15, 16 NRC 27, 39 (1982).

³ David Okrent, *Nuclear Reactor Safety: On the History of the Regulatory Process* (The University of Wisconsin Press, 1981). See, e.g., pp. 46, 103-35, and 163-78.

New York City. A significant contributor to the potential for this catastrophic number of early and late fatalities in the case of the Indian Point plants is the size of the population living in the vicinity of the plants. The Indian Point site has the largest population density of any nuclear power plant site in the country at distances of 10, 30, and 50 miles from the plant.⁴

Admittedly, the likelihood of a serious nuclear accident at the Indian Point plants resulting in thousands of near-term and later fatalities is low. Several elements are needed for such an accident to occur. First, there must be a severe accident at the plant which leads to melting of the reactor fuel. Second, there must be a failure in the containment structure which surrounds the reactor vessel. Such a failure could occur because of some equipment breakdown or human error which violates the integrity of the containment, or because the sequence of events during the accident leads to a radiation release which in some way bypasses the plant's containment system. Equipment failures and human errors leading to the loss of containment integrity occur from time to time at nuclear power plants, the most recent one occurring at the San Onofre Unit 1 plant on February 13, 1985. Accident sequences which can lead to bypass of the containment system have been identified for the Indian Point plants as well as for other plants. Third, weather conditions must permit the transportation of the radioactive releases from the plant to areas of population concentration. Weather conditions, such as severe winter storms, can also increase the consequences of a severe accident by preventing early evacuation of the surrounding population in some accident situations. The low likelihood of an accident resulting in large numbers of fatalities is based in large measure on predictions that an accident leading to a core meltdown is itself an event of low probability and/or the assumption that the simultaneous occurrence of a core melt accident, the loss of containment integrity and adverse weather conditions is unlikely.

Although it is relatively easy to predict the consequences of a severe accident at the Indian Point site given various assumptions concerning the type of accident, containment performance and weather conditions, it is far more difficult to predict with any degree of accuracy the probabilities of these events occurring. Indeed, the Indian Point Board expressly recognized the large uncertainties involved in efforts to predict the likelihood of core melt accidents, containment performance and weather conditions. Opinion, 18 NRC at 872, 878-81.

⁴ *Consolidated Edison Co. of New York* (Indian Point, Unit No. 2), LBP-83-68, 18 NRC 811, 893-95, 900-02 (1983).

At the same time, it is clear that the potential costs to society from dangerous, low-probability accidents increase dramatically at the high-population-density sites such as Indian Point. *Id.* at 893-94. The central question before the Commission in this proceeding is how to make decisions on whether to require additional safety measures at the Indian Point plants, and at other high-population-density sites, given the existing large uncertainties in accident probability estimates and the potentially greater costs to society from accidents at such sites. The uncertainties are so large that an objective observer could conclude that a severe accident at the Indian Point plants leading to catastrophic consequences is credible, or conversely to conclude it is incredible, depending upon how one views the uncertainties.

The Treatment of Uncertainties

The Indian Point Board factored the uncertainties in risk assessment into its decision in two ways. First, it reviewed and evaluated the Staff's uncertainty estimates for the accident risk assessments performed for the Indian Point plants. Although the Board adopted the Staff's high estimate of risk to account for uncertainty, the Board recognized that the Staff's estimate was an intuitive judgment on the part of one NRC Staff reviewer and noted that there was no basis for believing that reviewer's intuition was any better or worse than that of other witnesses. *Id.* at 891. It also appears that the Board may have relied upon new source term information, which has yet to be validated based on accepted scientific principles, in deciding not to increase the Staff's upper risk limit by a substantial additional factor.⁵ *Id.*

The Board also considered uncertainties in a second way. Both the Board and the Commission's Task Force on Interim Operation of Indian Point recommended that where the consequences of a severe accident appear to be high, as is clearly the case with the Indian Point plants, the Commission consider measures to reduce the severe accident risks. Put simply, the Board recommended that the Commission consider pursuing additional safety measures at the Indian Point site in recognition of the fact that such an accident could result in much more serious consequences than at sites with lower population density. *Id.* at 893-94.

It is of fundamental importance in this proceeding, as well as in other Commission regulatory activities, that the Commission factor into its

⁵ To the extent that it relies on new source term information, the uncertainty estimate adopted by the Indian Point Board may be too low. I suspect that an uncertainty estimate of a factor of 100 or more is just as likely to be correct as the factor of 40 adopted by the Board.

decisionmaking the uncertainties in risk assessment. Our Advisory Committee on Reactor Safeguards recently advised just that: "There are deep problems involved in the regulatory use of risk assessment for decisionmaking in the face of uncertainty. We recommend that the Commission adopt a position on this point and make it clear to the NRC Staff."⁶ The Commission has adopted a position on uncertainties in this decision. Unfortunately, in deciding not to consider the potential costs to society of dangerous, low-probability accidents, and in deciding to reject those safety improvements for the Indian Point plants recommended by the NRC Staff and the Indian Point Board, the Commission has, in effect, chosen to ignore the large uncertainties inherent in risk assessment in general and in the specific risk assessments considered in this proceeding. More than anything else, this aspect of the Commission's decision reflects a return to the unquestioning complacency on accident risks of the pre-TMI period.

I strongly support the Board's recommendation that the Commission give serious consideration to the potential costs to society of dangerous, low-probability accidents at Indian Point. Given the uncertainties involved in risk assessment and the serious potential consequences of an accident at Indian Point, I believe it is both prudent and necessary to consider additional improvements which could reduce both the likelihood and consequences of such an accident.

Safety Improvements

The Indian Point Board considered a number of measures designed to reduce the likelihood and consequences of an accident at the Indian Point plants. These included: the measures required in the February 11, 1980 order by the Director of the Office of Nuclear Reactor Regulation; additional mitigative design features; the Safety Assurance program; measures to reduce tornado risk; a filtered vented containment system and separate containment structure; and additional steam generator requirements. I agree with the Indian Point Board on the need for, and benefits of, those safety measures which were recommended by the Board. In addition, I agree with the Board's judgment that further consideration should be given to a filtered vented containment system and separate containment structure.

I find the Commission's decision to reject all of the safety improvements recommended by the Board, save those few which the Licensees

⁶ Letter from ACRS to the Commission dated March 12, 1985, "ACRS Comments on the Proposed Rule on Backfitting."

have agreed to continue voluntarily, to be unsupportable. The Commission's decision is particularly ill-advised in the case of the proposed Safety Assurance program and the filtered vented containment. The proposed Safety Assurance program, which was recommended by both the NRC Staff and the Indian Point Board, contained a number of elements intended to address the potential for human error and equipment failures which can contribute to severe accident risk. The objectives of this program were to bring about improvements in key areas of human performance and equipment reliability, to improve and refine our understanding of accident risk estimates for the Indian Point plants and to reduce where possible areas of existing uncertainty in current risk assessments. A significant potential benefit from this proposed program was to be that the results of the program could be factored into the detailed risk assessments performed for the Indian Point plants. These risk assessments could then be more than just filed away and used as a justification for some bottom-line judgment on the accident risks at the Indian Point plants. Rather, they could become continuing and useful tools for identifying and addressing potential areas of safety weakness in the plants. As a result of the Commission's decision, these benefits will now be lost.

I also agree with the Board's conclusion that a filtered vented containment or a separate containment system should not be required at Indian Point Units 2 and 3 at this time. However, I am concerned that, contrary to the Board's assumption that "the Staff (and the Commission) will reexamine our conclusion" (18 NRC at 920), specific evaluation of such systems at Indian Point will now be delayed indefinitely. The arguments against the use of a filtered vented containment presented by the Staff and Licensees in this proceeding were generic and addressed concepts rather than specific proposed designs for installation at Indian Point. Because of this, I conclude that such systems have not been explored sufficiently to support a firm decision that they should never be required at Indian Point. The Board appeared to share this view in its recommendation against requiring such systems "at this time."

The Staff and Licensees pointed out that the use of a filtered vented containment or a separate containment system might reduce latent cancer fatality risk by as much as a factor of 5 and that the costs of such systems would probably be in the tens of millions of dollars. For a site located in densely populated areas, such a reduction in risk might be worth the costs. The issue should at least be considered further.

Accordingly, I would have directed the Staff to develop a plan for a more detailed evaluation of the risk reduction potential and the costs (to NRC and the Licensees) of filtered vented containments or separate containment systems for Indian Point Units 2 and 3. Furthermore, I would

have directed the Staff to consider other additional defense-in-depth concepts at Indian Point, such as a dedicated decay heat removal system.

Emergency Planning

As the Commission notes, the Board found that emergency planning at Indian Point was inadequate in a number of respects. In view of the Board's findings, the consistent pattern of significant deficiencies in emergency planning at Indian Point and the evidence from the November 28, 1984 exercise, which indicates that at least some of these deficiencies continue to exist nearly 2 years after the close of the record in the special proceeding, the Commission should now initiate enforcement action under our regulations. Indeed, the determination of the need for such enforcement action was one of the express purposes of the special proceeding.

I would therefore initiate the 120-day clock and require the correction of all significant deficiencies within that period. It may well be, as the majority contends, that the results of the November 28, 1984 exercise will demonstrate that many of the deficiencies identified by the Board have now been corrected. In addition, the further exercise held on April 10, 1985, may show that the two continuing significant deficiencies identified in the November 22d exercise have now been corrected. But at present, we simply do not know based upon the record in this proceeding. The enforcement action called for under the Commission's regulations is designed to provide the information needed to answer just these questions. The Commission should follow its regulations and initiate the appropriate enforcement action. Instead, the Commission has chosen to defer any further action, beyond requesting a report from the Staff, to address the continuing problems in emergency planning at Indian Point.

Conclusion

For the foregoing reasons, I cannot support the Commission's decision today.

ADDITIONAL VIEWS OF CHAIRMAN PALLADINO AND COMMISSIONERS ROBERTS, BERNTHAL, AND ZECH

It is important to note that none of the Commissioners, including Commissioner Asselstine, would order shutdown of Indian Point Unit 2 or 3 at this time by virtue of the unacceptability of risks to the public. The Commission majority believes that what is at issue here is whether or not there is a need for special additional safety measures justified by reduction in public risk because of siting characteristics of these plants. The Commission majority reviewed the same information and reached a different conclusion from that reached by Commissioner Asselstine. We will not address all the areas of perceived disagreement as this would be essentially a repetition of the rationale presented in the Decision itself.

However, neither the Commission majority nor Commissioner Asselstine would have required substantial safety modifications such as filtered vented containment or dedicated heat removal systems at this time. The difference seems to be one of degree — namely, Commissioner Asselstine would require an agency commitment to additional study of measures such as filtered vented containment specifically for the Indian Point plants, whereas the majority of the Commission believes these issues can be adequately addressed in the NRC's severe accident research program and the Staff's activities to monitor relevant research and experience in other countries. The Commission reviewed the benefits and costs of a Safety Assurance Program, and the majority concluded that, although such programs may have potentially beneficial effects which merit future generic consideration, the record did not support imposition of the program. It also was not clear that such a program, as defined in the record of the proceeding, would be effective or justifiable.

Given its importance in probabilistic analysis, the Commission considered at some length the treatment of uncertainties in the Indian Point risk estimates. The Commission was briefed by the NRC Staff on the subject. While recognizing the limitations of uncertainty analyses in probabilistic risk assessment, the Commission majority found the Board's treatment of uncertainties adequate for reaching its decision in this case.

In reaching its decision not to impose special risk reduction requirements, the Commission majority recognizes that any remedial actions required to address particular generic or plant-specific safety issues will be instituted in a manner consistent with the resolution of licensing issues for any plant. This is because the Commission majority concluded that the Indian Point plants do not appear to be "risk outliers" requiring imposition of special risk reduction measures. In addition, on the basis

of the record, the majority of the Commission could not conclude that the measures imposed by the Director in 1980 would provide substantial, additional protection which is required to protect public health and safety. It is for this reason that the Commission majority decided to rescind the requirements of the Director's 1980 Order unless they are needed to meet other licensing requirements for the Indian Point units or are needed to fulfill generic requirements applicable to similar types of power reactors. The Commission majority shared the Board's concern regarding the wind vulnerability of Indian Point Unit 2 and consequently is requiring a Staff study of the susceptibility of certain Unit 2 structures to damage in high winds.

We all agree that the status of emergency planning set forth in the record of this proceeding is stale. In the emergency planning area, it is important to note that neither the Commission majority nor Commissioner Asselstine would shut down the plant because of the deficiencies identified in the course of this proceeding. However, Commissioner Asselstine argues that our regulations require us to initiate a 120-day clock in these circumstances. On this we disagree. The rule — 10 C.F.R. § 50.54(s)(2)(ii) — is not intended to require the Commission to initiate a 120-day clock whenever there might be emergency planning deficiencies. Rather, the initiation of the enforcement clock should be based on an assessment of the accuracy and currency of the information. Accordingly, the difference is in agreeing on how to address the issue. Commissioner Asselstine would start the 120-day enforcement clock. The majority of the Commission is unwilling to consider enforcement action prior to being informed as to the current status of emergency planning at Indian Point. Our request for a Staff report within 60 days assures that, if there are significant deficiencies in Indian Point emergency planning, we will have the information needed to decide whether to initiate enforcement action.

The Commission cannot agree with Commissioner Asselstine's position that our decision reflects a "return to the attitude of complacency towards safety which prevailed prior to the Three Mile Island accident and which was a significant contributor to that accident." It is not relevant to this decision to attempt historical comparisons or to estimate what portion of the responsibility for the TMI accident should be attributed to the agency's attitude prior to the accident. Suffice it to emphasize that this Commission is committed to assurance of the safe operation of all licensed facilities, including the Indian Point units. Indeed, as stated in its 1985 Policy and Planning Guidance, the Commission's policy is "to make sure that existing nuclear facilities and those coming on line operate safely. Consequently, the highest priority will be

given to assuring facilities are adequately designed, built, and tested prior to operating and that operating facilities maintain adequate levels of protection of public health and safety.” We believe that our decision in this proceeding supports this policy.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Thomas M. Roberts
James K. Asselstine
Frederick M. Bernthal
Lando W. Zech, Jr.

In the Matter of

Docket No. 50-289-SP
(Restart)

METROPOLITAN EDISON COMPANY,
et al.
(Three Mile Island Nuclear
Station, Unit No. 1)

May 9, 1985

The Commission denies Intervenor's motion to reconsider its decision (CLI-85-2, 21 NRC 282 (1985)) that no further hearings are warranted in the TMI-1 restart proceeding.

RULES OF PRACTICE: REOPENING OF RECORD

The burden is on the movant to establish prior to reopening that the standards for reopening are met. A movant is not entitled to engage in discovery in order to support a motion to reopen. Rather, the issue in each case is whether the available information meets the standards for reopening, i.e., timely raises a significant safety issue which might have affected the Licensing Board's decision, such that the record should be reopened and discovery initiated.

RULES OF PRACTICE: REOPENING OF RECORD

If a motion to reopen is to succeed, it is not enough merely to express a willingness to provide unspecified, additional information at some unknown date in the future. *See generally, e.g., Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-753, 18 NRC 1321, 1324 (1983).*

RULES OF PRACTICE: MOTION FOR RECONSIDERATION (RAISING MATTERS FOR FIRST TIME)

A party may not raise in a petition for reconsideration a matter not placed in contest before. *See, e.g., Kansas Gas and Electric Co. (Wolf Creek Generating Station, Unit No. 1), ALAB-477, 7 NRC 766, 768 (1978).*

ORDER

On March 13, 1985, the Commonwealth of Pennsylvania (Commonwealth) and Three Mile Island Alert (TMIA) moved the Commission to reconsider its February 26, 1985 decision that no further hearings are warranted in the TMI-1 restart proceeding. CLI-85-2, 21 NRC 282.¹ Both the Commonwealth and TMIA maintained that further hearings should be held on leak rate falsifications at TMI-2, leak rate testing at TMI-1, Staff's "likely" change of position, Licensee's response to the Commission's October 25, 1979 Notice of Violation, and the changes to the Keaten Report. In addition, TMIA argued that hearings should be held on the Parks/King/Gischel allegations of harassment and widespread safety violations at TMI-2, and on changes to the Lucien Report. The Union of Concerned Scientists (UCS) supported the motions for reconsideration. The Licensee and NRC Staff opposed the motions. As explained below, the parties have presented no new arguments which would cause the Commission to reconsider its decision. The motions for reconsideration are therefore denied.

Before discussing the factual issues raised in the motions for reconsideration, the Commission will address the procedural arguments. TMIA

¹ The Commission in CLI-85-2 also held that the Licensing Board should issue a decision on the training and mailgram issues. The Commission also decided to institute a separate proceeding on TMI-2 leak rate falsifications, and offered Mr. Husted the opportunity to request a hearing on the Appeal Board condition affecting his employment.

repeated the argument previously made by UCS that the Commission in requiring the parties to set forth disputed issues of fact applied an incorrect legal standard. TMIA expanded on this argument by citing examples in CLI-85-2 where the Commission found that there were no factual disputes. TMIA claimed that without discovery it could not challenge the facts presented by the Staff and Licensee, and hence the Commission's requirement amounted to a predetermination of the issues.²

TMIA has misconstrued the standards for reopening. The burden is on the movant to establish prior to reopening that the standards for reopening are met. The movant is not entitled to engage in discovery in order to support a motion to reopen. Rather, the issue in each case is whether the available information meets the standards for reopening, i.e., timely raises a significant safety issue which might have affected the Licensing Board's decision, such that the record should be reopened and discovery initiated. The Commission explained in CLI-85-2 that the requirement that the parties put forward their best case was imposed in order "fairly to judge whether further hearings should be held." 21 NRC at 286 n.4. After reviewing the available evidence, the Commission in CLI-85-2 found that this standard was not met on any issue. *See generally, e.g., Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-753, 18 NRC 1321, 1324 (1983)* ("[i]t is not enough merely to express a willingness to provide unspecified, additional information . . . at some unknown date in the future").

TMIA and UCS argued that the Commission applied an improper standard in ruling on whether Staff's "likely" change of position required reopening. Staff's "likely" change of position presents the question of whether a party's "likely" change of testimony may have invalidated the adjudicatory decision to the extent that the original testimony was critical to the decision. To decide this issue, the Commission properly considered each factor supporting Staff's changed position in order to determine the possible impact on the original adjudicatory decision. As the Commission explained in CLI-85-2, the issues cited by Staff for its "likely" change of position were either fully litigated or are not currently sig-

² UCS argued that the Commission has no legal authority to reverse the Appeal Board's decision to reopen on the Hartman allegations, ALAB-738, 18 NRC 177 (1983), because the Commission did not properly take review of that decision. When that decision issued, the Commission issued an order staying it to preserve the *status quo*, and taking review of whether it should be stayed until OI completed an investigation into the Hartman allegations. The Commission subsequently lifted the stay and simultaneously took review of whether the hearing was still required. The Commission, which has the ultimate responsibility for its adjudications, clearly had the authority to act as it did. *See Florida Power and Light Co. (St. Lucie Nuclear Power Plant, Unit 2), CLI-80-41, 12 NRC 650 (1980)*.

nificant. Therefore, Staff's "likely" change of position does not require reopening.³

TMIA argued that the Commission applied a standard to determine when company employees' actions are to be imputed to management which is inconsistent and legal error. There is no inconsistency or legal error in the Commission's decision. The Commission stated that the corporate entity must bear some responsibility for the acts of its employees, but corrective action can ameliorate improper conduct. The Commission further stated that it would not hold executive managers *personally* responsible for the acts of employees in the absence of knowledge of or involvement in those acts. There is nothing inconsistent in this approach, nor is it inconsistent with TMIA's argument that the pattern of conduct must be used to evaluate Licensee's performance. The Commission simply disagrees with TMIA's assessment that there has been a pattern of improper conduct by current management.⁴

The Commission will now turn to the factual issues raised in the motions for reconsideration. TMIA, the Commonwealth, and UCS all argued that the Commission erred in not requiring further hearings in the restart proceeding on TMI-2 leak rate falsifications. The Commonwealth maintained that the separate proceeding to be initiated on TMI-2 falsifications is inadequate because it exempts GPU's officers and directors, and because its completion is not a precondition of restart.

As explained in CLI-85-2, the Commission feels justified in relying on a statement to the court by a United States District Attorney regarding the involvement of GPU's officers and directors. That statement, made after the matter had been before the Grand Jury for 4 years, was a carefully worded statement of exoneration. The Commission does not believe that a further expenditure of agency resources in duplicating the work of the Grand Jury and the United States Attorney would be justified.

The Commission further explained in CLI-85-2 why the TMI-2 leak rate falsifications did not warrant hearings in the restart proceeding.⁵

³ None of the other arguments regarding Staff's "likely" change of position presents any basis for reconsideration of the arguments previously made to and considered by the Commission.

⁴ TMIA also requested that the Commission allow informal discovery on TMI-2 leak rate falsifications to continue. This request was opposed by Licensee and Staff, and in a pleading filed on behalf of "numerous former employees of Metropolitan Edison Company who may be involved in hearings concerning the alleged leak rate falsification." The TMIA request is denied. There is currently no ongoing hearing on TMI-2 leak rate falsifications, and it would be inappropriate to rule on discovery among potential future parties.

⁵ UCS creatively argues that the Commission erred in reversing the Appeal Board's decision to reopen on the Hartman allegations, because the Commission relied on extra-record information. UCS conveniently ignores that the Appeal Board reopened the record based on extra-record information. Clearly in

(Continued)

Neither TMIA, the Commonwealth, nor UCS has presented any new information which would alter the Commission's judgment. TMIA's argument that upper management must have been aware of the falsifications, and that the falsifications occurred because of financial concerns of upper management, is based on little more than speculation. The concerns expressed by TMIA, the Commonwealth, and UCS regarding Mr. Ross rely on unsupported speculations and inferences. While, as noted by TMIA, some former operators expressed a view that Mr. Ross must have known of the TMI-2 leak rate falsifications, none had any actual evidence of such knowledge beyond this. Moreover, the weight of evidence is to the contrary.⁶ Hence this issue does not raise a significant safety issue.

The parties in the motions for reconsideration also claimed that further hearings are required on TMI-1 leak rate practices,⁷ changes to the Keaten Report, and Licensee's response to the October 1979 Notice of Violation.⁸ None of the arguments on these issues presents any basis for reconsideration of the arguments previously made to and considered by the Commission in making its original decision. The claim of factual errors in CLI-85-2 is without merit.⁹ Accordingly, these issues do not

deciding whether new information warrants reopening the Commission must consider available new information. UCS' real complaint is with the fact that the Commission considered more information than the Appeal Board, and reached a different conclusion.

⁶ TMIA also challenged the Commission's decision to bar possibly implicated individuals from "responsible management" or "operational" positions. TMIA claimed that the Commission statement that the "present system of checks and balances and procedural safeguards ensures that no individual in other positions can adversely affect the plant's operation" was not advanced by any party. The Commission fully explained the basis of this decision, which comes from the Licensing Board's management decision. See 21 NRC at 303-04.

⁷ UCS argued that test results were routinely discarded at TMI-1, and negative test results were regularly accepted as valid. UCS maintained that Mr. Ross must have been aware of these practices. To clarify some apparent confusion, the Commission's statement in CLI-85-2 that "[w]e do not agree that Ross must have known of the irregularities at TMI-1," 21 NRC at 313, referred to additions of hydrogen and water. The Commission is not presently concerned with Mr. Ross' knowledge of negative test results or discarding invalid tests. The Commission in CLI-85-2 explained that there was no culpable motive for those practices, and that they pose no current concern.

⁸ The Commission was not, as TMIA argued, confused about Licensee's response to the October 1979 Notice of Violation. The Commission adequately explained that Mr. Dieckamp reviewed the response, found "the argument," or, more accurately, one specific part of the response, "kind of thin," and chose not to intervene.

⁹ TMIA claimed, contrary to the Commission's finding, that there are significant factual disputes. TMIA cited as factual disputes the reason spurts of hydrogen were added and the significance of the loop seal. Neither of these items presents a significant factual dispute. The Commission's decision found it unnecessary to resolve the reason for the spurts of hydrogen, concluding that the circumstantial evidence of a few irregularities did not raise a significant safety issue *at this time*. The significance of the loop seal is a judgment based on available evidence; there is no factual dispute regarding its existence. TMIA's argument that Unit 2 operators learned of the loop seal and its effect on leak rates from Unit 1 operators is supported by only vague recollections. This does not raise a significant factual dispute.

warrant further discussion.¹⁰ See, e.g., *Nuclear Engineering Co.* (Sheffield, Illinois Low-Level Radioactive Waste Disposal Site), CLI-80-1, 11 NRC 1, 5-6 (1980).

Finally, TMIA maintained that further hearings should be held on the Parks/King/Gischel allegations, and on the changes to the Lucien Report. TMIA made no new argument regarding the Lucien Report and accordingly has failed to persuade us that our conclusion not to hold hearings on this matter is erroneous. With regard to the Parks/King/Gischel allegations, TMIA now claims that it did move to reopen the record on the procedural violations themselves, because it "recited in full detail OI's findings regarding the accuracy and significance of safety violations alleged by the 'whistleblowers.'" OI's investigative report on the procedural violations was issued in September 1983. TMIA *one year later* discussed those violations to support its motion to reopen on the alleged discrimination. A party may not raise in a petition for reconsideration a matter not placed in contest before. See, e.g., *Kansas Gas and Electric Co.* (Wolf Creek Generating Station, Unit No. 1), ALAB-477, 7 NRC 766, 768 (1978). TMIA has not under any reasonable view of its motion to reopen requested that the Commission reopen on the procedural violations at TMI-2.¹¹ Nor does the Commission find it necessary to consider *sua sponte* whether this issue warrants reopening. The relation of the procedural violations at TMI-2 to the operation of TMI-1 appears tenuous at best. The Commission will address the procedural violations as a separate enforcement matter.

TMIA also asserted that the Commission made factual errors in its analysis of this issue. TMIA began its discussion with an apparent premise that no action could be taken against these individuals *for any reason* because they were engaged in protected activity. The Commission in CLI-85-2 adequately explained that hearings are not warranted because the actions taken against Messrs. King and Gischel were not based on their involvement in protected activities, and the apparent discrimination against Parks represented an isolated occurrence. TMIA's claim of factual errors in the Commission's decision can better be characterized as a factual disagreement with the Commission's findings. TMIA once again has relied on its 10 C.F.R. § 2.206 petition as a basis for its view of the factual circumstances here. The Commission in CLI-85-2 adequately addressed those arguments.

¹⁰ The Commonwealth also argued that the Commission should not make any decision on restart before the Licensing Board issues a decision on the training issue. Since the Commission did not decide that issue in CLI-85-2, it is not properly before the Commission in a motion for reconsideration.

¹¹ Moreover, even if TMIA had made such a motion, it appears it would have been untimely.

The motions for reconsideration are therefore denied.
Commissioners Asselstine and Bernthal disapprove this Order.
It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 9th day of May 1985.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Thomas M. Roberts
James K. Asselstine
Frederick M. Bernthal
Lando W. Zech, Jr.

In the Matter of

Docket No. 50-289-SP
(Restart)

METROPOLITAN EDISON COMPANY,
et al.
(Three Mile Island Nuclear
Station, Unit No. 1)

May 16, 1985

The Commission denies Intervenors' motion to reopen the record in the TMI-1 restart proceeding and Intervenors' request that the Commission sponsor a health effects study prior to making a restart decision.

RULES OF PRACTICE: REOPENING OF RECORD

Under established Commission practice three factors are considered in determining whether a motion to reopen should be granted: "(1) Is the motion timely; (2) does it address significant safety (or environmental) issues; and (3) might a different result have been reached had the newly proffered material been considered initially." *Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1)*, CLI-85-2, 21 NRC 282, 285 n.3 (1985).

MEMORANDUM AND ORDER

I. BACKGROUND AND SUMMARY

On June 21, 1984, Marjorie and Norman Aamodt filed a motion with the Commission alleging that releases of airborne radioactive materials from the March 28, 1979 accident at TMI-2 were substantially greater than have been acknowledged and that these releases have led to an unexpectedly high level of cancer in local residents. The Aamodts based their allegations on door-to-door interviews that Marjorie Aamodt and others conducted of residents of two areas near the TMI-2 facility. The Aamodts requested the Commission to investigate their allegations and to defer a decision on the restart of TMI-1 until the issues they raised have been studied further and fully resolved. On December 13, 1984, the Commission denied the Aamodts' motion to sponsor a new study of health-related issues arising from the TMI-2 accident. The Commission stated that the "Aamodts have not presented sufficient reliable information to show that previous, more comprehensive and scientific surveys of TMI-2 accident radiation releases are erroneous." CLI-84-22, 20 NRC 1573, 1575 (1984).¹

On January 15, 1985, the Aamodts filed a motion asking the Commission to reconsider the December 13 denial of their request. They also requested the Commission to reopen the record in the TMI-1 restart proceeding, asserting that the issues raised by their survey were relevant to "the management competence, emergency planning and health issues" litigated in the restart proceeding. On April 13, 1985, the Aamodts amended their request by submitting additional information.

For the reasons which follow, the motions to reopen the record and to defer a decision on TMI-1 restart are denied.²

¹ Commissioners Asseltine and Bernthal dissented. They would have provided NRC funding to ongoing studies being conducted by the Commonwealth of Pennsylvania's Department of Health.

² Should the Commission in the future acquire information regarding the need for any further studies along the lines requested by the Aamodts, it will, of course, make its views known along with any appropriate recommendations. The NRC Staff is currently evaluating this matter and will be providing recommendations to the Commission shortly. The Commission is also assessing whether the Commission's Advisory Panel for the Decontamination of TMI-2 could provide a useful forum for citizens to raise health-related concerns. These matters are not relevant to the restart proceeding because health effects resulting from the TMI-2 accident are not related to a determination whether TMI-1 can be safely operated today. See § II.C, *infra*.

II. ANALYSIS OF MOTION TO REOPEN THE RECORD

The Aamodts claim that the record of the restart proceeding should be reopened to examine health-related issues arising from the TMI-2 accident. The Aamodts allege that death certificates obtained from the Pennsylvania Department of Health establish that: (1) there is an elevated cancer mortality rate in certain areas surrounding TMI-2; (2) an increased rate of neonatal hypothyroidism in Lancaster County in 1979 resulted from the TMI-2 accident; (3) serious post-accident health effects within and beyond the 10-mile radius of TMI demonstrates that the presently approved emergency plans are inadequate; (4) residents near TMI are suffering adverse health effects from high levels of radiation currently in the environment; and (5) the 5100° Fahrenheit (°F) temperatures reached within the TMI-2 core during the accident produced elevated levels of fission products and transuranics which have escaped to the environment and could be harmful to the public.

The Aamodts also believe the record should be reopened on an issue relating to the integrity of Licensee's management. The Aamodts allege that information developed in the restart proceeding on the Dieckamp mailgram issue demonstrates that Licensee personnel lied to the Pennsylvania Bureau of Radiation Protection on the morning of March 28, 1979. The Aamodts maintain that after the Commonwealth had been warned of projected radiation releases of 10 rems per hour over Goldsboro, TMI personnel discounted this information by claiming, contrary to fact, that the surveillance teams had been dispatched and had verified that a significant release had not occurred.

Under established Commission practice three factors are considered in determining whether a motion to reopen should be granted: "(1) Is the motion timely; (2) does it address significant safety (or environmental) issues; and (3) might a different result have been reached had the newly proffered material been considered initially." *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 1), CLI-85-2, 21 NRC 282, 285 n.3 (1985).

The NRC Staff opposed the request to reopen the record, arguing that the criteria for reopening the record had not been satisfied. The Licensee also opposed reopening of the record on whether Licensee personnel lied to Bureau of Radiation Protection, but did not take a position on whether the record should be reopened on the other issues raised by the Aamodts.

A. Timeliness

The central issue raised by the Aamodts relates to their allegation that there are elevated levels of cancer in the TMI area. Their request to reopen the record on that matter is untimely. The Aamodts first presented their concerns regarding cancer levels to the Commission in June of 1984, yet did not request reopening of the record until January of 1985. The Aamodts have not presented any justification for not requesting at that time a reopening of the record.³

B. Whether Claims Raise a Significant Safety or Environmental Issue

The Commission has reviewed the material presented by the Aamodts regarding alleged elevated cancer levels in the TMI area and continues to believe that the prior studies are correct in concluding that the number of health effects from radiation releases arising from the TMI-2 accident will be negligible. The Aamodts have not presented information which casts doubt on the previous studies. For example, the Aamodts have not reported when the cancers which form the basis for their allegations were diagnosed relative to the TMI-2 accident and have not shown that the cancers resulted from the TMI-2 accident. When the cancers arose or were first diagnosed is particularly significant, in light of the obvious fact that cancers which arose prior to the TMI-2 accident cannot be attributed to the accident, and the fact that, even for those cancers arising since the accident, the undisputed scientific evidence is that there is generally a latency period for cancer development following exposure to radiation. Even if additional information, such as date of diagnosis of the cancers, type of cancer, health, occupational, and personal histories of the deceased were available, we believe it is unlikely that statistically and scientifically valid conclusions could be reached regarding the causes of the cancers in the small population groups associated with the Aamodts' informal survey. The epidemiological evidence presented by the Aamodts is fragmentary and anecdotal. As a technical and logical matter, it is not sufficient to support a reasonable doubt as to the adequacy and correctness of the several detailed scientifically conducted studies on which the Commission relied. Therefore, under the circum-

³ The Aamodts also have not established when the information they rely on in support of their other claims became available and whether the facts could have been presented to the Commission at an earlier date.

stances, the Aamodts have not raised a significant safety or environmental concern.

Their other claims similarly fail to raise significant issues. With respect to their allegations that there was a higher rate of neonatal hypothyroidism in Lancaster County in 1979 than there was in the 1981-1983 period, the Pennsylvania Department of Health has analyzed the seven cases of hypothyroidism that arose in 1979 and concluded that they could not be attributed to radiation, but should be attributed instead to factors such as incomplete maturation of thyroid glands and lack of enzymes to synthesize thyroxine. In fact one of the seven cases occurred prior to the accident and another within 3 months following the accident, a time period too short for the hypothyroidism to have resulted from the TMI-2 accident. The Aamodts have not provided information that would lead us to question the Department of Health's conclusions.

The Aamodts' allegation that health effects reported by TMI area residents, such as nausea and severe vomiting, resulted from radiation released from the TMI-2 accident that was higher than reported is not supported by available information. The NRC Staff estimates that the average radiation dose to an individual within 10 miles of the TMI site resulting from the TMI-2 accident was approximately 8 millirems, and the average dose received by individuals within 50 miles was approximately 2 millirems. Based on accepted scientific principles governing the effects of exposure to varying levels of radiation, these dose levels are far too low to be the cause of the kind of adverse health effects cited by the Aamodts. In the absence of other evidence demonstrating a link between the cited health effects and the TMI-2 accident, the Commission must continue to support the findings reached in earlier assessments of radiation releases from the TMI-2 accident.

With respect to the Aamodts' claim that there are currently unacceptably high levels of radiation in the environment near TMI, the NRC Staff, the Environmental Protection Agency and the Pennsylvania Department of Environmental Resources conducted an informal field survey with sophisticated radiation monitoring equipment of sites selected by the Aamodts. The agencies concluded that the radiation levels were within the normal range.

The Aamodts also speculate that the high temperatures (in excess of 5000°F) reached within the TMI-2 reactor core during the accident created a "high probability" that transuranic materials were released into the atmosphere. Transuranic materials emit alpha radiation and could be another possible source of adverse health effects. The NRC Staff has examined these allegations and concluded that the likelihood of measurable quantities of transuranic material becoming airborne and subse-

quently being released into the environment is low. The Staff further noted that no measurable quantity of transuranic material other than that associated with normal background levels has been identified in any of the air or soil samples taken around the TMI site during or after the accident. Accordingly, again the Aamodts' concerns do not raise a significant issue.

Finally, the Aamodts' claim that the Licensee deceived the Pennsylvania Bureau of Radiation Protection concerning radiation measurements on the day of the TMI-2 accident is based on a draft document which was prepared in the course of an NRC investigation conducted in 1980, but before pertinent individuals had been interviewed by the NRC. After the interviews, the Staff determined that the facts contained in the working draft were erroneous and concluded that the Licensee had not provided erroneous information relating to the Goldsboro dose-rate prediction. The Commission has concluded on the basis of its review of the allegations and the Staff's and Licensee's responses that the Aamodts' claim of deception is not supported and accordingly does not raise a significant safety issue.

C. Likelihood of Reaching a Different Result

The Commission does not believe that the information presented by the Aamodts in their motion would have led to a different result. With the possible exception of the claim that Metropolitan Edison Company officials deceived Commonwealth officials on TMI-2 accident radiation releases and the neonatal hypothyroidism issue,⁴ the Aamodts' concerns are not relevant to the restart proceeding because health effects resulting from the TMI-2 accident are not related to a determination whether TMI-1 can be safely operated today. As discussed above, the Commission finds that the Aamodts' claims of Licensee deception to be without any foundation. With respect to the neonatal hypothyroidism, the information presented by the Aamodts does not form a basis for concluding that the Licensing Board erred in LBP-81-59, 14 NRC 1211, 1596 (1981) when it concluded that the alleged increase in neonatal hypothyroidism was not caused by the TMI-2 accident.

For these reasons the Aamodts' motion to reopen the record is denied, as well as its request that the Commission sponsor a health effects study prior to making a restart decision.

⁴ The Licensing Board addressed the hypothyroidism issue in the context of evaluating the protective action criteria used by the Commonwealth of Pennsylvania in emergency planning.

Commissioner Asselstine's separate views are attached.
It is so ORDERED.

For the Commission⁵

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 16th day of May 1985.

SEPARATE VIEWS OF COMMISSIONER ASSELSTINE

I concur in the result reached by the Commission, but not in the substance of the Order. I do not believe that we should reopen the record of the TMI-1 Restart proceeding to hear this issue. However, I do believe further study is necessary. The Commission should hire an independent consultant who is expert in the fields of epidemiology and the health effects of ionizing radiation. That consultant should review the information submitted by the Aamodts as well as the various existing studies of the radiological releases from the TMI accident and the impact of those releases on the people surrounding the plant.

⁵ Commissioner Roberts was not present for the affirmation of this item; if he had been present, he would have approved.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Thomas M. Roberts
James K. Asselstine
Frederick M. Bernthal
Lando W. Zech, Jr.

In the Matter of

Docket No. 50-289-SP
(Restart)

METROPOLITAN EDISON COMPANY,
et al.

(Three Mile Island Nuclear
Station, Unit No. 1)

May 29, 1985

The Commission lifts the effectiveness of its 1979 enforcement order directing that TMI-1 remain shut down and permits TMI-1 to resume operation subject to the completion of two conditions. The Commission holds that the two management-related issues which remain pending before the agency do not warrant keeping TMI-1 shut down until agency proceedings have been completed.

ATOMIC ENERGY ACT: ENFORCEMENT ACTION
(OPPORTUNITY FOR HEARING)

The law normally affords a licensee the opportunity to challenge an enforcement action in a public hearing prior to the time an enforcement action takes effect. *Consumers Power Co.* (Midland Plant, Units 1 and 2), CLI-73-38, 6 AEC 1082, 1083 (1973).

**ATOMIC ENERGY ACT: ENFORCEMENT ACTION
(DURATION)**

The law obligates the Commission to lift the effectiveness of an immediately effective shutdown order once the concerns which led to making the order immediately effective have been adequately resolved. *See, e.g., Pan American Airways v. CAB*, 684 F.2d 31 (D.C. Cir. 1982); *Northwest Airlines v. CAB*, 539 F.2d 748 (D.C. Cir. 1976); *Air Line Pilots Ass'n, International v. CAB*, 458 F.2d 846 (D.C. Cir. 1972), *cert. denied*, 420 U.S. 972 (1975).

**ADMINISTRATIVE PROCEDURE ACT: IMMEDIATE
AGENCY ACTION**

A provision in the law allows immediate action when required by the public health and safety or public interest. *See* 10 C.F.R. § 2.202(f), which implements 5 U.S.C. § 558(c).

**ATOMIC ENERGY ACT: LICENSEE'S CHARACTER
(STANDARD FOR DETERMINATION)**

A generally applicable standard for integrity is whether there is reasonable assurance that the licensee has sufficient character to operate the plant in a manner consistent with the public health and safety and applicable NRC requirements.

**ATOMIC ENERGY ACT: LICENSEE'S CHARACTER
(STANDARD FOR DETERMINATION)**

In determining whether a licensee has the requisite integrity to operate a nuclear power plant, the Commission may consider evidence regarding licensee behavior having a rational connection to the safe operation of the plant. This does not mean, however, that every act of a licensee is relevant. To be so, the action must have some reasonable relationship to licensee's character, i.e., its candor, truthfulness, willingness to abide by regulatory requirements, and acceptance of responsibility to protect public health and safety.

**ATOMIC ENERGY ACT: LICENSEE'S CHARACTER
(STANDARD FOR DETERMINATION)**

Acts bearing on a licensee's character generally should not be considered in isolation. The pattern of licensee's relevant behavior, including corrective actions, should be considered.

**ATOMIC ENERGY ACT: LICENSEE'S CHARACTER
(STANDARD FOR DETERMINATION)**

Licensee behavior includes acts of licensee employees, since all organizations carry on their activities through individuals.

**ATOMIC ENERGY ACT: ENFORCEMENT ACTION
(HEARING RIGHT)**

That a Licensing Board has imposed license conditions does not convert an enforcement proceeding into a license amendment proceeding. Once the Commission establishes a formal adjudicatory hearing in an enforcement case, it need not grant separate hearings on any license conditions that are imposed as a direct consequence of that enforcement hearing.

**ATOMIC ENERGY ACT: ENFORCEMENT ACTION
(HEARING RIGHT)**

Restart of a nuclear power plant following its ordered shutdown does not constitute a license amendment, but involves lifting a suspension, and hence does not create new hearing rights. *See, e.g., San Luis Obispo Mothers for Peace v. NRC*, 751 F.2d 1287, 1314 (D.C. Cir. 1984); *Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station)*, CLI-79-7, 9 NRC 680, *aff'd*, *Friends of the Earth v. United States*, 600 F.2d 753 (9th Cir. 1979); *Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 and 2)*, CLI-80-10, 11 NRC 438 (1980), *aff'd*, *Save the Valley v. NRC*, 714 F.2d 142 (6th Cir. 1983) (Table).

**ATOMIC ENERGY ACT: ENFORCEMENT ACTION
(HEARING RIGHT)**

Section 2.204 of 10 C.F.R., which provides that the Commission shall make a license amendment immediately effective upon finding that the

public health, safety, or interest so requires, applies only when the Commission makes the determination to make a license amendment effective without affording an opportunity for a prior hearing.

ATOMIC ENERGY ACT: INITIAL LICENSING DECISIONS (IMMEDIATE EFFECTIVENESS)

The standards in 10 C.F.R. § 2.764(f)(2)(i), which provides that the Commission shall make a Licensing Board decision authorizing a unit to operate at full power immediately effective

if it determines that it is in the public interest to do so, based on a consideration of the gravity of the substantive issue, the likelihood that it has been resolved incorrectly below, the degree to which correct resolution of the issue would be prejudiced by operation pending review, and other relevant public interest factors, . . .

apply only to initial licensing decisions.

ATOMIC ENERGY ACT: ENFORCEMENT ACTION (LIFTING OF ORDER)

The standard for determining whether to lift the immediate effectiveness of an enforcement order is whether the concerns which led to making that order immediately effective have been adequately resolved. Once the Commission finds this has been done, it is legally obligated to lift the immediate effectiveness of the order, regardless of the nature of the latest Licensing Board decision on the matter. This is a matter peculiarly within the Commission's knowledge and involving the most discretionary aspects of its enforcement authority.

ATOMIC ENERGY ACT: ENFORCEMENT ACTION (LIFTING OF ORDER)

The Commission cannot ignore its legal obligation to lift the immediate effectiveness of a shutdown order once the concerns which led to making that order immediately effective are satisfied, even if a single issue not significant for safe plant operation remains pending before the Licensing Board. *See, e.g., Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station), CLI-79-7, 9 NRC 680 (1979) (resumption of operation authorized prior to hearing); see also ICC v. Oregon Pacific Industries, 420 U.S. 121, 127 (1975) (Powell, J., concurring); Pan American Airways v. CAB, 684 F.2d 31 (D.C. Cir. 1982); Northwest Airlines, Inc. v. CAB, 539 F.2d 748 (D.C. Cir. 1976); Airline*

Pilots Ass'n, International v. CAB, 458 F.2d 846 (D.C. Cir.), cert. denied, 420 U.S. 972 (1975).

NRC: JURISDICTION

The NRC is not a legislative body and it lacks discretion to act on the basis of issues that are not within the scope of the laws established by Congress.

ATOMIC ENERGY ACT: RESPONSIBILITY OF NRC

In the Atomic Energy Act, Congress has directed the NRC to make decisions regarding the licensing of nuclear reactors on the basis of its own expert judgment and analysis of whether the detailed regulatory requirements of the Commission have been satisfied.

MEMORANDUM AND ORDER

I. INTRODUCTION AND SUMMARY

Three Mile Island, Unit 1 (TMI-1) has not operated since February 15, 1979, when its operator, Metropolitan Edison Company, shut it down for refueling.¹ Following the March 28, 1979 accident at TMI-2, the Commission on July 2, 1979, issued an immediately effective enforcement order (unpublished) directing that TMI-1 remain shut down until further order. In an August 9, 1979 Order the Commission explained the basis for its shutdown decision and established the restart proceeding to determine whether TMI-1 should be allowed to resume operation. CLI-79-8, 10 NRC 141. Exhaustive hearings have been held in the restart proceeding, and only two issues, both management-related, remain pending before the agency. The agency's appellate review of the Atomic Safety and Licensing Board's ("Licensing Board") decision on the adequacy of GPUN's training program is under way, and the Licensing Board is currently preparing its decision on the Dieckamp mailgram issue.

¹ As a result of a corporate reorganization effective January 1, 1982, General Public Utilities Nuclear Corp. (GPU Nuclear) replaced Metropolitan Edison Company as Licensee. Licensee will be referred to throughout this Order as Licensee, GPU Nuclear, or GPUN. Reference will also be made to General Public Utilities Corp. (GPU), the parent company of GPU Nuclear.

In today's Decision for the reasons that follow, the Commission, after setting forth its overall views on Licensee's competence and integrity, concludes that the two remaining management issues do not raise concerns warranting maintaining the immediate effectiveness of the shutdown Orders, and therefore that lifting the effectiveness of those Orders is required. This Decision lifts the effectiveness of the shutdown Orders, an action which permits TMI-1 to resume operation, subject to satisfactory completion of the conditions imposed in this Order.

The Commission's review of whether to lift the immediate effectiveness of the 1979 shutdown Orders has taken considerably longer than the Commission originally anticipated because of a succession of events and the development of new information following the initial closing of the formal adjudicatory record in 1981. The Commission evaluated whether that new information warranted reopening of the record in an Order dated February 25, 1985, and concluded that it did not. CLI-85-2, 21 NRC 282. Some of that new information is also discussed in today's Decision.

Because of the unique nature of this proceeding, the Commission has decided also to address certain other concerns which have been brought to its attention in the context of the restart proceeding, but which fall outside the scope of the proceeding.

II. BACKGROUND

A. Establishment of the Proceeding — Effectiveness and Appellate Reviews

The law normally affords a licensee the opportunity to challenge an enforcement action in a public hearing prior to the time an enforcement action takes effect:

The norm for administrative action modifying outstanding licenses embraces a prior opportunity to be heard. . . .

[I]t has always been recognized that summary administrative action substantially curtailing existing rights . . . is a "drastic procedure." *Fahay v. Mallonee*, 332 U.S. 245, 253 (1947). See *Ewing v. Mytinger & Casselberry, Inc.*, 339 U.S. 594, 599 (1950); *Davis*, Administrative Law § 7.08.

Consumers Power Co. (Midland Plant, Units 1 and 2), CLI-73-38, 6 AEC 1082, 1083 (1973).

In this case, however, the Commission determined in 1979 that the public health, safety and interest required making the shutdown Orders

immediately effective.² Since the law obligates the Commission to lift the effectiveness of an immediately effective shutdown order once the concerns which led to making the order immediately effective have been adequately resolved, *see, e.g., Pan American Airways v. CAB*, 684 F.2d 31 (D.C. Cir. 1982); *Northwest Airlines v. CAB*, 539 F.2d 738 (D.C. Cir. 1976); *Air Line Pilots Ass'n, International v. CAB*, 458 F.2d 846 (D.C. Cir. 1972), *cert. denied*, 420 U.S. 972 (1975), the Commission provided for a dual review of the Licensing Board's decision. One review was the normal appellate review which consisted of appeals of Licensing Board decisions to the Atomic Safety and Licensing Appeal Board ("Appeal Board") and then to the Commission.³ The other, the "effectiveness review," involved determining whether to lift the immediate effectiveness of the shutdown Orders and authorizing plant operation during the pendency of the appellate review. *See* CLI-79-8, *supra*, 10 NRC at 149. This "effectiveness" review, which involves "the most discretionary aspects" of the Commission's enforcement authority, CLI-81-34, 14 NRC 1097, 1098 (1981), originally consisted of a review of decisions rendered by the Boards, other relevant information provided to the parties for comment, and party comments.

These two independent reviews have been simultaneously under way since the Licensing Board issued its first Partial Initial Decision. While the Commission originally anticipated that the effectiveness review would be completed before any of the appellate review was finished, the appellate review has been completed on all but the two remaining management issues, namely, training and the Dieckamp mailgram. Accordingly, the Commission's effectiveness review is now limited to whether the concerns regarding those two issues are such as to warrant maintaining the effectiveness of the shutdown Orders.⁴

Today's Decision is based on the record of the formal adjudication. This record includes the relevant adjudicatory decisions, and other matters and papers filed in the formal adjudication, including information

² In the Commission's July 2, 1979 Order directing that TMI-1 remain shut down pending further order, the Commission stated that it lacked the "requisite reasonable assurance" that Unit 1 "can be operated without endangering the health and safety of the public," and that "it is in the public interest that a hearing precede restart of the facility." This step was taken based upon a provision in the law that allows such immediate action when required by the public health and safety or public interest. *See* 10 C.F.R. § 2.202(f), which implements 5 U.S.C. § 558(c).

³ The Commission originally intended to conduct the appellate review of the Licensing Board's decision itself. Because of the complexity of the proceeding, the Commission subsequently established an Appeal Board to hear initial appeals. CLI-81-19, 14 NRC 304 (1981).

⁴ Neither the Licensing Board's forthcoming decision on the Dieckamp mailgram nor the appellate review of that decision and the training decision will be prejudiced by this effectiveness Decision. If the Licensing Board, or the Appeal Board or Commission as part of the appellate review, should determine that additional measures are required, appropriate action will be taken.

presented in motions to reopen the record and nondisputable matters such as personnel changes.

B. Proceedings Before the Licensing Board

The Licensing Board to date has issued four partial initial decisions in this proceeding.⁵ The first set forth the procedural background of the hearing and contained the Board's findings on the management competence of GPU Nuclear. Among the issues addressed in that decision were Licensee's management structure, the adequacy of its operator training program, its safety-related maintenance and repair procedures, management's response to the TMI-2 accident, and the Licensee's technical capability and resources. LBP-81-32, 14 NRC 381 (1981). With the exception of a subissue involving possible cheating on operator license examinations, over which it retained jurisdiction,⁶ the Board's conclusions on the management issues were favorable to resumed operation of TMI-1.⁷ On October 2, 1981, the Licensing Board reopened the record to hear evidence on the implications of the information on cheating, and appointed a Special Master to hear the evidence.

On December 14, 1981, the Licensing Board issued a Partial Initial Decision on hardware/design issues, the separation of Units 1 and 2, and emergency planning. This decision was also favorable to restart, subject to correction of various deficiencies. LBP-81-59, 14 NRC 1211, 1711.

The Special Master issued his recommended findings on the cheating issues on April 28, 1982. LBP-82-34B, 15 NRC 918. After reviewing the Special Master's Report, and the parties' written comments on that Report, the Licensing Board on July 27, 1982, issued its Third Partial Initial Decision, which addressed the cheating incidents. The Board, imposing four conditions on the Licensee's training program, concluded that the issues in the reopened proceeding "have been resolved in favor of restarting Three Mile Island Unit 1," and that the conclusions of the two

⁵ Over 155 days of adjudicatory hearings have been held in this proceeding, and thirteen parties have participated. In addition, thousands of members of the public who were not parties to the proceeding have provided written and/or oral statements.

⁶ Shortly before the issuance of the Board's first decision, the NRC Staff notified the Licensing Board of its investigation into alleged cheating by two of Licensee's senior reactor operators on NRC-administered, operator license exams. In light of this development the Board retained jurisdiction "to consider further the effect of the investigation of cheating on our decision subsequent to the issuance of the investigation report." 14 NRC at 403.

⁷ The Board, however, imposed ten license conditions regarding management, if Licensee were permitted to restart TMI-1.

earlier partial initial decisions remained in effect. LBP-82-56, 16 NRC 281, 385.

On May 3, 1985, the Licensing Board issued its Fourth Partial Initial Decision.⁸ LBP-85-15, 21 NRC 1409. That decision, issued in response to the Appeal Board's remand in ALAB-772, *see discussion infra*, addressed the adequacy of GPU Nuclear's licensed operator training program. The Licensing Board found the training program adequate, provided that GPU Nuclear "institute a procedure for evaluating after training the performance of its trained operators in the job setting for revision of the training program." *Id.* at 1536. The Board retained jurisdiction "solely for the purpose of approving the plan for job performance evaluation," *id.* at 1537, but held that the plan did not have to be developed or approved prior to restart.

C. Appellate Review

In the emergency planning area, the Appeal Board, although it modified somewhat the Licensing Board's decision, found that the plans were adequate once all required conditions were met. ALAB-697, 16 NRC 1265; ALAB-698, 16 NRC 1290 (1982). On September 8, 1983, the Commission completed its review of ALAB-697 and ALAB-698 and, reinstating a condition regarding staffing of the emergency offsite facility imposed by the Licensing Board, concluded that emergency planning for TMI-1 is adequate, subject to necessary Staff certifications.⁹ CLI-83-22, 18 NRC 299 (1983).

In the hardware area, the Appeal Board in ALAB-729, 17 NRC 814 (1983), found in favor of restart.¹⁰ The Commission took review of five issues in that opinion, and on July 26, 1984, resolved four of them on

⁸ In response to a Commission request in CLI-85-2, the Licensing Board on April 11, 1985, provided its ultimate conclusion on the training issue and the essence of the supporting rationale. LBP-85-10, 21 NRC 603.

⁹ Staff on April 2, 1985, certified that the conditions related to emergency preparedness had been satisfied.

¹⁰ As a separate matter, the Appeal Board on June 30, 1982, requested Commission authorization to hear three issues *sua sponte*: (1) repair of the corroded steam generator tubes; (2) possible cracking in some high-pressure nozzles or their thermal sleeves; and (3) possible distortion of auxiliary feedwater spargers. The Commission, although it agreed that these issues "must be satisfactorily resolved before . . . a decision on . . . restart," decided to handle these issues outside of the restart proceeding. CLI-82-12, 16 NRC 1, 1 (1982). The first issue is being addressed in the separate proceeding on the steam generator repairs at TMI-1. The Licensing Board issued a decision authorizing issuance of the license amendment necessary for operation with the repaired steam generators, LBP-84-47, 20 NRC 1405 (1984), *aff'd*, ALAB-807, 21 NRC 1195 (1985), and that amendment was issued. The latter two issues were addressed by the Staff in SECY-82-502. Staff found no cracking in TMI-1 nozzles or sleeves and that the feedwater sparger issue was inapplicable to TMI-1. The Commission accepts the NRC Staff's findings and is satisfied that these issues have been resolved.

the basis of the record already developed in this proceeding. On the fifth issue, the Commission directed Staff to certify the status of environmental qualification for radiation of certain electrical equipment.¹¹ CLI-84-11, 20 NRC 1.

In the management area, the Appeal Board on August 31, 1983, reopened the record on allegations made by Mr. Harold Hartman, a former TMI-2 operator, which dealt with possible falsification of leak rate data at TMI-2 prior to the accident. ALAB-738, 18 NRC 177.¹²

On May 24, 1984, the Appeal Board issued its decision on the rest of the management issues. ALAB-772, 19 NRC 1193. The Appeal Board found that the record needed further development on GPU Nuclear's licensed operator training program, and on a May 9, 1979 mailgram from GPU President Herman Dieckamp to Congressman Udall concerning the TMI-2 accident. The Appeal Board in ALAB-772 also granted a motion to reopen on pre-accident leak rate practices at TMI-1.

On September 11, 1984, the Commission took review of whether the hearings ordered by the Appeal Board in ALAB-738 and ALAB-772 were warranted, and whether any of the information in NUREG-0680, Supp. No. 5, "TMI-1 Restart, an Evaluation of the Licensee's Management Integrity as It Affects Restart of Three Mile Island Nuclear Station Unit 1, Docket 50-289" July 1984 ("NUREG-0680, Supp. No. 5"), warranted further hearings.¹³ CLI-84-18, 20 NRC 808. On February 25, 1985, the Commission held that for public policy reasons the Licensing Board should issue its decision on the two remaining issues in this proceeding — training and the Dieckamp mailgram — but no other hearings were warranted within the restart proceeding. CLI-85-2, 21 NRC 282 (1985).

The Commission in CLI-85-2 fully explained why no further hearings were warranted within the restart proceeding. Briefly summarized, the Commission found that no issue met the standards for reopening, i.e., raised a significant safety concern which might have affected the Licensing Board's decision. With regard to the three most significant issues dis-

¹¹ Staff on May 24, 1985, certified that the equipment was qualified.

¹² The Commission on October 7, 1983, took review of whether the hearing ordered by the Appeal Board should proceed prior to completion of an investigation into these allegations by the NRC's Office of Investigations and, to preserve the status quo, stayed the Appeal Board's decision while it conducted that review. Subsequently, the Department of Justice requested the Commission not to pursue this matter during the pendency of the criminal proceeding against Metropolitan Edison Co., *United States v. Metropolitan Edison Co.*, No. 83-00188 (M.D. Pa.), and the Commission agreed to cooperate. After the criminal proceeding was settled via a plea agreement and resulting conviction, the Commission lifted the stay. CLI-84-17, 20 NRC 801 (1984).

¹³ The NRC Staff in NUREG-0680, Supp. No. 5, set forth its latest evaluation of Licensee's management integrity, specifically focusing on matters addressed in numerous investigations conducted by the Commission's Office of Investigations.

cussed in CLI-85-2 — TMI-2 leak rate falsifications, TMI-1 leak rate practices, and Staff's "likely" change of position — the Commission found as follows.

Personnel changes and procedural safeguards have mooted the significance of the TMI-2 leak rate falsifications for current TMI-1 operations.¹⁴ Of those licensed to operate TMI-2 prior to the accident, only one — Michael Ross — is licensed to operate TMI-1, and he has been cleared of involvement in falsifications at TMI-2 by the NRC's Office of Investigations (OI) report. GPU Nuclear's upper management similarly has been cleared of involvement by the U.S. Attorney, based on a Grand Jury proceeding which led to the indictment of Metropolitan Edison Company. Hence the fact that individuals working at TMI-2 over 6 years ago may have falsified records has no significance to the current operation of TMI-1.

With regard to pre-accident TMI-1 leak rate practices, the Commission in CLI-85-2 explained that the circumstantial evidence of a few irregularities does not raise a current safety concern. OI investigated pre-accident TMI-1 leak rate practices, and found no pattern of falsifications, nor any motive to falsify. While the OI investigation did identify some procedural violations, such as the practice of discarding test results, those violations are just one more example of pre-accident deficiencies at TMI, and their significance today is minimal at best. The purpose of the restart proceeding was to determine whether current practices at TMI-1 provide reasonable assurance of safe operation. Whether TMI-1 can be safely operated was extensively litigated, and the Commission is satisfied, based on the extensive examination of GPU Nuclear in this proceeding, that the personnel, procedures, and organization currently in place provide reasonable assurance that similar procedural deficiencies will not recur.

The third significant issue in CLI-85-2 — Staff's "likely" change of position — is also of minimal current significance. Of the four events relied on by Staff for its "likely" change of position, one (the Floyd certification) was fully litigated, and the other three (TMI-2 leak rate practices, pre-accident training irregularities, and Licensee's response to the

¹⁴ The Commission in CLI-85-2 stated that it would be instituting a proceeding separate from the restart proceeding on TMI-2 leak rate falsifications "to determine the ultimate status of those likely involved in the TMI-2 leak rate falsifications, which includes those Licensee has segregated from operational duties at TMI-1 and those now working at other nuclear facilities." 21 NRC at 305. The Commission excluded from this hearing those cleared by the U.S. Attorney, and Michael Ross, cleared by OI's investigation. The Commission also offered Charles Husted an opportunity to request a hearing on a condition imposed by the Appeal Board which barred him from having any supervisory responsibilities insofar as the training of nonlicensed personnel was concerned.

1979 Notice of Violation) have no current significance. Therefore Staff's "likely" change of position does not warrant further hearings.

D. Effectiveness Review of Management Issues

The Commission as part of its effectiveness review of the Licensing Board's decisions has obtained written submissions from the parties, and has heard oral presentations by the parties on October 14, 1981, in Washington, D.C., on the Licensing Board's First Partial Initial Decision on management competence, and on November 9, 1982, in Harrisburg, Pennsylvania, on the next two Licensing Board partial initial decisions.¹⁵ In addition, the Commission held an evening session in Harrisburg on November 9, 1982, where it heard from members of the public regarding the restart of TMI-1.¹⁶

Subsequent to receipt of the parties' comments on the Licensing Board's decision on the cheating incidents, there were numerous developments in the management area which have led to additional oral and written presentations by the parties and have affected and substantially prolonged the Commission's review process. Although the Commission in CLI-85-2, *supra*, decided that none of this new information warranted further hearings, as summarized *supra*, the Commission will briefly discuss the chronology of events in order to place today's Decision in perspective.

On April 18, 1983, the NRC Staff advised the Commission that because of the pendency of several matters that might bear on the competence and integrity of TMI-1 management, the so-called "open issues," the Staff was initiating actions to "revalidate" its position that Licensee management had sufficient integrity to operate the facility.¹⁷ Staff in a May 19, 1983 memorandum to the Commission listed the following open issues: the *General Public Utilities (GPU) v. Babcock and Wilcox (B&W)* lawsuit transcript review;¹⁸ the Hartman allegations concerning

¹⁵ The parties mentioned in today's Decision are the Commonwealth of Pennsylvania (Commonwealth), the Union of Concerned Scientists (UCS), Three Mile Island Alert (TMIA), Marjorie and Norman Aamodt, the NRC Staff, and the Licensee.

¹⁶ The Commission has also solicited and received numerous written submissions from the public on whether and, if so, under what conditions, TMI-1 should be restarted.

¹⁷ Staff "revalidated" its position in NUREG-0680, Supp. No. 5, concluding that "there is reasonable assurance that GPUN can and will conduct its licensed activities in accordance with regulatory requirements and that GPUN can and will operate TMI-1 without undue risk to the health and safety of the public." *Id.* at 13-10.

¹⁸ GPU sued B&W in the United States District Court for the Southern District of New York (80 Civ. 1683(RO)), claiming that B&W, the manufacturer of the reactor's nuclear steam supply system, should be held liable for causing the TMI-2 accident. That lawsuit was settled after nearly 3 months of trial.

leak rate falsifications at TMI-2;¹⁹ the Parks, King, and Gischel allegations regarding improper practices and harassment at TMI-2 during the cleanup;²⁰ concerns raised by the firm of Rohrer, Hibler and Replogle (RHR) and by Basic Energy Technology Associates, Inc. (BETA) reports;²¹ and questions regarding whether GPU failed promptly to notify the Commission or Appeal Board of material information in the RHR, BETA and other reports.²² Subsequently, additional questions were raised regarding the preparation of the Keaten report by GPU,²³ leak

Much of the information developed in that trial appeared to relate to Licensee's management competence and integrity, and hence appeared relevant to the restart proceeding. Accordingly, the Commission directed the NRC Staff to review the trial transcripts and the exhibits, whether introduced in evidence or not, to determine whether they contained new information relevant to restart. The Commission also provided the parties to the restart proceeding an opportunity to comment on these documents and the Staff's review, and several parties submitted comments. Several issues arising from this review were referred to OI for investigation, and are discussed separately, *infra*.

The Appeal Board denied a motion to reopen the record based on the *GPU v. B&W* trial evidence, ALAB-738, 18 NRC 177, 195-97 (1983), and the Commission declined to take review of that holding.

¹⁹ Harold Hartman, a reactor operator at TMI-2 prior to the accident, alleged that leak rate tests, which were used to assess whether primary system leakage surpassed technical specification limits, were purposely manipulated and records of such tests falsified or destroyed at TMI-2 prior to the accident to cover up the fact that over an extended period of time the results of the tests exceeded Technical Specification limits. The Commission in CLI-85-2 explained that these allegations do not raise a concern for current operation of TMI-1. See discussion *supra*.

²⁰ Messrs. King and Gischel were employed by GPU Nuclear in connection with the ongoing cleanup of TMI-2. Mr. Parks was employed by Bechtel. They alleged that established safety procedures were not being followed in conducting the cleanup, and that they had been harassed by management for raising these concerns. These allegations were referred to OI, which conducted separate investigations into the alleged procedural violations and the harassment claims. OI Report Nos. 11-83-002 (May 18, 1984), 11-83-002 (September 1, 1983). The Appeal Board prior to completion of the OI investigations denied a motion to reopen the record on these allegations. ALAB-738, *supra*, 18 NRC at 197. Based on the OI investigations, the Commission found that Licensee had not discriminated against Messrs. King and Gischel. For the purpose of its analysis, the Commission accepted Staff's conclusion that Mr. Parks had been discriminated against, but found that this single act of discrimination did not meet the standards for reopening, particularly given that the major GPUN official involved no longer was associated with TMI-1. CLI-85-2, *supra*, 21 NRC at 327-29.

²¹ The RHR and BETA reports were prepared for Licensee by outside consultants. The RHR report ("Priority Concerns of Licensed Nuclear Operators at TMI and Oyster Creek and Suggested Action Steps" (Mar. 15, 1983)) dealt primarily with operator attitudes, while the BETA report ("A Review of Current and Projected Expenditures and Manpower Utilization for GPU Nuclear Corporation" (Feb. 28, 1983)) was designed to evaluate operational efficiency. Both reports contained information that appeared to bear on issues in the restart proceeding, and hence were the subject of comments by several parties. Staff in NUREG-0680, Supp. No. 4 ("TMI-1 Restart — An Evaluation of the RHR, BETA, and Draft INPO Reports" October 1983) evaluated these reports and found no significant new information. The Appeal Board denied a motion to reopen the record based on the substance of these reports. ALAB-774, 19 NRC 1350 (1984).

²² The NRC Staff concluded that the RHR and BETA reports were not provided to the NRC in a timely manner. This issue was referred to OI to determine why the reports were not provided at an earlier time. The OI investigation did not disclose evidence of a deliberate attempt by Licensee management to withhold information contained in the RHR and BETA reports from the NRC. OI Report No. 1-83-013, April 16, 1984. The Appeal Board denied a motion to reopen based on the reporting of these documents to the NRC, ALAB-774, *supra*, as did the Commission. CLI-85-2, *supra*, 21 NRC at 341.

²³ Questions regarding preparation of the Keaten report — an internal GPU report on the TMI-2 accident written by a task force headed by R.W. Keaten — arose from the review of the *GPU v. B&W* trial material. Essentially, this issue, which was investigated by OI, involves the propriety of changes made to drafts of the report by GPU management, and whether those changes reflect adversely on management's integrity. OI in its investigation did not find evidence of improper changes to the Keaten report itself.

(Continued)

rate practices at TMI-1,²⁴ pre-accident training irregularities,²⁵ changes to the Lucien Report,²⁶ and a change in operator testimony regarding the sequence of events during the accident.²⁷ Further, Licensee was indicted for criminal acts in connection with the Hartman allegations, and subsequently pled guilty to one count and nolo contendere on six others. The United States District Court for the Middle District of Pennsylvania on February 29, 1984, entered a judgment of guilty on the one count, and a judgment of conviction on the six counts to which Metropolitan Edison pled nolo contendere.

In response to these open issues, Licensee on June 10, 1983, committed to several significant organizational changes. Licensee committed to reassign personnel such that "no TMI-2 licensed operator will operate TMI-1, with the exception of the Manager of Operations, Michael Ross."²⁸ Licensee also committed to "add full time on shift operational

However, OI did find that Licensee in response to the NRC's October 25, 1979 Notice of Violation (NOV) had made inaccurate and incomplete statements. OI Report No. 1-83-012 (May 18, 1984). The Commission found that the removal of the individuals primarily responsible for the response to the NOV mooted any significance of this issue. CLI-85-2, *supra*, 21 NRC at 323, 334.

²⁴ The NRC Staff in its abbreviated investigation into leak rate test practices at TMI-2 discovered some questionable data at TMI-1. Accordingly, OI was asked to investigate possible leak rate falsification at TMI-1. OI completed its investigation (OI Report Nos. 1-83-028 and 1-83-028, Supplement, April 16, 1984) shortly before the Appeal Board reopened the record on this issue in ALAB-772, 19 NRC 1193 (1984), *rev'd*, CLI-85-2, 21 NRC 282 (1985). OI, although it identified some procedural irregularities, did not find either a pattern of falsifications or a motive to falsify. The Commission found that this issue did not meet the standards for reopening. *See* discussion *supra*.

²⁵ Staff in the review of the *GPU v. B&W* trial record found several pre-accident Licensee memoranda which indicated possible regulatory violations in Licensee's training program. OI conducted three separate inquiries into pre-accident training irregularities. OI Report Nos. Q-1-83-014 (May 31, 1983); Q-1-83-015 (July 26, 1983); Q-1-84-004 (March 22, 1984). OI determined that none of these inquiries warranted a full investigation. The Appeal Board in ALAB-774, *supra*, denied a motion to reopen based on pre-accident training irregularities.

²⁶ The *GPU v. B&W* trial record review also led to an OI inquiry into changes made to a technical report regarding the accident prepared by K.P. Lucien of Energy Incorporated under contract to the Licensee. OI Report No. Q-1-84-006 (May 18, 1984). Based on OI's investigation, the Commission found no direct evidence of wrongdoing, and concluded that hearings on this issue were not warranted. CLI-85-2, *supra*, 21 NRC at 337.

²⁷ OI also investigated the causes of a change in testimony by Licensee employees during the *GPU v. B&W* trial from their earlier statements concerning whether full-flow high pressure injection (HPI) had been manually initiated on the morning of the accident when the last two reactor coolant pumps were shut down. OI Report No. 1-84-005 (July 13, 1984). The Commission found from OI's investigation that there was no factual evidence to support the charge that the change in testimony was improperly motivated, and that this issue did not warrant reopening. CLI-85-2, *supra*, 21 NRC at 338.

²⁸ The Licensing Board described Mr. Ross as possibly "the most important person on the TMI-1 operating team as far as the public health and safety is concerned," LBP-81-32, *supra*, 14 NRC at 439, and hence Mr. Ross has been closely examined throughout this proceeding. As explained in CLI-85-2, the Commission finds that TMI-1 can be operated safely with Mr. Ross in his current position. 21 NRC at 298-99.

The Commission in CLI-85-2 modified Licensee's commitment and imposed it as a condition:

No pre-accident TMI-2 operator, shift supervisor, shift foreman, or any other individual both in the operating crew and on shift for training as a licensed operator at TMI-2 prior to the accident shall be employed at TMI-1 in a responsible management or operational position without specific Commission approval.

(Continued)

quality assurance [QA] coverage until the open issues are resolved.”²⁹ Further, Licensee stated that until the open issues were effectively resolved it would “reassign personnel such that those functions which provide overview assessment, analysis, or audit of plant activities would contain only personnel with no pre-accident involvement as exempt Met Ed employees at TMI-1 or 2.”³⁰ Finally, Licensee committed to “reallocate the priorities and assignments within the Office of the President of GPU Nuclear.”

The Commission on November 28, 1983, heard oral presentations from GPU on its June 10, 1983 management organization proposal and subsequent changes.³¹ GPU in its presentation stated that its June 10, 1983 plan had been implemented, and committed to taking the following further steps. First, GPU would elect to the GPU Nuclear Board of Directors three outside directors “with meaningful credentials and demonstrated independence.” Second, these new directors would comprise a Nuclear Safety and Compliance Committee of the GPU Nuclear Board, and that Committee would employ a staff to monitor the operation and maintenance of the GPU system nuclear units.³² Third, the Nuclear Safety and Compliance Committee would periodically issue reports regarding the operation and maintenance of the GPU system nuclear units, and those reports would promptly be provided to the

“Operational position” as used here includes any position involving actual operation of the plant, the direction or supervision of operators, or independent oversight of operations.

This condition shall also apply to the pre-accident Vice President, Generation, TMI-2 Station Manager, TMI-2 Supervisor of Technical Support (from January 1977 to November 1978), TMI-2 Superintendent of Technical Support (from December 1978 to the accident), and TMI-2 Supervisor of Operations. This condition shall not apply to Michael Ross, and Brian Mehler may continue in his present position consistent with this condition.

21 NRC at 341-42.

²⁹ See discussion *supra* for a listing of the “open issues.”

³⁰ Mr. Clark at the November 28, 1983 Commission meeting explained that “the exempt classification [a payroll classification] . . . picks up all supervisory management, all people charged with the responsibility for directing the operation. It does not pick up the workers, the hands-on people, be they mechanics or clerks.”

³¹ The Commission heard oral presentations by the other parties on December 5, 1983, on GPU’s proposal. Staff in its presentation set forth the conditions under which it believed TMI-1 could be safely operated, which included round-the-clock NRC inspection and a 25% power limitation.

UCS in comments dated January 25, 1984, argued that the Commission had failed to respond to the UCS request that the parties be provided an opportunity to present oral responses to Staff’s December 5 proposal. The Commission responded to the UCS motion by providing the parties an opportunity to submit written comments on Staff’s proposal. The parties also had the opportunity to discuss the Staff proposal in the August 15, 1984 oral presentations to the Commission.

³² Licensee notified the Commission on March 15, 1984, that Messrs. Lawrence L. Humphreys (Chief Executive Officer of UNC Nuclear Industries), Warren F. Witzig (Chairman, Nuclear Engineering Department, Pennsylvania State University), and Robert V. Laney (consultant in nuclear and energy project management) had been elected to the GPU Nuclear Board of Directors, and that they would make up the Nuclear Safety and Compliance Committee.

The Commission in CLI-85-2 adopted Licensee’s commitment as a condition: “Licensee, in the absence of Commission authorization to the contrary, is to retain its expanded Board of Directors and its Nuclear Safety and Compliance Committee.” 21 NRC at 342.

NRC and the public. Fourth, Mr. Robert Arnold, who had been President of GPU Nuclear, was reassigned to nonnuclear work within the GPU system. Mr. Philip Clark, formerly Executive Vice President, replaced Mr. Arnold as President of GPU Nuclear, while Mr. E.E. Kintner, formerly Vice President, became Executive Vice President. Both Messrs. Clark and Kintner were elected members of the Board of Directors of GPU Nuclear.³³

On January 27, 1984, the Commission set forth its tentative views and plan for resolution of management integrity issues prior to restart.³⁴ The Commission stated that the only then-ongoing OI investigation which might require further resolution prior to a decision on the management issues was the Unit 1 leak rate investigation. The Commission explained "that, in principle, temporary separation from nuclear operations of some GPU employees and other actions, including those proposed by the Licensee, can serve as an interim solution to the management integrity issues raised by the 'open items,' pending resolution of those items." The Commission also noted its view, "based on currently available information, . . . that neither Chairman of the Board William Kuhns nor President of GPU Herman Dieckamp will have to be temporarily or permanently separated from nuclear operations prior to restart."

The Commission on June 1, 1984, requested the parties

to comment on whether, in view of ALAB-772 and all other relevant information, including investigative reports by the Office of Investigations, the management concerns which led to making the 1979 shutdown orders immediately effective have been sufficiently resolved so that the Commission should lift the immediate effectiveness of those orders prior to completion of review of any appeals from ALAB-772.

Licensee, Staff, TMIA, the Aamodts, UCS and the Commonwealth submitted comments, and the Commission heard oral presentations from the parties on August 15, 1984.

³³ Subsequently, on February 6, 1984, GPU Nuclear announced further changes to its organization. Mr. John F. O'Leary, former Deputy Secretary of the Department of Energy and GPU Board member since October 1979, was elected Chairman of GPU Nuclear. Mr. Clark, President and Chief Operating Officer of GPU Nuclear, was also appointed Chief Executive Officer. Mr. Herman Dieckamp, former Chairman and Chief Executive Officer of GPU Nuclear since its inception, remained only as a member of the Board of Directors of GPU Nuclear, although he continued to hold the positions of President, Chief Operating Officer, and a member of the Board of Directors of GPU.

³⁴ The Commission on January 20, 1984, provided the parties with a list of integrity issues for comment. This list represented a compilation of issues having as their bases "facts or disputes about facts raised during the restart proceeding or thereafter, and which at face value appear to have some possible connection with management integrity." The list was designed to assist the Commission in identifying and evaluating issues concerning Licensee's integrity. Licensee, Staff, TMIA, the Aamodts, UCS, and the Commonwealth commented on that list.

Staff, as part of its comments, provided its "revalidation" of Licensee's management in NUREG-0680, Supp. No. 5. Staff in that evaluation found a

pattern of activity on the part of . . . Met-Ed [which], had it been known at the time [of the Licensing Board proceeding on TMI-1 restart], would likely have resulted in a conclusion by the staff that the licensee had not met the standard of reasonable assurance of no undue risk to public health and safety.

Id. at 13-5. With regard to the current Licensee, GPU Nuclear, Staff balanced the past improper acts of Metropolitan Edison against GPU Nuclear's record of remedial actions and performance, including the record of current senior management, and concluded that GPU Nuclear was acceptable.

The Commission, in its September 11, 1984 Order taking review of whether further hearings should be held, stated it would not rule "on whether to lift the immediate effectiveness of the 1979 shutdown orders until after it has decided on what further evidentiary hearings, if any, are required in the restart proceeding." The Commission further stated that, if it "decides that further hearings are required, it will decide whether the public health, safety and interest require completion of those hearings prior to a decision on lifting effectiveness." CLI-84-18, *supra*, 20 NRC at 809.

After the Commission decided what further hearings were required and the Licensing Board issued its partial initial decision on GPU Nuclear's licensed operator training program, the Commission heard oral presentations from the parties on May 22, 1985. The parties in their presentations addressed both the training decision and the overall question of whether the Commission should now lift the immediate effectiveness of the shutdown Orders.

III. THE COMMISSION'S EFFECTIVENESS DECISION

The Commission in CLI-85-2 decided that for public policy reasons the Licensing Board should issue a decision on the two issues remaining in this proceeding, training and the Dieckamp mailgram. The Commission further decided that hearings in the restart proceeding were not warranted on any other issue. The question before the Commission now is accordingly limited to whether any concerns regarding the training issue are such as to warrant maintaining the immediate effectiveness of the shutdown Orders prior to completion of the agency's appellate review of

that issue, and whether any concerns regarding the mailgram issue warrant maintaining the effectiveness of the shutdown Orders at least until the Licensing Board issues a decision on that issue.³⁵

As explained below, the Commission has decided that these two issues do not raise serious questions about whether TMI-1 can be safely operated, and accordingly do not warrant keeping TMI-1 shut down until agency proceedings have been completed. The Commission, after first placing these two issues in perspective by providing a general overview of the competence and integrity issues, will discuss below why these two issues do not raise serious questions about the current safe operation of TMI-1. The Commission will then address procedural issues raised by Intervenor. Finally, the Commission will discuss Staff's proposals of round-the-clock NRC inspection and a 25% power limitation.

A. Management Competence and Integrity

1. Introduction

In the Commission's August 9, 1979 Order, the Commission directed the Licensing Board to evaluate whether Licensee had sufficient managerial capability and resources to operate TMI-1 safely. CLI-79-8, *supra*, 10 NRC at 145. In a subsequent Order issued on March 6, 1980, the Commission gave the Licensing Board specific guidance on areas to be addressed in determining whether management had sufficient competence to operate the facility. CLI-80-5, 11 NRC 408 (1980).³⁶ The Licensing Board addressed these issues in its Partial Initial Decision of August 27, 1981, LBP-81-32, 14 NRC 381, and reassessed management competence after the cheating incidents in its Partial Initial Decision of July 27, 1982, LBP-82-56, *supra*.

³⁵ Were the Commission to wait for completion of the proceedings before the Licensing Board, it would then have to decide whether to await completion of the appellate review. As explained *infra*, the Dieckamp mailgram issue does not raise health and safety concerns that warrant maintaining the immediate effectiveness of the shutdown Orders. Therefore, there is no reason to postpone a decision until the Licensing Board issues its decision.

³⁶ The Commission in that order directed the Licensing Board to examine the following broad issues: (1) whether Metropolitan Edison's management is sufficiently staffed, has sufficient resources and is appropriately organized to operate Unit 1 safely; (2) whether facts revealed by the accident at Three Mile Island Unit 2 present questions concerning management competence which must be resolved before Metropolitan Edison can be found competent to operate Unit 1 safely; and (3) whether Metropolitan Edison is capable of operating Unit 1 safely while simultaneously conducting the clean-up operation at Unit 2.

CLI-80-5, *supra*, 11 NRC at 408. The Commission then went on to list 13 specific issues for the Licensing Board to examine in the course of examining the broad questions.

The Appeal Board in its review of the Licensing Board's decisions reopened the record on four management-related issues: the adequacy of training, the accuracy of the Dieckamp mailgram, pre-accident TMI-1 leak rate practices, and TMI-2 leak rate falsifications. The Appeal Board found the record on the remaining management issues to be adequate, and affirmed the Licensing Board's findings on those issues.

The Commission in CLI-85-2, *supra*, reversed the Appeal Board's decision to reopen the record on TMI-1 leak rate practices and TMI-2 leak rate falsifications. The Commission, having carefully reviewed the Appeal Board decisions on the management issues, is satisfied that the Appeal Board has thoroughly evaluated the major issues relating to management, and endorses its favorable substantive findings on Licensee's management. The Commission addressed the Appeal Board's conclusion that further hearings are required in CLI-85-2. The Appeal Board decisions, the Commission's decision in CLI-85-2, the Licensing Board's May 3, 1985 decision on training (LBP-85-15, *supra*), and the underlying adjudicatory record constitute the basis for the Commission's finding that GPU Nuclear has sufficient competence and integrity to operate TMI-1 safely. Nevertheless, because the management competence and integrity issues are so significant, for completeness, before addressing the training and Dieckamp mailgram issues, we will summarize here our reasons for endorsing the overall favorable findings in the adjudicatory proceeding on the management issues.

2. Overview

The Commission has indicated that the broad issues regarding competence to be considered in this proceeding are whether GPU Nuclear management "is sufficiently staffed, has sufficient resources and is appropriately organized to operate Unit 1 safely." CLI-80-5, *supra*, 11 NRC at 408. Essentially, the issue of competence concerns whether GPU Nuclear has the technical resources and capabilities to provide reasonable assurance that TMI-1 will be operated safely.

The concept of "integrity," or "character," is a more difficult one to define. *See generally, e.g.,* ALAB-772, *supra*, 19 NRC at 1206-08; *Houston Lighting and Power Co.* (South Texas Project, Units 1 and 2), LBP-84-13, 19 NRC 659 (1984). A generally applicable standard for integrity is whether there is reasonable assurance that the Licensee has sufficient character to operate the plant in a manner consistent with the public health and safety and applicable NRC requirements. The Commission in making this determination may consider evidence regarding licensee behavior having a rational connection to the safe operation of a nuclear

power plant.³⁷ This does not mean, however, that every act of licensee is relevant. Actions must have some reasonable relationship to licensee's character, i.e., its candor, truthfulness, willingness to abide by regulatory requirements, and acceptance of responsibility to protect public health and safety. In addition, acts bearing on character generally should not be considered in isolation. The pattern of licensee's relevant behavior, including corrective actions, should be considered.

Without question, the Metropolitan Edison management of TMI-2 prior to and immediately following the March 28, 1979 accident failed to provide the climate, resources, attitude, and leadership that the Commission expects of a licensee. We note that a portion of this proceeding and the parties' efforts have been devoted to demonstrating management's failures prior to the accident, which include the events leading to the criminal conviction of Metropolitan Edison. However, those past events are 6 years old, and the company responsible no longer operates TMI-1.³⁸ The Commission's responsibility and concern is with the management and company that would operate Unit 1 today, and with their willingness and ability to operate the plant according to the high standards that we require and that the public demands and deserves. Therefore, the Commission rests its decision on evidence demonstrating that past inadequacies have been corrected, and that the current company and management have the necessary competence and integrity to provide reasonable assurance that TMI-1 will be operated consistent with public health and safety and the Commission's requirements.

GPU Nuclear has replaced Metropolitan Edison as the company responsible for operation of TMI-1. GPU Nuclear has a new chairman and revised Board of Directors, a new President, Executive Vice President, Vice President of TMI-1, Chairman of the General Operations Review Board, and numerous other lower-level managers, as well as a substantially modified organizational structure and operational procedures.³⁹ It is the qualifications of this management, not the management of 6 years ago, that the Commission is now evaluating. The Commission is satisfied

³⁷ The references to "licensee behavior" include acts of licensee employees, since all organizations carry on their activities through individuals.

³⁸ Not only does a company with a different name now have responsibility for operation of TMI-1, but the organizational structure is substantially modified from the previous company and a substantial number of the individuals in direct management of TMI-1 at the time of the accident have been replaced. See discussion *infra*.

³⁹ See LBP-81-32, *supra*, 14 NRC at 403. Philip Clark, GPUN President, informed the Commission during oral presentations on August 15, 1984, of the current figures. Of the twelve senior GPUN employees, eight joined the GPU system after the TMI-2 accident. Three of the remaining four had no involvement with Metropolitan Edison. Of 435 key personnel (including managers, technical/professional and licensed operators), 235 joined GPU after the accident and another 100 had been employed within the GPU system prior to the accident, but not with Metropolitan Edison.

that current management has both the necessary competence and integrity to operate TMI-1 safely.

The Commission in reaching its favorable conclusion regarding management competence and integrity has considered the depth with which the performance and plans of the Licensee have been examined. Indeed, because of the TMI-2 accident, the Commission has examined the management of this utility more extensively than in any other case in NRC's history. That examination has shown that present GPU Nuclear management is fundamentally sound. Personnel changes in GPU Nuclear management in 1983-1984 (which were not in dispute) even further support this conclusion.⁴⁰

With regard to Licensee's overall competence, Licensee in the initial proceeding on management issues made a strong affirmative showing of the overall strength of its management structure, human resources, safety review process, and shift staffing commitments. The GPU Nuclear structure provides dedicated technical resources to operate GPU's nuclear facilities, thus minimizing resource competition from the nonnuclear aspects of GPU operations. The organization of GPU Nuclear provides significantly greater technical resources and more logically organized and accountable functional relationships than existed in Metropolitan Edison. The quantity of technical resources applied to nuclear operations has been significantly increased.⁴¹ Those GPUN managers new to the GPU system since the accident have extensive experience and significant technical qualifications that adequately correct pre-accident failings.

The training department has increased its staff, significantly expanded and modified the curriculum, and significantly increased the time devoted to operator training. An entirely revised maintenance system has been put in place since the accident. Subsequent allegations that management aided cheating were not proven during an extensive hearing. While the cheating should not have occurred, the Commission finds that, because present GPU Nuclear management did not participate in, encourage, or condone the cheating, those incidents do not undermine the overall competence of GPU Nuclear management to operate TMI-1 safely.

⁴⁰ No party moved to reopen the record based on these personnel changes.

⁴¹ See *id.* at 413. On August 15, 1984, GPU Nuclear provided the Commission with current information on its technical resources. Approximately 915 full-time company employees devote their efforts to TMI-1. Of these, 435 are key personnel, including managers, technical/professional positions, and licensed operators. Prior to the TMI-2 accident, Metropolitan Edison devoted approximately 315 employees to TMI-1, including 127 key personnel. Prior to the accident the TMI training staff was comprised of seven individuals. It now has 55.

The Commission finds, considering the above factors, that Licensee's current management has the requisite competence to provide reasonable assurance that TMI-1 can be operated safely.

With regard to Licensee's integrity, the restart proceeding would not have been as lengthy and complex as it has been had Licensee's performance been exemplary. The Licensee's performance since the accident has been marred first and foremost by the cheating incidents. In this connection the Commission notes not only the cheating itself, but Licensee's early unwillingness in a few particular instances to acknowledge the fact of cheating and to take prompt disciplinary action against those responsible.⁴²

GPU Nuclear was also responsible for several procedural violations during the TMI-2 cleanup, for procedural violations at TMI-1 found in the October 28, 1983 Region I inspection report, and for the harassment of Parks.

However, the issue before the Commission is not whether GPU Nuclear has made mistakes, but whether GPU Nuclear as presently constituted and staffed has the necessary integrity to provide reasonable assurance that it will safely operate TMI-1. The Commission finds that it has. GPU Nuclear has now shown a determination to correct its errors and improve itself. The Commission notes in this regard GPU Nuclear's willingness to seek the views of independent evaluators,⁴³ to implement their recommendations,⁴⁴ and to add qualified outside expertise to its staff.⁴⁵ Further, high-level management at GPU Nuclear has demonstrated a commitment to assure that a proper attitude is followed throughout the organization.⁴⁶

⁴² The Licensing Board in its May 3, 1985 decision on training (LBP-85-15, *supra*) found that Licensee's management had now accepted their responsibility for the cheating.

⁴³ For instance, Licensee contracted for the BETA and RHR reports, *see* note 21, *supra*, for a review of its training programs by Data Design Laboratories ("Assessment of Selected TMI-1 Training Programs" (Sept. 10, 1982)) ("1982 DDL Report"), and for an assessment by Admiral H.G. Rickover ("An Assessment of the GPU Nuclear Corporation Organization and Senior Management and Its Competence to Operate TMI-1" (Nov. 19, 1983)) ("Rickover Report"). Licensee has also been evaluated by the Institute of Nuclear Power Operations. These reports for the most part were generally favorable to Licensee.

⁴⁴ For instance, all but one of the original Operator Accelerated Retraining Program (OARP) Review Committee's recommendations on Licensee's training program have been or are being implemented, all but two of the recommendations in the RHR report have been or are being implemented, and all but two of the recommendations in the BETA report have been addressed, either through implementation or disagreement.

⁴⁵ For instance, GPU Nuclear has expanded its Board of Directors to include three outside directors, who will also head a Nuclear Safety and Compliance Committee. *See generally* note 32 and accompanying text, *supra*.

⁴⁶ For instance, upper management in response to the cheating personally interviewed operators to ensure that the operators understood that cheating would not be tolerated, and upper management in response to the Parks incident has implemented policies to ensure that harassment does not recur.

Most importantly, there is no persuasive evidence that any of the individuals in charge of GPU Nuclear have been personally implicated in wrongful acts. Indeed, the individuals currently responsible for the leadership of GPU Nuclear present an impressive array of credentials and experience. They are also responsible for the significant improvements made over the past performance of Metropolitan Edison Company.

The Commission finds that the present organization which will be responsible for operation of TMI-1 has demonstrated, both in personnel and in actions, that the past failings at TMI will not be repeated. In sum, after considering the personnel currently in charge of TMI-1 and the performance of GPU Nuclear, the Commission concludes that GPU Nuclear has the necessary competence and integrity to provide reasonable assurance of safe operation of TMI-1. The Commission expects GPU Nuclear to recognize that the public as well as the NRC will be closely watching its future performance, and therefore to strive to achieve standards of excellence that will serve as a model for the industry. We will now turn to the two specific issues still pending in the restart proceeding.

B. Whether the Training Issue Raises Concerns Warranting Maintaining the Immediate Effectiveness of the Shutdown Orders

1. Background

a. Proceedings Through ALAB-772

One of the most important issues in the restart proceeding is whether the operators at TMI-1 are adequately trained. In its First Partial Initial Decision, the Licensing Board, after reviewing the program, organization, and personnel devoted to training, concluded that "Licensee has in place at TMI-1 a comprehensive and acceptable training program." LBP-81-32, *supra*, 14 NRC at 478.

After the Special Master examined the cheating incidents, the Licensing Board in its Third Partial Initial Decision reevaluated the training program. The Licensing Board stated that it "remained convinced that the evidence supported the conclusion that Licensee's training program was well designed to train qualified operators and that there was a rational plan to implement the program." LBP-82-36, *supra*, 16 NRC at 379. The Board was satisfied that Licensee was devoting sufficient resources to its training program, and that Licensee "cannot be faulted in the selection of the advice it sought for its training program, the credentials of its training managers or on the general design of its training program." *Id.* The Licensing Board found that inadequacies in the administration of

the training program resulted from a failure to apply the principles of quality assurance and quality control to the instruction and examination process, and did not represent a total program failure. The Licensing Board imposed four conditions aimed at ensuring adequate program implementation, which were to be satisfied by Licensee within 2 years following any restart authorization.⁴⁷

The Appeal Board in ALAB-772 held that the Licensing Board had not developed an adequate record on the adequacy of the training program in light of the cheating incidents. The Appeal Board found that “[t]he deficiencies in operator testing, as manifested by the cheating episodes, may be symptomatic of more extensive failures in Licensee’s overall training program. Whether those deficiencies still exist or have been sufficiently cured is not evident from the record.” 19 NRC at 1233.

The Appeal Board held that the “principal difficulty” with the Licensing Board’s decision was its failure adequately to reconsider in light of the cheating incidents its earlier finding that Licensee’s training program was “‘comprehensive and acceptable.’” *Id.*, quoting 14 NRC at 478. The Appeal Board noted in this regard “that the generally positive testimony of the OARP Review Committee and licensee’s other independent consultants was of decisional significance” to the Licensing Board’s initial favorable finding.⁴⁸ *Id.* at 1234. The Appeal Board noted that the OARP Review Committee prior to the cheating incidents had found “pre-accident neglect” of the TMI Training Department and identified shortcomings (such as bitterness and anxiety among some employees, inadequate training facilities, and the need for special teacher training for the instructors). Despite these criticisms, the OARP Review Committee on balance gave the Licensee’s training program high marks. The Appeal Board believed that additional testimony was required from the

⁴⁷ Those four conditions were:

- “(1) There shall be a two-year probationary period during which the Licensee’s qualification and requalification testing and training program shall be subjected to an in-depth audit by independent auditors, approved by the Director of NRR, such auditors to have had no role in the TMI-1 restart proceedings.
- (2) Licensee shall establish criteria for qualifications of training instructors to ensure a high level of competence in instruction, including knowledge of subjects taught, skill in presentation of knowledge, and preparation, administration, and evaluation of examinations.
- (3) Licensee shall develop and implement an internal auditing procedure, based on unscheduled (‘surprise’) direct observation of the training and testing program at the point of delivery, such audits to be conducted by the Manager of Training and the Supervisor of Operator Training and not delegated.
- (4) Licensee shall develop and implement a procedure for routine sampling and review of examination answers for evidence of cheating, using a review process approved by the NRC Staff.”

16 NRC at 384. The last three of these conditions have been implemented. Design Data Labs has been hired (and approved by Staff) to do the in-depth audit required by the first condition. The probationary period has been incorporated as a license condition.

⁴⁸ The OARP Review Committee was comprised of five individuals with expertise in various aspects of training who are not affiliated with the Licensee, although their compensation was paid by Licensee.

OARP Review Committee regarding how it would now strike the balance between the positive and negative aspects of the program. The Appeal Board held that, “[o]nce the cheating incidents raised questions about that judgment, it was incumbent upon the Board to seek further testimony from the independent experts upon which it so heavily relied in the first instance.” *Id.* The Appeal Board therefore reopened the record and directed the Licensing Board to take further evidence from the OARP Review Committee regarding the effect of the cheating incidents on its earlier favorable findings.⁴⁹

b. The Licensing Board's Decision on Remand

The Licensing Board, following the lead of Licensee and UCS, chose to interpret the Appeal Board's directive broadly. Thus, rather than limiting the hearing to the views of the OARP Review Committee, the Board considered the overall question of whether GPU Nuclear's licensed operator training program is adequate to prepare the TMI-1 licensed operators to operate the plant safely.⁵⁰

The Licensing Board, after examining all the evidence before it,⁵¹ concluded “that the Licensee has made an appropriate response to the 1981 cheating episodes and to the concerns of the Appeal Board set out in ALAB-772.” *Id.* at 1419. The Board found Licensee's response satisfied each of the following four essential elements: (1) management personnel have conceded their failures in connection with the cheating, have committed to prevent any recurrence, and have extensively improved communications between management and employees; (2) employee attitudes have improved; (3) examination security will prevent future cheating; and (4) the training program has been improved. The fourth element was the most extensively litigated, and received the most attention in the Board's decision.

⁴⁹ In CLI-85-2, the Commission, noting that the evidentiary hearing on training had been completed, found that for public policy reasons the Licensing Board should proceed to issue its decision. 21 NRC at 289.

⁵⁰ Licensee chose to present testimony on the overall adequacy of its training program, and UCS challenged that overall adequacy. The Board explained as follows: “The Board agreed with the Staff that ALAB-772 did not remand this matter to litigate again the entire licensed-operator training program. Licensee and UCS, having elected a complete litigation, the Board followed them, because a complete case tended to bound the concerns of ALAB-772.” LBP-85-15, *supra*, 21 NRC at 1533.

⁵¹ Six groups of witnesses testified in the reopened hearings on training. Licensee presented four groups, consisting of the panel of five experts who made up the Reconstituted OARP Review Committee, and three groups of Licensee employees involved in the training program. Staff presented a panel of witnesses who testified regarding the methodology used by the Reconstituted OARP Committee to evaluate the training program. Finally, a UCS witness also testified regarding the methodology which should be used to evaluate a training program.

The Licensing Board in reaching its decision examined the personnel in charge of the training program, management's response to the cheating, including employee attitudes, and the licensed-operator training program itself. The examination of the training program included an examination of program development and methodology, substance and execution, and program evaluation and feedback.

The Board found that the "licensed operator training program for TMI-1 is adequate to train reactor operators and senior reactor operators to operate the unit safely," *id.* at 1536, with one proviso. That proviso was that the "training program needs improvement because it does not provide for the evaluation of its trained personnel in the job setting for the purpose of validating and revising its training program." *Id.* at 1502. To correct this deficiency, the Board imposed a condition requiring Licensee to "implement a plan to evaluate the performance of trained reactor operators and senior reactor operators in the job setting for revision of its TMI-1 licensed-operator training program." *Id.* at 1536. The Board, although it retained jurisdiction to review the terms of the license condition to be proposed by Licensee, held that this plan did not need to be developed and approved prior to restart.⁵²

Finally, the Board considered the impact of the views of the Reconstituted OARP Review Committee.⁵³ The Board could not find from the

⁵² The Licensing Board had explained in its April 11, 1985 Response to CLI-85-2 that "(f)ormal evaluation of operator performance in the job setting is almost by its very nature a function best performed after restart . . ." LBP-85-10, 21 NRC 603, 607 (1985).

⁵³ The Reconstituted OARP Review Committee (Reconstituted Committee) conducted two reviews of Licensee's training program. The first, which consisted of reviewing documents, interviewing training instructors, supervisors and administrators, and inspecting training facilities, was conducted in response to the Appeal Board's decision in order to provide a Report to the Commission in connection with a then-upcoming meeting on whether to lift the effectiveness of the shutdown Orders. The Reconstituted Committee in its July 3, 1984 "Special Report of the Reconstituted OARP Review Committee" ("Special Report") responded to the Appeal Board's concerns "[w]ithin the limits of time and resources available." Special Report at 5. The Reconstituted Committee stated in that Special Report that the cheating incidents "were extremely serious and reflect unfavorably on the organizations as well as the individuals involved." *Id.* Nonetheless, the conclusions of the Reconstituted Committee were favorable.

The Reconstituted Committee conducted a further review of the training program in order to prepare its testimony. In that review, the Reconstituted Committee reviewed pertinent documentation, interviewed personnel, observed training sessions, and visited relevant facilities. The Reconstituted Committee in their testimony discussed, among other things, Licensee's training resources and management, the training staff, instructor development, licensed operator training programs and procedures, and communications between management, training and operations personnel. The Committee also discussed the specific sub-issues raised by the Intervenors.

The Committee, recognizing that its earlier Special Report had been limited by time constraints, explained that, subsequent to that report, each member had spent as much time as he had available to further review Licensee's training program to provide assurance that the conclusions reached in the Special Report were correct. The Committee concluded as follows: "[I]t is the Committee's judgment that the licensed operator training program at TMI-1 is an effective program and will continue to qualify individuals to operate TMI-1. The Committee thus takes this opportunity to reaffirm the conclusions reached in the Special Report . . ."

substance of the Committee's review alone that the Committee's ultimate conclusion — that the program was adequate to produce individuals competent to operate TMI-1 — was either correct or incorrect. However, the Licensing Board did find that the Committee satisfied the remanded order in ALAB-772, in that the Committee "provided its very carefully constructed and well-founded opinions on the basic issue and various subsidiary evidentiary questions just as the Appeal Board requested." LBP-85-15, *supra*, 21 NRC at 1534. Therefore, the Board, rather than attempting to separate the Committee's findings and testimony from the other evidence, simply used those findings in conjunction with other evidence in analyzing each issue regarding Licensee's training program.⁵⁴ The Board in this regard noted the very high value it placed on the Committee members' opinions.

c. Analysis

The concerns about Licensee's training program which led in part to making the 1979 shutdown Orders immediately effective were based on the apparent deficiencies in Licensee's pre-accident training program. Licensee's current training program, as extensively described by the Licensing Board, bears little resemblance to that pre-accident program.

There have now been three hearings which have considered the adequacy of GPU Nuclear's licensed operator training program. The Licensing Board found that Licensee's improvements to its training program over this time period have been significant. Licensee has substantially improved the licensed operator training staff for TMI-1,⁵⁵ upgraded the

⁵⁴ The Licensing Board also addressed the impact of INPO's accreditation of Licensee's training program. As the Board did not rely on this accreditation in its decision, that accreditation need not be further addressed here.

⁵⁵ As summarized by the Licensing Board:

In 1981, it [the licensed operator training staff] consisted of one supervisor and two instructors, who were SRO-licensed. Two contractor-supplied personnel also were assigned. None of these individuals held degrees. . . . Today, manpower in the Operator Training section devoted to TMI-1 licensed operator training consists of one manager, one administrative assistant, two staff positions (both with responsibilities as instructors), one supervisor, and three instructors (one of whom is assigned as Supervisor of Nonlicensed Operator Training). Of the six persons designated to conduct licensed operator training, four have been licensed or certified as senior reactor operators. Three of these licenses are current; the other is not, but that instructor is now requalifying for a current SRO license. . . . The combined nuclear power plant experience of the staff is 48 years, of which 25 years are commercial. The combined instructor experience for the Operator Training staff is 29 years, of which 22 years are in the nuclear field. Five of the staff hold bachelor's degrees; one of these has a master's degree as well.

Id. at 1428 (citations omitted). In addition, there is now a separate Simulator Development Section of the Training Department that consists of one manager and three instructors. *See id.* at 1429.

training facilities and support equipment,⁵⁶ and changed the training program “from a traditional, knowledge-based program that depended heavily upon the prior knowledge of the instructors to a very modern, structured, performance-based program.” *Id.* at 1420.⁵⁷

The question facing the Commission, then, is whether, after three exhaustive hearings and a Licensing Board decision favorable to Licensee,⁵⁸ there are still concerns about Licensee’s licensed operator training program which warrant maintaining the effectiveness of the shutdown Orders. In light of the depth of examination given Licensee’s training program and the Licensing Board’s favorable findings, the answer to this question is favorable to restart. The Commission finds that there are no concerns about the adequacy of GPU Nuclear’s training program which would warrant maintaining the immediate effectiveness of the shutdown Orders during the agency’s appellate review of the Licensing Board’s decision.⁵⁹

⁵⁶ “An upgrading of training facilities and support equipment has been in progress since 1980. The majority of classroom training for licensed operators now takes place in a modern, 20,000-square-foot training center built for this purpose and first occupied in mid 1981. The center, used entirely for training purposes, has fifteen classrooms (two of which can be combined into an auditorium). It houses the Basic Principles Training Simulator (BPTS) and its support equipment, a control room mockup, office space for a training staff of sixty-two, a library, file room, audio-visual equipment room, conference room and photocopy, vending machine, storage and rest room areas. . . . A new, identically sized building has been designed with construction to begin in the Spring of 1985. This building will house the BPTS and the new replica simulator (under construction), the Communications Division, and will provide more instructor work area.” *Id.* at 1430.

⁵⁷ The credit for this improvement must be given to the managers now in charge of Licensee’s training program. *See id.* at 1455.

⁵⁸ Concerning the one deficiency found by the Licensing Board, the Commission agrees that job performance evaluations are best performed after a plant goes into operation, and that this condition need not be met prior to restart. *See* LBP-85-10, *supra*. With regard to whether reasonable progress has been made on this item, the Board stated that Licensee would demonstrate reasonable progress if it began immediately to satisfy the requirement. Licensee on May 28, 1985, submitted a proposed plan to satisfy this requirement. Under the terms of the Board’s decision, this is sufficient to demonstrate reasonable progress.

⁵⁹ On May 22, 1985, TMIA moved the Commission to reopen the record. TMIA claimed that it had just discovered another instance of cheating by Floyd in 1979, and that Licensee’s failure to produce this information during the hearings undermines the Licensing Board’s conclusion in its May 3, 1985 Partial Initial Decision on training that Licensee’s managers have acknowledged their failures and their responsibility to prevent cheating.

The Licensing Board’s May 3, 1985 decision has been appealed to the Appeal Board. Accordingly, that Board is the appropriate one initially to consider TMIA’s motion. That motion is therefore hereby referred to the Appeal Board.

The Commission has nonetheless considered whether the pendency of that motion should impact on today’s Decision. The Commission has decided that it should not. First, Licensee identified this incident to the Commission and parties on June 1, 1984, nearly 1 year before TMIA chose to file its motion to reopen. TMIA’s motion therefore appears to be untimely, and should not cause any further delay in making today’s Decision.

More importantly, the adequacy of Licensee’s *current* training program has been litigated and found to be acceptable. The consideration of the current training program specifically included whether adequate remedial steps had been taken in response to earlier cheating. One more example of earlier cheating would be redundant and of minimal significance.

(Continued)

C. Whether the Dieckamp Mailgram Issue Raises Concerns Which Warrant Maintaining the Immediate Effectiveness of the Shutdown Orders

1. Background

On May 7, 1979, Congressman Udall, then-Commissioner Gilinsky and others toured Three Mile Island. James Floyd, who was at that time TMI-2 Supervisor of Operations, conducted the tour of the TMI-2 control room. Mr. Floyd during that tour stated that on the first day of the accident a pressure spike⁶⁰ occurred which initiated the containment building spray. He asserted that the spike had been observed by Licensee personnel and an NRC inspector.

On May 8, 1979, the *New York Times* published an article describing Mr. Floyd's presentation. The paper stated that Mr. Floyd asserted that control room personnel and NRC inspectors knew the plant's fuel core was seriously damaged 2 days before the damage was formally reported and the seriousness of the accident made public.

Herman Dieckamp, GPU President, on May 9 sent a mailgram to Congressman Udall with a copy to then-Commissioner Gilinsky. That mailgram stated, in pertinent part, "[t]here is no evidence that anyone interpreted the 'pressure spike' and the spray initiation in terms of reactor core damage at the time of the spike nor that anyone withheld any information."

In the original management hearings, neither the parties nor the Licensing Board pursued whether Dieckamp told the truth in the mailgram. Instead the Licensing Board relied on the NRC's Office of Inspection and Enforcement (IE) investigation and testimony to conclude that Mr. Dieckamp had not made a material false statement, and that Mr. Dieckamp believed the statement to be true when he made it. LBP-81-32, *supra*, 14 NRC at 555-56.

In ALAB-772, *supra*, the Appeal Board found the Licensing Board's reliance on IE's investigatory report unjustified because of the conclusory nature of that document. The Appeal Board noted that no party had actively pursued this issue and that no party had chosen to cross-examine Mr. Dieckamp on the mailgram when he testified in the proceed-

With regard to the assertion that Licensee withheld the information, the Commission need only note that Licensee itself identified this information 1 year ago.

The Commission therefore concludes that the pendency of this motion to reopen does not raise concerns which would warrant maintaining the effectiveness of the shutdown Orders.

⁶⁰ The "pressure spike" refers to the sudden increase in containment pressure during the accident from about 3 to 28 psig, followed by a rapid decrease to 4 psig. This spike was due to the burning or explosion of hydrogen, which is symptomatic of core damage.

ing. Nonetheless, it held that the Licensing Board erred in not pursuing the matter more fully. Although the Appeal Board noted that it was not suggesting any wrongdoing by Mr. Dieckamp, and that further hearings might not be very fruitful because memories fade after 5 years, it remanded the matter to the Licensing Board for further hearings in order not to "leave it dangling." 19 NRC at 1268.

On February 25, 1985, the Commission found as a matter of public policy that the Licensing Board should issue a decision on the Dieckamp mailgram issue. The Commission in that Order noted that Mr. Dieckamp continues to hold a high-level position with Licensee's parent organization, and that hearings would resolve any "lingering questions." CLI-85-2, *supra*, 21 NRC at 289.

2. Analysis

The Commission has given considerable thought to whether it should wait for the Licensing Board to issue its decision on the mailgram issue before making its decision as to whether to lift the immediate effectiveness of the shutdown Orders. The Commission has determined that the mailgram issue does not raise health and safety concerns that would warrant maintaining the immediate effectiveness of the shutdown Orders.

Mr. Dieckamp is no longer President of GPU Nuclear and is not involved in the daily operations at TMI-1. Although he continues to serve on the Board of Directors of GPU Nuclear, in that position he does not have day-to-day responsibility for the safe operation of the facility. Executive management responsibility is vested in Messrs. Clark, Kintner, and O'Leary, none of whom were at GPU at the time of the accident. Moreover, these individuals have direct access to the parent Board of Directors of GPU for matters of safety and budget without going through Mr. Dieckamp in his role as President of GPU. We do not believe that under the present organizational structure and procedures, including provision for independent oversight of nuclear safety, Mr. Dieckamp's presence as President of GPU and as a Board member of GPUN could adversely affect the safe operation of TMI-1, especially for the short period before the Licensing Board renders a decision.

We further emphasize that in ordering further hearings the Appeal Board did not find that Mr. Dieckamp had probably engaged in wrongdoing. Rather, the Appeal Board wanted to resolve any lingering suspicions. If the Licensing Board should determine that Mr. Dieckamp has engaged in wrongdoing, the Commission will take appropriate action. However, options to be considered in that event would not include shutting down the facility.

D. Procedural Issues

1. *Applicable Standards for an Effectiveness Decision*

UCS argues that this proceeding is no longer an enforcement proceeding where the issue would be whether to lift the immediate effectiveness of the shutdown Orders. UCS contends instead that, because the Licensing Board has imposed license conditions, it is a license amendment proceeding. UCS therefore concludes that the standards in 10 C.F.R. § 2.764 or § 2.204 for making a Licensing Board decision immediately effective should apply, and that these regulations do not allow the Commission to make an “immediate effectiveness” decision where the controlling decision — the Appeal Board’s decision in ALAB-772 to reopen the record — is not favorable to operation.

The Commission does not agree with UCS. That the Licensing Board has imposed license conditions does not convert this proceeding into a license amendment proceeding. Once the Commission establishes a formal adjudicatory hearing in an enforcement case, as it did here, it need not grant separate hearings on any license conditions that are imposed as a direct consequence of that enforcement hearing. The UCS logic would lead to a situation in which every condition or qualification on operation suggested in an enforcement hearing would have to be recycled through an array of separate additional hearings.⁶¹

Therefore this remains an enforcement proceeding, and neither § 2.764 nor § 2.204 is applicable.⁶² Rather, the standard for determining

⁶¹ Nor would restart itself constitute a license amendment, as UCS contends. Restart involves lifting a suspension, and hence does not create new hearing rights. *See, e.g., San Luis Obispo Mothers for Peace v. NRC*, 751 F.2d 1287, 1314 (D.C. Cir. 1984); *Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station)*, CLI-79-7, 9 NRC 680, *aff’d*, *Friends of the Earth v. United States*, 600 F.2d 753 (9th Cir. 1979); *Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 and 2)*, CLI-80-10, 11 NRC 438 (1980), *aff’d*, *Save the Valley v. NRC*, 714 F.2d 142 (6th Cir. 1983) (Table).

⁶² Section 2.204, which provides that the Commission shall make a license amendment immediately effective upon finding that the public health, safety, or interest so requires, applies only when the Commission makes the determination to make a license amendment effective without affording an opportunity for a prior hearing. Here an exhaustive hearing has already been held on possible amendments to the license, and since additional amendments would be imposed or granted only as a result of a prior hearing, § 2.204 does not apply.

Section 2.764(f)(2) of 10 C.F.R. is similarly inapplicable. Section 2.764(f)(2)(i) provides that the Commission shall make a Licensing Board decision authorizing a unit to operate at full power immediately effective

if it determines that it is in the public interest to do so, based on a consideration of the gravity of the substantive issue, the likelihood that it has been resolved incorrectly below, the degree to which correct resolution of the issue would be prejudiced by operation pending review, and other relevant public interest factors.

The standards in § 2.764(f)(2) apply only to initial licensing decisions. TMI-1 received an operating license in 1974, and a decision to allow restart of TMI-1 would reinstate Licensee’s rights under that operating license. That license conditions have been imposed as a result of the hearing process does not convert this enforcement proceeding into a licensing action such that § 2.764 would apply, as any enforcement proceeding can lead to license conditions.

whether to lift the immediate effectiveness of an enforcement order is whether the concerns which led to making that order immediately effective have been adequately resolved. Once this has been done, the Commission is legally obligated to lift the immediate effectiveness of the order, regardless of the nature of the latest Board decision.⁶³ As the Commission explained in an earlier order:

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.

CLI-81-34, 14 NRC 1097, 1098 (1981).

2. *Whether the Commission Can Base Its Effectiveness Decision in Part on Information Outside the Formal Adjudicatory Record*

UCS, TMIA and the Aamodts argue that the Commission must base its decision whether to lift the immediate effectiveness of the shutdown Orders on the formal adjudicatory record. They argue that the Commission's regulations do not authorize consideration of off-the-record material and that such consideration denies them the fundamental right of cross-examination.

The Commission's decision today is based entirely on the formal record of the proceeding.⁶⁴ The Commission therefore need not address this argument.

3. *Legal Effect of ALAB-772 on Lifting Immediate Effectiveness*

UCS argues that the Commission cannot lift the effectiveness of the shutdown Orders because its earlier orders establish that the Commission may not order restart unless the Boards' decisions are favorable to

⁶³ The Aamodts on October 27, 1983, requested the Commission to revoke GPU Nuclear's license to operate TMI-1. For reasons set forth in this Order the Commission has denied that request.

⁶⁴ As explained *supra*, the formal record includes information presented in motions to reopen the record and undisputable matters such as personnel changes. It also includes the fact that GPUN has taken various corrective steps, such as commissioning independent reviews. See note 43, *supra*. The substantive conclusions of these reports were not litigated, however, and accordingly are not considered in today's Decision.

restart. Similarly, UCS maintains that this is no longer a case of lifting the immediate effectiveness of a shutdown order, because Licensee has had a hearing and failed to prevail. Hence, UCS concludes, restart cannot be authorized unless and until the Licensing Board finds in Licensee's favor on all issues.

The Licensing Board has now found in Licensee's favor on all but one issue, the Dieckamp mailgram, which remains pending before the Board. Hence the UCS arguments are moot except for that issue.

The Commission already has concluded that the mailgram issue does not raise health and safety concerns that warrant maintaining the immediately effective shutdown Orders. Clearly the Commission is not legally bound to wait for a Licensing Board decision on such an issue prior to lifting the immediate effectiveness of the shutdown Orders. The Appeal Board did not find against Licensee; rather, the Appeal Board found the evidentiary record inadequate to resolve one way or the other whether Mr. Dieckamp engaged in any wrongdoing. TMI-1 is shut down, then, not because of the Appeal Board's decision, but because of the immediately effective shutdown Orders. The UCS argument that Licensee has had a hearing and failed to prevail is therefore without merit.

Concerning whether the Commission has bound itself to await a final Licensing Board decision, no matter how insignificant the issue for safe operation of TMI-1, the Commission in the August 9, 1979 Order establishing the restart proceeding stated that, "[i]f the Licensing Board should issue a decision authorizing [restart] . . . , the Commission will . . . decid[e] whether the provision of this order requiring the licensee to remain shut down shall remain immediately effective." CLI-79-8, *supra*, 10 NRC at 149. *See also* CLI-81-19, 14 NRC 304, 305 (1981); Order of March 10, 1982 (unpublished); Order of July 2, 1979 (unpublished).

The Commission subsequently stated, however, that if the public health, safety and interest no longer require the suspension, "then the Commission is required by law — whatever the nature of the Licensing Board decision — to lift that suspension immediately." CLI-81-34, *supra*, 14 NRC at 1098. Hence the Commission has put the parties on notice that the entire hearing and decision process did not necessarily have to be completed before an effectiveness decision.

Even if the Commission had not put the parties on notice, moreover, the change in circumstances since this proceeding began in 1979 would justify the course chosen in this Order. When the Commission originally contemplated that it would consider restart only if the Licensing Board's decision were favorable, it did not envision that the proceeding would

last over 5 years⁶⁵ or that only one issue not significant for safe plant operation would remain before the Licensing Board, and that after an appellate remand. The Commission cannot ignore its legal obligation to lift the immediate effectiveness of a shutdown order once the concerns which led to making that order immediately effective are satisfied, even if a single issue not significant for safe plant operation remains pending before the Licensing Board. *See, e.g., Sacramento Municipal Utility District (Rancho Seco Nuclear Generating Station), CLI-79-7, 9 NRC 680 (1979)* (resumption of operation authorized prior to hearing); *see also ICC v. Oregon Pacific Industries, 420 U.S. 121, 127 (1975)* (Powell, J., concurring); *Pan American Airways v. CAB, 684 F.2d 31 (D.C. Cir. 1982)*; *Northwest Airlines, Inc. v. CAB, 539 F.2d 748 (D.C. Cir. 1976)*; *Airline Pilots Ass'n, International v. CAB, 458 F.2d 846 (D.C. Cir.), cert. denied, 420 U.S. 972 (1975)*. Hence the pendency of the mailgram issue before the Licensing Board does not preclude the Commission from lifting the immediate effectiveness of the shutdown Orders.

E. Staff's Proposal of a 25% Power Limitation and Round-the-Clock NRC Inspection

The NRC Staff at one time proposed limiting the power level to 25%, with operation beyond 25% depending "upon the functioning of the GPUN Nuclear Safety and Compliance Committee, a Staff report on plant operations at 25% of power with no major safety problems having been identified, and an evaluation of the GPU operational QA [quality assurance] coverage." Staff also would require round-the-clock NRC inspection, "at least until the licensee's operational QA coverage and the Nuclear Safety and Compliance Committee of the licensee's Board of Directors are solidly in place and functioning." These conditions were apparently originally based on concerns both about the integrity of those who will be operating TMI-1 and about the effect of 6 years of nonoperation on plant systems and personnel. Although Staff has not repeated this proposal in recent filings, the Commission has decided that it warrants some discussion.

The Licensee, UCS, and the Aamodts commented specifically on Staff's proposed conditions. Licensee stated that a temporary limit of 40-45% of full power would be more meaningful in terms of plant conditions and operator experience than the 25% proposed by Staff.

⁶⁵ The Commission in its August 9, 1979 Order suggested a tentative schedule for the restart proceeding under which the Licensing Board would have issued its decision in slightly under 1 year. CLI-79-8, *supra*, 10 NRC at 152.

UCS argued that the Staff's goals in limiting operation to 25% power can be achieved at 5% power, and that an accident at 25% could result in release of radiation beyond the limits permitted by 10 C.F.R. Part 100. Hence UCS concluded that a 25% power limit is unsupported.

The Aamodts maintained that round-the-clock NRC inspection would be inadequate because of the NRC's lack of specific knowledge of how TMI-1 operates and because such a "policing action by NRC is not an acceptable alternative to a competent and trustworthy management or experienced and trained operators." The Aamodts also questioned the competence and integrity of NRC inspectors, and noted that NRC surveillance would create practical and legal problems concerning who had responsibility for operating the plant.

The Commission has determined that the management concerns which led to making the 1979 shutdown Orders immediately effective have been resolved adequately, and hence that GPU Nuclear has the required competence and integrity to operate TMI-1 safely pending completion of further proceedings. Therefore, the Commission has decided not to impose on Licensee for integrity reasons either of Staff's proposed conditions.

However, the Commission notes that TMI-1 has been shut down for over 6 years. The Commission believes because of this consideration alone that the power level should be raised gradually to ensure that all components of the facility still function properly, and that there is an adequate opportunity to operate the plant at low power levels. Accordingly, to ensure a safe return to operation, the Commission directs the Licensee to submit a power ascension schedule, with hold points as necessary at appropriate power levels, to the NRC Staff for its approval prior to restart. Licensee is not to restart TMI-1 until the Staff has approved the proposed power ascension schedule.

Furthermore, because the facility has not operated for 6 years, the Commission has determined that Licensee's performance during the period of startup and power ascension, beginning with initial criticality, should be carefully monitored and thoroughly evaluated. During this time period, and any time period thereafter Staff feels to be appropriate, the Staff is to provide more oversight to TMI-1 than it would normally give an operating reactor. The NRC Staff is to develop the oversight program and is to provide a general description of it to the Commission for its information prior to restart.⁶⁶

⁶⁶ The increased NRC oversight and power ascension programs are not being imposed because of any contested issues in the proceeding; they are being imposed because the plant has been shut down for over 6 years. Therefore, it is permissible for the Commission to allow the Staff to approve these programs, without the participation of the other parties.

The Commission is also directing the Staff to prepare combined Performance Appraisal Team (PAT) inspections and Systematic Appraisal of Licensee Performance (SALP) inspections at the end of 6 months of operation and again at the 12-month mark. These reports will address areas such as plant operations, maintenance, licensed and nonlicensed operator training, quality assurance, radiological controls, fire protection, emergency preparedness, security and safeguards and design, engineering and plant modifications. The combined PAT/SALP reports are to be provided to the Commission and the public.

F. Summary of Effectiveness Decision

The law requires the Commission to lift the immediate effectiveness of the shutdown Orders once the concerns which led to making those Orders immediately effective are satisfied. After a full agency appellate review, all but two issues in the restart proceeding have been resolved favorably to resumed operation of TMI-1. While one of those issues remains pending before the Licensing Board, the other has been resolved favorably by that Board. The Commission has now determined that any remaining concerns about those two issues do not warrant maintaining the effectiveness of the shutdown Orders. Accordingly, the Commission must lift the immediate effectiveness of the shutdown Orders. This Decision authorizes TMI-1 to restart, subject to satisfactory completion of the conditions imposed in this Order.

IV. DISCUSSION OF OTHER ISSUES

As noted earlier, the Commission has decided because of the unique nature of this proceeding also to discuss several other concerns raised by members of the public which fall outside the scope of the restart proceeding.

The prospect that TMI-1 may be restarted has evoked a great deal of concern on the part of many residents of the surrounding communities. Most of the written comments and oral statements addressed to the Commission at a November 9, 1982 public meeting in the Harrisburg, Pennsylvania area were opposed to restart. Many of those opposed were greatly concerned for their own safety and the safety of their families. We recognize that those concerned look to us to safeguard their interests and we are confident that the basis for their concerns about the safety of this plant have been resolved.

Members of the public raised three general concerns that warrant comment here: (1) whether the results of public referenda⁶⁷ against allowing restart should prevent restart; (2) whether TMI-1 should remain shut down until Unit 2 is cleaned up; and (3) whether this Decision to lift the immediate effectiveness of the shutdown Orders reflects a choice of economics over public safety.

With regard to the first issue, the Commission believes that such referenda provide a valuable indication of public concern. Even though such concerns are ordinarily transmitted and translated into government action through legislation enacted by elected legislative bodies, the Commission has given careful consideration to the public's concerns regarding this matter. To alleviate at least some of the public's concerns, the Commission has attempted to explain fully the basis for its Decision today. The fact remains, however, that the NRC is not a legislative body and it lacks discretion to act on the basis of issues that are not within the scope of the laws established by Congress. In the Atomic Energy Act, Congress has directed the NRC to make decisions regarding the licensing of nuclear reactors, such as this one, on the basis of its own expert judgment and analysis of whether the detailed regulatory requirements of the Commission have been satisfied. While we are aware of the sentiment of many members of the public against restart, we are convinced there is reasonable assurance that this plant will be safely operated. Hence we must make our decision to authorize this plant to resume operation.

With regard to the second issue, the cleanup of TMI-2, many commenters believed that cleanup should be completed prior to any decision to restart TMI-1. The Commonwealth of Pennsylvania opposed restart until adequate funding has been assured to complete the cleanup. The Commonwealth also asserted that the cleanup activities may pose a threat to the safe operation of Unit 1 and argued that restart should be postponed until questions regarding the wisdom and safety of operating Unit 1 next to the damaged Unit 2 have been answered.

The Commission for some time has been concerned about the pace of the cleanup efforts and in many forums has advocated that cleanup be conducted on an expedited basis. Recently there has been substantial progress both in securing cleanup funds and in the cleanup itself. The Commission set forth its views on the present status of the cleanup and funding for the cleanup in an information notice on March 6, 1985 (50 Fed. Reg. 9143). The Commission's views are summarized below.

⁶⁷ On May 18, 1982, Dauphin, Cumberland, and Lebanon Counties held a nonbinding referendum on the restart of TMI-1. The majority of the votes cast in all three counties opposed restart.

The funding for the cleanup as proposed by Pennsylvania Governor Richard Thornburgh — the Thornburgh Plan — provides that funding will come from the utility industry, ratepayers, and the Federal and State governments. While the ratepayers and Federal and State governments have contributed funds to the cleanup for several years, no monies were forthcoming from the industry prior to December 1984 due to a requirement by Edison Electric Institute (EEI) that \$100 million be pledged before any money is actually contributed.

The Commission was becoming increasingly concerned in view of these events over both the pace of the cleanup and the possibility that funding shortfalls might slow down that effort even further. Accordingly, the Commission in June 1984 directed the NRC Staff to explore means to expedite the cleanup effort, including alternative methods to accomplish the cleanup, as well as actions that would compel the Licensee to complete specific cleanup milestones by specified dates.

Several significant events occurred while this effort was under way. EEI lifted the requirement that \$100 million be pledged before any money could be contributed, and informed the Commission in a letter dated September 5, 1984, that beginning in 1985 for a period of 6 years EEI members will contribute \$25 million annually to the cleanup of TMI-2, for a total of \$150 million. To ensure that this annual \$25 million contribution is met, Pennsylvania and New Jersey electric utilities have agreed to make up any shortfall by providing research and development grants each year to the extent necessary to maintain an annual funding level of \$25 million per year for this program. Hence the industry's share of the cleanup funds (amounting to \$25 million per year for 6 years) is now as reasonably assured as the other sources of funding.⁶⁸

Further, in late 1983 the upper GPUN management structure responsible for the cleanup began to change and a new management team began to be assembled. Progress in the cleanup began to improve, and in February 1984 the polar crane load test was conducted. Five months later the reactor pressure vessel head was removed, which constitutes a significant milestone in the progress of the cleanup. Licensee's management has now publicly committed to accelerate the early steps of the cleanup with the goal of conforming by the end of 1986 to the milestones identified in its December 1982 schedule.

The Commission in its August 9, 1979 Order directed the Licensing Board to address whether decontamination operations at TMI-2 would affect safe operation of TMI-1. The Licensing Board in its Second Partial Initial Decision held that, subject to Licensee's compliance with four

⁶⁸ The first payment of \$10.9 million from EEI was provided to GPU on December 28, 1984.

conditions, it was satisfied that Units 1 and 2 were sufficiently separated so that the cleanup of Unit 2 should not interfere with the safe operation of Unit 1. No party to the proceeding, including the Commonwealth, appealed those findings.

The Commonwealth in its comments noted that after the Licensing Board issued its findings the Commission advised the Chairman of the Senate Subcommittee on Nuclear Regulation, Committee on Environment and Public Works, in a letter dated March 22, 1982, that "the potential for slow degradation of containment integrity and equipment capability plus the increasing concern for an unexpected release of radioactive material" argued for a more aggressive and expeditious TMI-2 cleanup program. In that letter the Commission also raised the issue of the increased possibility of accidents involving radiation leakage and subsequent exposure to workers and the public as the TMI-2 equipment deteriorates. The Commonwealth argued that the possibility of these events raises questions about the ability of the Licensee to keep Unit 2 in a safe configuration.

The NRC Staff has continued to monitor closely the condition of the TMI-2 reactor for indications of equipment deterioration which could pose threats to public health and safety.⁶⁹ The Commission finds that the plant has continued to be maintained in a safe configuration and agrees with the Licensing Board that the condition of TMI-2 or its cleanup should not pose a threat to the safe operation of Unit 1, because of the nearly complete separation of the units. If for some reason the situation at TMI-2 unexpectedly were to deteriorate, the Commission would take prompt action regarding TMI-1 to prevent any harm to public health and safety, including shutting down Unit 1, if necessary. As long as TMI-2 remains in a safe configuration, we do not believe ongoing TMI-2 cleanup activities should bar the restart of TMI-1.

Finally, this Decision to lift the immediate effectiveness of the original shutdown Orders does not reflect a choice of economics over safety. The Commission has kept TMI-1 shut down for nearly 6 years while hearings have proceeded on the concerns which caused the Commission to issue the shutdown Orders. The sole issue in determining whether to lift those shutdown Orders is whether the original safety concerns have been resolved adequately. Economics plays no role in that determination. After an extensive adjudicatory hearing, one issue (training) remains pending before the agency on appellate review, and one (mailgram) remains pending before the Licensing Board. The Commission in

⁶⁹ For example, the NRC Staff has established an office at Three Mile Island which is manned by eleven professionals. A major function of that office is to monitor the status of TMI-2 plant conditions.

this Decision has fully addressed the significance of those two issues. The Commission finds there is reasonable assurance of the protection of the public health and safety, and, accordingly, must lift the immediate effectiveness of the shutdown Orders.

V. CONCLUSION

All but two issues in the restart proceeding — training and the Dieckamp mailgram — have been resolved after full agency appellate review. The Commission finds that the concerns regarding these two issues have been resolved sufficiently to require lifting the immediate effectiveness of the 1979 shutdown Orders.

In sum, the Commission has found that GPU Nuclear, the current Licensee at TMI-1, represents a significantly improved organization over Metropolitan Edison Company in terms of personnel, organizational structure, procedures, and resources. The Commission is satisfied that the pre-accident management faults at TMI have been corrected such that there is reasonable assurance that TMI-1 can and will be safely operated. The Commission also finds that none of the other concerns raised outside of this proceeding warrant separate enforcement action to keep TMI-1 shut down. Accordingly, the Commission is lifting the immediate effectiveness of the shutdown Orders. However, because TMI-1 has been shut down for over 6 years, the Commission is imposing the following two conditions:⁷⁰

- (1) To ensure a safe return to operation, Licensee is to submit a power ascension schedule, with hold points as necessary at appropriate power levels, to the NRC Staff for Staff's approval. The plant cannot be restarted prior to Staff approval of such a schedule; and
- (2) The NRC Staff prior to restart is to provide to the Commission for its information a general description of a program to provide increased NRC oversight at TMI-1 during the period of startup and power ascension, beginning with initial criticality, and any time period thereafter Staff feels to be appropriate.

Commissioner Asselstine dissents from this Order. His dissenting views are attached. As reflected in his attached separate views, Commissioner Bernthal disagrees, as a policy matter, with this Order only insofar as it indicates that further hearings are not warranted. The additional

⁷⁰ Staff on May 29, 1985, certified that all other conditions required to be met prior to restart had been met.

views of Chairman Palladino and statements of Commissioner Roberts and Commissioner Zech are also attached.

It is so ORDERED.⁷¹

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 29th day of May 1985.

⁷¹ TMIA, on May 20, 1985, filed a motion requesting the Commission "to stay its order of May 29, 1985, which will authorize the restart of Three Mile Island, Unit 1." In the alternative, TMIA requested a stay of 2 weeks to permit it the necessary time to seek an emergency stay from the courts. Licensee and the NRC Staff opposed TMIA's request. UCS on May 28 also filed a stay motion.

The TMIA and UCS requests to stay the Commission's Decision were filed prematurely. The Commission therefore could have simply rejected them. However, because of the controversy surrounding the restart of TMI-1, the Commission has considered these requests.

The Commission disagrees with the arguments that the standards for grant of a stay are satisfied. For the reasons set out in this and other Commission orders, TMIA and UCS have not made a strong showing that they are likely to prevail on the merits. The one issue raised by UCS that is not addressed in this or another order is that UCS is entitled to comment on Staff's certification regarding environmental qualification of electrical equipment. Certification is a matter outside the proceeding, and therefore UCS is unlikely to prevail on the merits of this claim. Moreover, neither TMIA nor UCS has demonstrated any irreparable injury, and the grant of a stay would have a significant adverse impact on others. Finally, the Commission finds that the public interest does not lie in the grant of a stay.

Licensee in response to the TMIA motion stated that each month's delay in returning to operation will cost Licensee's ratepayers \$6.7 million in increased costs, that Licensee's nonresidential customers will continue to suffer competitive disadvantages, that GPU common stockholders will suffer an approximately \$5 million reduction in earnings, and the TMI-1 owners' ability to fund excess advances to the TMI-2 cleanup will be impaired. Clearly this is a significant adverse impact on Licensee and others. Moreover, ascension to full power is a gradual process, and the public health and safety risks at low levels of power are far less than the theoretical, but fully acceptable, risks of full-power operation. The Commission in this Order is requiring that Licensee submit a power ascension schedule with appropriate hold points, and Licensee in response to TMIA's motion stated that "not until the sixth day after a Commission restart order does Licensee intend to take TMI-1 critical, . . . [and a] full 10 days will elapse before the plant even reaches and passes through the 5% power level." Licensee further stated that it would be a minimum of 99 days before TMI-1 begins sustained full-power operation. The plant therefore will be operated at relatively low power levels for several weeks. Moreover, as an extra measure of caution, the NRC Staff will be providing increased NRC oversight of TMI-1 during its startup and initial operation. Under the circumstances, the Commission finds that the standards for a stay have not been met.

However, the Commission recognizes that the parties to this proceeding likely will seek to stay today's decision in the courts. Therefore, to afford the parties to this proceeding an opportunity to seek judicial relief, if they so desire, the Commission has decided that TMI-1 cannot be returned to initial criticality until the later of the following:

- (1) The conditions imposed in this order are met, and the license conditions imposed in this proceeding to date are formally included in the TMI-1 license; or
- (2) no party to this proceeding has sought a judicial stay of this decision by June 3 at 5:00 p.m. If a judicial stay is sought by June 3, then in order to allow time for responses to the court and a court decision, TMI-1 cannot be returned to initial criticality until noon on June 11.

DISSENTING VIEWS OF COMMISSIONER ASSELSTINE

One reason for the Commission's 1979 decision to shut down TMI-1 was that the Commission had questions about the management capabilities of Metropolitan Edison (predecessor to GPU Nuclear). The utility had, after all, presided over the worst accident ever at a commercial nuclear reactor in this country. The Commission set up a Licensing Board to hear the evidence and decide whether GPUN had the requisite corporate character and competence to be permitted to operate TMI-1. The Licensing Board's conclusion was favorable, but in the years since the accident, new evidence has come to light repeatedly which cast continued doubt on GPUN's competence and integrity. This is one reason this proceeding has lasted for 6 years.¹ In its Order today, the Commission heaves a sigh of relief and concludes that all questions about the management capabilities of GPUN have been satisfactorily answered and that GPUN may be permitted to restart TMI-1. I cannot agree with the Commission's conclusion.

The Commission has managed to identify the primary question which must be answered — Does the Licensee exhibit the corporate integrity necessary for the Commission to be confident that the Licensee will operate the plant safely? Unfortunately, the Commission's decisionmaking process has not been able to produce a dispositive answer to that question. This is primarily because the Commission has either ignored or discounted important issues, and because the Commission's approach to the management integrity issue since the end of the Licensing Board proceeding in 1981 has been a piecemeal one. Each time evidence of a new transgression has come to light the Commission has chosen to deal with that particular issue in isolation. While acknowledging that a pattern of misbehavior would be significant, the Commission has refused to see such a pattern in the history of GPU's actions or inactions. *See* p. 1137, *supra*. Even in considering the various individual parts of the puzzle, the Commission has ignored the fact that there continue to be pieces missing which leave gaps in our information and preclude us from discerning the whole picture. The Commission has been satisfied with shuffling around individuals as a solution to GPU's problems. This approach quite simply begs the central question in this proceeding.

The character, integrity and attitude of our licensees is a matter of fundamental importance. The Commission's limited resources preclude

¹ Another reason is that in 1981 the primary coolant water was contaminated with a corrosive agent (thiosulfate) resulting in extensive damage to the TMI-1 steam generators and requiring novel and time-consuming repairs which have only recently been completed.

100% inspection of an operating plant. The Commission's role is, therefore, limited to one of auditing only a small portion of the activities of the licensees. Since licensees are in direct control of the plant, they must be relief upon to provide the first line of defense to ensure the safety of the public. The Commission must be able to rely on the licensees to provide accurate and timely information. A lack of candor or truthfulness in licensee submittals to the NRC undermines NRC regulation and poses a threat to the public health and safety. The Commission must also be able to rely upon licensees to have the commitment and willingness to implement their programs in an effective manner and with a commitment to safety as the first priority. As our Appeal Board noted in the *Midland* case, "[u]nless there is a willingness — indeed a desire — on the part of responsible officials to carry it out to the letter, no program is likely to be successful." *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-106, 6 AEC 182, 184 (1973). Finally, the Commission must be able to rely upon a licensee to comply with NRC requirements. A consistent pattern of violating Commission regulations may show a lack of corporate integrity such that future compliance cannot be assured, thus demonstrating that the licensee cannot be relied upon to act in accord with a commitment to the public health and safety. *See, for example, X-ray Engineering Co.*, 1 AEC 466 (1966).

What does an examination of the actions and inactions of GPU over the past 6 years show us? This is a Licensee which had the worst accident in the history of nuclear power in this country. One would expect that such a Licensee would learn from its mistakes and would want to strive for excellence in order to avoid even the possibility of such an accident ever occurring again at one of its plants. Instead, the history shows us a Licensee which has been unwilling or unable to provide to the Commission accurate and complete information on significant safety issues. It shows us a Licensee which has been unwilling or unable to recognize its own problems, to acknowledge responsibility for its missteps and to take quick, effective action to uncover the causes of those problems and to resolve them. It shows us a Licensee with a pattern of violating Commission regulations for the sake of expediency, a pattern which began before the accident and which continues even to this day.

One of the most significant Licensee missteps the Commission has discovered is the subject of the Hartman allegations. Prior to the accident at TMI-2, this Licensee engaged in widespread falsification of leak rate tests at TMI-2. The company failed to have a valid leak rate test in place and then falsified results to avoid having to shut the plant down for repairs. The utility's response to allegations of leak rate falsifications was

first to deny any such occurrences. After being indicted for criminal violations of the Atomic Energy Act, the utility ultimately pleaded guilty or no contest to several counts of the indictment which charged leak rate falsification and violations of NRC requirements. A guilty plea is considered an admission of guilt, yet even at the court hearing on the plea GPUN's representatives tried to avoid admitting culpability.

The Commission also discovered that after the accident the Licensee made a material false statement to the NRC in responding to the Notice of Violation resulting from the accident. After initially denying any wrongdoing, the Licensee took action to remove individuals responsible for making the material false statements to the Commission, but only when it became apparent that the presence of such individuals might further delay restart of TMI-1. However, Licensee did not admit wrongdoing in shifting the responsible individuals around; these individuals are still a part of the GPU organization, and there does not appear to be any legal bar to the Licensee using those people to operate TMI-1 once the plant is permitted to restart.

One of the most significant post-accident failures by GPUN was the cheating incident. As virtually all of the investigations of the TMI-2 accident have recognized, one of the root causes of the accident was human error, caused in large part by plant operators who were not trained to deal with the conditions present during the accident. How GPUN has chosen to deal with this fundamental deficiency in its prior operations provides a clear test of its competence and integrity, and its commitment to safety requirements. By any standard, GPUN fails that test.

Even though the company apparently had what appeared on paper to be an adequate training program (see LBP-81-32, 14 NRC 381, 478 (1981)), the Licensee failed to carry out that program in an effective manner. Most notable was the Licensee's unwillingness or inability to instill in its employees a respect for NRC safety requirements and a commitment to meet those requirements in every respect. This failure by GPUN led to widespread disrespect for the program and to cheating on NRC and company operator license examinations. When confronted with evidence of widespread cheating the Licensee's response can charitably be described as poor. The Licensee's investigation into the cheating incidents was barely adequate according to the Licensing Board, and poor according to the Special Master. LBP-82-56, 16 NRC 281 (1982) and LBP-84-34B, 15 NRC 918 (1982). Not until after GPUN could no longer deny the problem and not until it became apparent that this issue might further delay restart and become the subject of a hearing would the Licensee take significant actions both to ensure that the training program was upgraded to an acceptable level and to ensure that cheating

would not recur. Only in order to reach a settlement with the Commonwealth of Pennsylvania would the Licensee take any action against individuals who were involved in the cheating incidents (other than those designated as O and W in the reopened hearing). The Licensing Board has recently concluded that GPUN finally has responded to the problem and has an adequate training program. LBP-85-15, 21 NRC 1409 (1985). However, the fact remains that this is not because Licensee made a decision to accept responsibility for this fundamental failure leading to the TMI-2 accident and to create a training program to be proud of. Rather, Licensee's recent progress is largely due to outside pressure and a realization that continued failures in its training program could further delay the restart of TMI-1.

The Licensee's repeated failures to build a first-class operator training program, its failure to instill in its employees a respect for training and operator licensing requirements, and its failure to acknowledge and deal forthrightly with the widespread cheating incidents and other weaknesses in its training program present a damning picture of GPUN's commitment to safety. It would be difficult, if not impossible, to condone these repeated failures by any NRC nuclear power plant licensee. In the case of the Licensee for the TMI units they are simply inexcusable.

Licensee management also knowingly and intentionally certified to the Commission that one employee had completed the necessary prerequisites for taking an NRC reactor operator examination when Licensee knew that that employee cheated on the Licensee's qualifying examinations. LBP-82-56, *supra*, 16 NRC at 352.

The NRC Staff has also concluded that Licensee failed to file with the Licensing Board reports (BETA and RHR) relevant to an ongoing proceeding before that Licensing Board. Staff further concluded that GPU had not provided them to the Commission in a timely manner. NUREG-0680, Supp. No. 5 (July 1984).

Even Staff recognized, in its July 1984 reevaluation of the Licensee's management integrity, a pattern in the above occurrences of activity by the Licensee which, had it been known by the Staff at the time the Staff formulated its position on management in the restart proceeding, "would likely have resulted in a conclusion by the Staff and [the Licensee] had not met the standard of reasonable assurance of no undue risk to the public health and safety." NUREG-0680, Supp. No. 5, at 2-2. The Staff went on to conclude, however, that the Licensee's present organization was acceptable. *Id.* That judgment was based upon a variety of factors: the Staff's finding on the significance and extent of Licensee participation in the pattern of events which the Staff identified as the basis for its change in position; the Staff's finding that the pattern of events

which it identified as significant was all-inclusive; the Staff's finding that the present Licensee organization was a new organization in all significant respects, and the Staff's finding regarding subsequent performance of the Licensee's new organization.

The Commission agrees with the Staff and concludes that all of the integrity issues are thus resolved. But does the more recent history of the organization show a Licensee striving for excellence? No, it does not. Unfortunately the Commission's conclusion fails to consider more recent occurrences which indicate that this "new" organization suffers from many of the same problems as did the old. Further, the record upon which the Commission makes its decisions is far from complete.

Under the "new" organization, procedural and safety violations continue to be a problem. A former Bechtel startup and test engineer, Mr. Richard Parks, made allegations that Licensee's contractor for the TMI-2 cleanup violated safety and quality assurance procedures. Further, Mr. Parks alleged that he was fired as a direct result of his raising safety concerns about the TMI-2 Recovery Program. The Department of Labor investigated Parks' discrimination complaint and substantiated it. Our Office of Investigations (OI) investigated the safety and procedural concerns raised by Parks and concluded that they were not only substantiated but that the allegations were merely illustrative of the problem and not exhaustive. Memo from Ben B. Hayes, Director, OI, to Chairman Palladino dated September 1, 1983, "Three Mile Island Nuclear Generating Station, Unit 2 — Allegations Regarding Safety Related Modifications and Quality Assurance Procedures." OI went on to conclude that:

Senior licensee management was continually advised by TMI Quality Assurance and inhouse management of Bechtel's noncompliance with applicable procedures and safety misclassifications. The failure of senior licensee management to responsibly monitor Bechtel's work and hold Bechtel accountable is the underlying cause of the TMI-2 procedural problems.

Id. at 2. On October 29, 1984, Staff agreed with OI's conclusions that TMI senior personnel were aware of the need to comply with GPUN administrative procedures, that they did not do so even though they were evidently aware that such compliance was an NRC requirement, and that the circumvention of requirements was "at least to some degree deliberate" and that "their motivation appeared to be expediency rather than confusion." Memo from W.J. Dircks, EDO, to the Commission dated October 29, 1984, "Investigation of TMI-2 Polar Crane Allegations." Once again Licensee failed to exhibit a willingness or capability to carry out its own programs in an effective and safe manner or to

adhere to NRC regulations. And when Licensee or contractor personnel attempted to raise safety concerns, Licensee's response was not to examine those concerns and to make a reasoned response; it was to get rid of the complainer.

One would think that after this OI report identified such serious concerns with the TMI-2 Recovery Program, this Licensee would ensure that such violations did not recur. However, we have additional information which indicates that similar procedural and safety violations have occurred at TMI-2 once again. Obviously, GPUN has been either unwilling or unable to take adequate measures to ensure that its own program will be carried out and that NRC requirements will be complied with.

Even more disturbing than this, however, is the Licensee's record on environmental qualification of electrical equipment (better known as EQ). Such qualification is necessary to ensure that safety equipment will perform its intended function in the harsh environments resulting from a serious accident like that which occurred at TMI-2. Again, one would expect GPUN, because of its TMI-2 experience to make every effort to understand the issue and to ensure that its equipment at TMI-1 is fully qualified. But is that the case? No, it is not. Staff responsible for EQ has told us at a recent Commission meeting, that GPUN has been the most difficult Licensee it has had to deal with on this important safety issue. The limited certification of equipment qualification necessary for restart has taken almost a year for the Staff to accomplish because GPUN seemed not to know what was required of it. Instead of being in the forefront of industry efforts to assure equipment qualification, GPUN proves to be the worst performer in the nation. Once again this Licensee has exhibited its failure to understand and to implement NRC regulations.

The Licensee has, then, a consistent pattern of violating Commission regulations. The most recent evidence seems to show that this pattern has continued rather than that it has been broken as the Commission concludes. I recognize that there have been many personnel and organizational changes at TMI-1. However, given the history and the seeming continuation of an inadequate commitment to safety by this corporation, I am unable to conclude that GPUN has the requisite corporate integrity and competence such that we can have reasonable assurance that GPUN can be relied upon in the future to comply with NRC requirements and to act in accordance with a commitment to the public health and safety.

I am also unable to conclude that there is reasonable assurance that this utility has the requisite corporate character and integrity because there are significant gaps in the record of this proceeding. On those issues which the Commission has considered and which have not been

considered by a licensing board, the Commission's basic approach has been to treat each issue in isolation. The solution to each issue has been to allow GPUN to transfer those individuals primarily responsible for various Licensee failures to other parts of the GPU organization not responsible for the actual physical operation of the TMI-1 plant.² By following this piecemeal approach, the Commission has refused to take a larger view of the Licensee's corporate character or address the root causes of GPUN's problems in the area of corporate character. The Commission has instead been satisfied with band-aid, short-term fixes. The Commission has not addressed the issue of why this Licensee continues in its pattern of failing to adhere to requirements or whether the band-aid fixes really solve the underlying problems. I recognize that this broader integrity question is not an easy issue to address. What is needed is an integrated look at all of these integrity issues to determine: what are the root causes, why does this corporation seem to be unwilling or unable to comply with regulations and what remedial actions are necessary to ensure future compliance? The sub-issues are many and complex, and there are massive amounts of information which must be considered, experts to be consulted. The Commission is not really equipped to do all of this, but licensing boards are particularly useful in and perfectly capable of performing this function. The Commission seems to have recognized this when it established this proceeding in 1979 and decided to have a licensing board consider the issues initially. In the interest of expediency, however, the Commission has chosen now not to follow this more reasonable approach and allow the licensing board to consider all of the relevant information on this issue.

A further benefit to a hearing would be that the gaps in the formal, adjudicatory record would be cured. Much of the information relied upon by the Commission in making its immediate effectiveness decision and its decision on whether further hearings are necessary has never been the subject of a formal hearing as the Commission said its decision would be when it set up the proceeding in 1979. CLI-79-8, 10 NRC 141 (1979). While we have much information and the Staff's conclusions about present management, the Licensing Board has never been given an opportunity to hear the information and the parties have not been

² With the exception of a few employees directly involved in the leak rate falsification at TMI-2, the Commission has not even required that those transfers be made permanent. There is no legal bar to Licensee using those people in TMI-1 operations other than a requirement that a few employees get Commission permission before being allowed to work in operational or significant management positions. Further, some of those transferred still work at TMI-1. The Commission's solution — out of sight, out of mind — thus does not forthrightly face up to the issue. It merely postpones it — presumably until after restart.

given an opportunity to test that information in an adjudicatory setting. Written comments on written reports are hardly an adequate substitute for the in-depth treatment these issues would receive in a hearing. I previously identified several issues which I believe specifically ought to be heard by the Licensing Board to make the record complete. This would further enable the Licensing Board to address the issue of whether all necessary remedial actions have been taken to ensure Licensee competence and integrity. See *Dissenting Views of Commissioner Asselstine*, CLI-85-2, 21 NRC 282, 342 (1985).

A particularly significant gap not only in the record but also in our information base to be used in making this decision is the lack of information on the leak rate falsification issues. There has never been a complete, public investigation of this matter. The Office of Investigations (OI) did not complete its investigation of this issue, and the information available to the Grand Jury is not available to us for evaluation. We have some information which clearly indicates that at least at TMI-2 the leak rate falsification was widespread and condoned, if not encouraged, by first-level management. However, we do not know who precisely was involved. Nor do we know whether anyone above the first level of management should be held responsible. We do not know, therefore, whether all necessary remedial actions have been taken. Without such information I am unable to reach a conclusion on management competence and integrity. See *id.* at 346-49 for a more complete discussion of this issue.

A further benefit of a hearing on these issues would be to increase public confidence in our decisionmaking, and in the safety of the plant. The people of central Pennsylvania are not unreasonable. All most of them want before TMI-1 is permitted to restart is to know that the NRC carefully considered all of the evidence and did the best it could to ensure that TMI-1 will be operated safely. Having been forced to endure one serious nuclear power plant accident, the people of central Pennsylvania deserve nothing less than a full and searching inquiry into every relevant safety issue before TMI-1 is allowed to restart. Above all else, the Commission owes it to them to make every effort to ensure that TMI-1 will be operated safely. Unfortunately, by its actions today, the Commission is turning its back on that responsibility. The Commission's decisionmaking process, and its refusal to allow further hearings has not promoted public confidence. Rather, it has only served to harden opposition to restart and to cause needless distress for the people of the TMI area.

Because it has now concluded that all questions about GPUN's competence and integrity have been resolved, the Commission has chosen to

do little in the way of providing additional oversight and safeguards for this troubled plant. In recognition of the fact that this utility has not operated TMI-1 for 6 years, the Commission provides for some additional NRC oversight. However, this oversight of TMI-1 operations is vaguely defined at best, limited in time, and largely left to the discretion of the Staff. Given the questions still remaining about this Licensee, the Commission should have required more, both to ensure that the Commission can have confidence that the plant will be operated safely and to help increase public confidence. Such additional measures could provide some early warning of safety weaknesses in TMI-1 operation. The Commission should at least require the following:

- (1) There should be continuous NRC resident inspector coverage at TMI-1 — 24 hours a day, 7 days a week, for a period of not less than 1 year. Additional NRC inspectors could be drawn from Region I and other regions.
- (2) There should be a special inspection program for TMI-1 including: performance appraisal team inspections every 6 months, intensive periodic regional inspections and a systematic assessment of the Licensee's performance every 6 months, for *at least* 1 year. The Staff should then meet with the Commission after each review so that the Commission can personally monitor TMI-1 operations.
- (3) There should be special safety awareness training for *all* TMI-1 employees, including senior GPU management. These training sessions should be conducted by the NRC Director of Inspection and Enforcement and the Administrator of Region I. The purpose should be to reemphasize to Licensee the importance of carrying out safety programs in a manner designed to protect the public health and safety, the importance of proper training and the importance of complying with GPUN procedures and NRC requirements.
- (4) In order to increase public confidence further, the Commission should provide an opportunity for the Commonwealth of Pennsylvania to appoint an onsite representative who would have access to all GPUN-NRC safety information. The State representative could ask reasonable questions of NRC and bring safety issues to the attention of the Commission. This opportunity should continue for as long as the Commonwealth finds it useful.
- (5) The Commission should also require an addition to the GPUN Board of Directors and the GPUN Safety Oversight Committee. This new director should be selected by the Commission,

should be someone not affiliated with the nuclear industry and should be someone who possesses a high degree of public credibility.

- (6) The Commission should quarantine by license condition from participation in *any* TMI-1 related activities all those individuals already quarantined voluntarily by GPU or by the Commission by license condition as well as the following:
 - a. H.M. Dieckamp
 - b. M.J. Ross
 - c. B. Mehler

In order to restore any quarantined individual to TMI-1-related activities, a hearing should be required to specifically consider whether that individual possesses the requisite competence and integrity to be involved in TMI-1-related activities.

- (7) There should be a specific requirement that Licensee hold the plant at 25% power for a period of at least 6 months. Commission approval should be required at the end of that time before further power ascension is permitted. This is similar to the operational restrictions previously recommended by the Staff. The Licensee has not operated this plant for more than 6 years, and many of its personnel lack operating experience with the plant. A period of limited power operation would permit a better assessment of the Licensee's capabilities under actual operating conditions. At the same time, the limited power level would reduce accident risk somewhat by providing greater response times to deal with problem conditions should they arise.³

Without the completion of hearings on certain management competence and integrity issues (as I have outlined above and in my dissent on CLI-85-2) and the imposition of more specific additional safeguards, I am unable to conclude that there is reasonable assurance that GPUN will operate TMI safely. Given an opportunity through further hearings on these issues, it is possible that GPUN could provide sufficient evidence to establish that its present organization has the requisite competence and integrity to operate TMI-1 in a safe manner. But since the

³ Although both a Licensing Board and an Appeal Board have concluded that the corrosion of the steam generators has been adequately addressed by the Licensee, I am not convinced that we have seen the last of the corrosion problems resulting from the Licensee's introduction of thiosulfate into the reactor coolant system. The corrosion event creates some degree of uncertainty about the quality of the materials, both in the steam generators and in other portions of the primary system, including the pressure vessel internals. Because this is a novel problem, there is an added advantage of a 25% limit on power operation in providing additional protection while gaining more experience with the adequacy of these remedial actions.

Commission has refused to hold further hearings, I must reach my decision on the record now before us. The present record leads to one clear and inescapable conclusion: this Licensee has failed to demonstrate that it is fit to hold an NRC license to operate a nuclear power plant. I cannot, therefore, join the Commission's order which permits restart of TMI, Unit 1.

SEPARATE VIEWS OF COMMISSIONER BERNTHAL
(May 29, 1985)

This Decision today on TMI-1 restart, and the Commission's earlier vote on February 13, represents the most visible failure to date of that elusive ideal — the collegial decisionmaking process. It is not the first example of failure in that process, but it is far and away the most important, one which shows in embarrassing detail how the people of Pennsylvania and the people of this country, whether supporters or opponents of TMI, have been robbed of what they deserve — a truly collegial decision by the Commission.

It has been evident for more than a year that the basis existed for a Commission consensus decision on this issue. Unfortunately, the decisionmaking process, as contrived by your Congress and your Commission, permits such an outcome only as a long-shot random-change coincidence in views among Commissioners.

What the Commission and the public have lost as the Commission wandered down this unwise and ill-considered path toward the restart vote today is the opportunity to see a job done convincingly and right. Instead, the Commission has in all likelihood set the stage for endless wrangling over what is done and what is undone, what is known and what is unknown, what is true and what is untrue in these 6 years and thousands of pages of on-the-record and off-the-record TMI proceedings.

I have repeatedly said that it is in the public interest to have a thorough airing of all the remaining issues and questions related to the unfortunate accident at TMI-2. I have repeatedly urged my colleagues, right up to the 11th hour, to reconsider this ill-advised path toward restart. I find the Commission's methodology for restart to be crudely insensitive to what should be a paramount concern — public confidence. The Commission majority's path for restart runs contrary to the broad public interest in knowing all that can be learned about the events leading up to and following the accident at TMI.

I recognize that legitimate concerns can attach to the needless imposition on this Licensee of burdensome, confidence-diminishing measures proposed by some as a condition for restart. But the Commission should also display equal concern, prudence, and foresight in assessing the need for the public to know. Where the Commission should have gone the extra mile — in the case of providing support for the Pennsylvania Dept. of Health's long-term health-effects study, in its receptiveness to the urgent pleas a few weeks ago of the TMI Advisory Panel to serve as a conduit for public concerns, in the far-reaching decision in February not to clear the air on all remaining questions outstanding — the Commission has instead chosen to go only the extra inch.

Indeed, the history of TMI has been a history of such mistakes. No one would argue about the mistakes that led to the accident itself. But early on, in the wake of the accident, there should have been less concern in all circles, local, State, and national, for the possible consequences of a utility bankruptcy, and more concern for an expeditious cleanup of the world's worst nuclear accident.

The Congress failed to act first, and determine responsibility later, in getting about the urgent business of cleanup. What other country in the world, given the circumstances, would have haggled over responsibility or even dollars first, and have then left cleanup of the worst commercial nuclear power plant accident to an uncertain future in the hands of an uncertain utility?

Then the Commission itself contrived an ill-conceived hybrid proceeding, neither fish nor fowl, neither adjudicatory nor enforcement, a proceeding that virtually precluded any possibility of orderly and timely resolution of the issues.

Nor have I particular admiration for the way this Licensee conducted many of its affairs before, during, or since the accident. In a real-world, competitive market, unprotected by regulation at all levels of government, such grievous mistakes would cost you the store.

Nevertheless, despite the occasional desires of some Commissioners to act as a surrogate Board of Directors for this Licensee, that is emphatically not the function of the Commission. For all the breast-beating that has gone on over the last several years about management competence and integrity, it is still wonderfully strange that no Commissioner has ever raised more than a half-hearted, second-thought question as to the same management's credentials and abilities to operate another plant at Oyster Creek — and no Commissioner has ever mounted a serious attempt to shut down or prohibit further operations at that site. One is led to suspect that the much discussed questions about management integri-

ty and competence have more to do with suspicions than with supportable basis in fact.

Almost a year ago, I urged the Commission to appoint, even at what appeared to be that late date, a Special Master to carry out all remaining hearings before the Commission itself, so that those issues could be closed once and for all. What appeared then to be a late date has turned out not to have been so late after all. And instead, the Commission has now spent exactly 1 more year trying to justify and procedurally legitimize its decision *not* to pursue further the issues I had previously identified. And so goes the still unconcluded history of the TMI accident and aftermath.

While I could continue at length to analyze and ponder and pontificate on which issues are closed, half-closed, or open, that would now serve little useful purpose. Whether this or that action, inaction, deed, or misdeed renders GPU management fit or unfit, better or worse than average will now assuredly be debated for years. Not one member of the Commission sitting here today was present at the creation of this thing, and I find no reason in the Commission's action of February 13 for optimism that anyone here today will see it brought to an end.

But before the arguing and recriminations ensue, the public deserves to know whether, by objective evaluation of the physical preparation of this plant, and by all reasonable measures of Licensee management, personnel and capability, I find that TMI-1 can and will, with reasonable assurance (and then some, one must add for the case of TMI), be operated in conformance with the requirement to preserve the public health and safety.

On February 13, the majority of this Commission decided, in CLI-85-2, that no further hearings were required as a part of the TMI restart proceeding. I agreed with the majority at that time that further hearings were not required as a *legal* matter. I believed at that time and still believe that it is important, indeed critical, that our decision be one that will pass legal muster. However, there is and always has been more involved in this matter than strict legality.

Like it or not, the accident at TMI-2 has been responsible for increased skepticism concerning the nuclear energy option on the part of a significant segment of our fellow citizens. Thus, the *way* in which the Commission decides to handle the restart matter affects not only the Licensee and the citizens of Middletown, or even just the citizens of Pennsylvania. It is a decision which will have a great deal to do with how people across the country will view both this Commission and the nuclear energy option in general. Therefore, while a legally defensible position is critical, equally important in this, of all cases, is public confidence in

the fact that the Commission has exhausted all reasonable avenues of inquiry which can shed further light on the events associated with the country's worst commercial nuclear power accident. These considerations formed the basis for my disagreement with the majority position in February.

This restart proceeding has occupied an extraordinarily long period of time and has generated a massive record which constitutes the most in-depth look at a facility and its management in the Commission's history. It is precisely because so much time and so many resources have been devoted to the technical review of this facility and examination of its management that it is a shame to jeopardize public confidence in the ultimate decision by failing to resolve several issues about which there are still nagging doubts on the part of significant segments of the interested public. I still dissent from my colleagues' choice to forego any further consideration of those issues (CLI-85-2).

At the same time, however, no available information leads me to believe that a decision otherwise favorable to restart would be impacted, as a legal matter, by further examination of the issues identified either by me or by my colleague, Commissioner Asselstine. More importantly, although sound public policy considerations dictate to me that further hearings should have been held, I firmly believe that, as a technical matter, this facility can now be operated in a manner wholly consistent with public health and safety.

Technical judgments, that is, judgments regarding the actual safety of a particular facility, can only be made in comparison to accepted standards of safety at other plants which the Commission has licensed to operate. Technical issues of safety at TMI-1 are, for the most part, very similar to issues at other pressurized water reactors, and in particular, to other Babcock and Wilcox plants now operating. Insofar as the procedures, systems and operating crews are similar to other licensed facilities, the important question becomes whether these procedures, systems, management and operating teams are equal to or better than that which is accepted and consistent with safe operation of other plants. All available information suggests that TMI-1 measures up very well to that standard.

Nevertheless, there are certain unique technical aspects to the restart of TMI-1 which could have a significant impact on safety, and which must be carefully considered in making this decision. First, one must consider the steam generator tube degradation and the unique tube repair technique which was utilized by the Licensee. There is near universal agreement among technical experts that the steam generator repairs have restored the steam generators to their original licensing basis.

This matter has been thoroughly litigated and has resulted in a decision by the Licensing Board favorable to the Licensee. Further, even though steam generator tube performance will be carefully monitored by GPU and NRC, one must keep in mind that the steam generator tube rupture event has been taken off the list of unresolved generic safety issues, because the public health and safety consequences of such an event are now generally conceded to be small.

The second unique feature which must be considered with regard to TMI-1 is the fact that it has been idle for 6 years. Although maintenance of equipment at the plant has been extensive since it was shut down in 1979, problems can be expected in systems that have been out of normal service for such a long time. However, in anticipation of possible restart problems the planned startup will be unusually cautious and deliberate, with many hold points on the way to full power. Power ascension activities will be carefully monitored by round-the-clock presence of NRC Staff personnel — an extraordinary policy for either initial startup or restart of any reactor.

A third possible concern is the fact that there have been numerous changes in operations and management personnel, and that this turnover has disadvantages due to the fact that potentially valuable experience has been lost. However, an extensive training program, reviewed and approved in protracted hearings should serve to alleviate that concern. The Staff has been consistent and clear in its opinion that the present management and operating team at TMI-1 have the capability and commitment to operate the facility safely.

In addition, the concern has been raised that operation of TMI-1 with the TMI-2 cleanup continuing a short distance away will pose significant safety problems. However, all of the information at the Commission's disposal indicates that the two operations can be conducted concurrently, consistent with public health and safety, and that in fact there is little or no association between the two.

Finally, it should be noted that, although several Category A deficiencies were originally found by FEMA as a result of emergency planning exercises, those deficiencies have been corrected, and emergency planning is now found to be fully acceptable for TMI-1. For all of the above reasons, I believe that as a technical matter TMI-1 can and will be operated in a manner fully consistent with public health and safety.

Having said this, I must also say that, to the extent I can do so consistent with my mandate to protect public health and safety, I do not intend to hold an otherwise appropriate Commission decision hostage to the mistakes and poor judgment of this or previous Commissions. It is *also* in the public interest that the 6-year suspension of operations at TMI-1

be lifted when it is safe to do so — indeed the law *requires* the Commission to do so. There is clearly no reconciling that fact with my dissatisfaction over the tortuous path the Commission has chosen to take us from June 1984 to June 1985 and beyond.

By now, it is quite clear where the Commission decision today is headed, and although I take strong exception to the Commission's disregard for what I consider to be elementary and neglected public policy considerations, it is also essential that where confidence is deserved in this decision, confidence should be fostered.

The action of the Commission majority in closing the record in this case may not inspire much public confidence in the wisdom of the Commission. But the public can and should have confidence that this plant is indeed ready for operation — that it meets or exceeds the standards the Commission has laid down and requires at ninety-three other plants in this country, from San Onofre to St. Lucie, from Grand Gulf to Oyster Creek. I therefore will lend my concurrence to the vote of the majority today in so finding.

ADDITIONAL VIEWS OF CHAIRMAN PALLADINO ON TMI-1 RESTART

The decision on whether or not to lift the immediately effective shutdown orders placed on Unit 1 at Three Mile Island in 1979 has not been an easy one for me. Extensive expressions of concern have been raised by many local citizens and political leaders. Last week, the Commission heard many of these concerns reexpressed in oral presentations on TMI-1 restart. As a Pennsylvanian I know first-hand the reaction of some of the public during the stressful days following the accident at TMI-2.

The Commission has given careful consideration to public concerns through its attention to the underlying health and safety questions in this case. Indeed, the Congress in the Atomic Energy Act, has directed the NRC to make decisions regarding the licensing of nuclear reactors, such as this one, on the basis of its own expert health and safety judgment and analysis of whether the detailed regulatory requirements of the Commission have been satisfied. Thus, while we are aware of the sentiment of many members of the public, the Commission must base its decision to authorize restart on its conclusion that there is reasonable assurance that this plant will be safely operated.

I am voting to lift the shutdown orders and allow operation of Three Mile Island, Unit 1 because I am confident that GPU Nuclear can and will abide by NRC requirements and will operate Unit 1 so that public health and safety will be adequately protected. My confidence is based on: (1) the four favorable partial initial decisions of the Licensing Board after extensive public hearings; (2) the NRC Staff's review and conclusion, sustained in the hearings, that the shutdown orders should be lifted; and (3) my own review of the available information as discussed in the proposed order.

My confidence is bolstered by the greater-than-usual NRC regulatory scrutiny that will be given to this Licensee and this plant during initial startup. Our inspectors will be there to oversee the Licensee's activities during this important time period.

I continue to believe that the Commission was correct in its February 1985 decision not to hold more hearings on additional topics. There already have been more than 150 days of hearings. In addition, the Commission itself has spent countless hours on the TMI-1 restart matter, including sessions in Harrisburg.

It is important to recall that in 1979 the Commission stated that the public hearing called for in the shutdown orders was to resolve concerns so as to provide reasonable assurance that the facility could be operated without endangering the health and safety of the public.

Thus, the question that needed to be answered about the additional topics for hearings was whether or not the topics would bear upon a decision to keep Unit 1 shut down. The information that was considered by the Commission in making its decision not to hold further hearings and the reasons for the decision are public, and I believe they support that decision.

The Commission's February 1985 order addressed specific matters proposed for further hearings at that time. These included: (1) the likely change in the Staff's position in Supplement 5 of its Safety Evaluation Report; (2) the handling of allegations by Mr. Richard Parks, a former Bechtel Operations Engineer, regarding violation of TMI-2 cleanup procedures; (3) the Hartman allegations of TMI-2 leak rate falsification; and (4) allegations of TMI-1 leak rate falsification. I believe a brief comment on each of these items is in order.

With regard to the question of the likely change of the Staff's position, there were four issues raised by the Staff. The Commission's February 1985 order explained the reasons for concluding that none of the issues posed a significant safety issue. Two of the issues relate to items on which we held hearings and the remaining two items hold no

continuing significance because they relate to individuals who no longer are involved in operating TMI-1.

With regard to the Parks matter, this had to do with TMI-2. The facts were investigated and harassment of Mr. Parks was found. However, no widespread pattern of discrimination, harassment or intimidation was shown and the major GPU Nuclear official involved is no longer with TMI-1 or GPU Nuclear organizations. Thus, it is a TMI-2 issue.

With regard to the Hartman matter, as a separate item, we have ordered that all individuals who were suspect in the TMI-2 leak rate falsification are to be covered by a future hearing, with the exception of those individuals that were found by the U.S. Attorney to not have participated in, directed, condoned, or been aware of the acts, or omissions, that were the subject of the Hartman indictment. We also found, on the basis of a separate NRC investigation that it was unlikely Mr. Ross knew of or was involved in TMI-2 leak rate falsification. Thus, the Hartman matter, as a restart issue, has been dealt with.

The TMI-1 leak rate falsification allegations have been investigated by NRC; no pattern of deliberate falsification was found. The Commission found that there were no significant factual disputes concerning leak rate practices at TMI-1, and that the facts as currently known did not raise a significant safety issue which might have led the Licensing Board to reach a different result.

I believe that the major management faults which existed in 1979 have been corrected. The current organization is a different and improved organization from the one which operated Three Mile Island in 1979. It is a significantly improved organization in terms of personnel, organizational structure, procedures and resources. I am satisfied that the pre-accident management faults have been corrected.

Public confidence is a key issue for GPU Nuclear and TMI-1, and for nuclear energy and its regulators. Public confidence must be earned over and over again. In the case of TMI-1, public confidence was damaged by events surrounding the accident at TMI-2. GPU Nuclear has publicly stated that excellence is its standard and has made changes aimed at fulfilling that goal. The NRC and, I am sure, the public will be monitoring their performance closely.

I have read both the long and short versions of Commissioner Asselstine's dissenting views, and I feel compelled to make the following additional comments on three of his points.

First, I do not agree with Commissioner Asselstine's statement that the Commission is turning its back on its responsibility to make every effort to ensure that TMI-1 will be operated safely. The question of whether or not this reactor can and will be operated safely has been of

significant concern to the Commission since NRC shut the reactor down in 1979. It was the NRC which kept TMI-1 shut down after the 1979 accident. It was NRC that conducted the extensive series of hearings on the adequacy of TMI-1 and its management. And, it is the NRC which plans to take extra precautions during the startup and power ascension phases. Thus, we have not turned our back on our safety responsibilities; rather, we have fulfilled them in an extraordinarily comprehensive manner for TMI-1.

Second, Mr. Asselstine criticizes the Commission for having addressed management competence and integrity in a piecemeal fashion without examining the pattern established by individual actions. While, of necessity, individual flaws in TMI management had to be treated one by one, because they did not all arise at the same time, significant management changes were made to restore our confidence in overall management competence and integrity. I do not believe that those were trivial changes or merely "shuffling around individuals" as Mr. Asselstine suggests.

The management faults which existed in 1979 have been corrected. The present organization is different from and improved over the one that operated Three Mile Island at that time.

Third, I believe Mr. Asselstine is wrong in saying that the Commission has chosen to do little in the way of providing additional oversight and safeguards for restart of the plant. On the contrary, the Commission has set forth two important conditions that speak to this point:

- (1) To ensure a safe return to operation, Licensee is to submit a power ascension schedule, with hold points as necessary at appropriate power levels, to the NRC Staff for Staff's approval. The plant cannot be restarted prior to Staff approval of such a schedule; and
- (2) The NRC Staff prior to restart is to provide to the Commission for its information a general description of a program to provide increased NRC oversight at TMI-1 during the period of startup and power ascension, beginning with initial criticality, and any time period thereafter Staff feels to be appropriate.

The Staff does not take lightly such Commission direction. I am sure that it recognizes the importance of this task and based on past performance will not overlook necessary actions to fulfill these conditions.

In closing let me reiterate my view that the 1979 shutdown orders should be lifted, thus allowing TMI-1 to resume operation subject to the conditions set forth in this Order; I believe that this can and will be done with reasonable assurance that public health and safety will be adequately protected.

STATEMENT OF COMMISSIONER ROBERTS ON TMI-1 RESTART

In August 1979 the Commission ordered TMI-1 to remain shut down and a hearing to be held to determine whether its further operation should be allowed. At the time they ordered the hearing the five Commissioners who then held office anticipated that a decision on restart could be reached in approximately 1 year. See the Attachment to CLI-79-8, 10 NRC 141, 152 (1979). That assumption turned out to be overly optimistic. Almost 6 years have elapsed and now that hearings on all issues believed by a majority of the presently incumbent Commissioners to be material to a restart decision have been completed, no one who was a Commissioner at the time a hearing was ordered is a Commissioner.

The record of the proceeding is a massive one. The Licensing Board charged by the Commission with taking evidence and reaching an initial decision has made findings favorable to restart. Moreover, the Appeal Board and the Commission have completed appellate review of all hardware/design issues, all emergency planning issues, and all management issues except the training and mailgram issues considered by the Licensing Board on remand. Only if we have sufficient remaining concerns regarding favorable resolution of the training and mailgram issues to warrant maintaining the effectiveness of the shutdown order can we legitimately do so, since the law requires the lifting of an immediately effective license suspension once the concerns that justified imposing it have been adequately resolved. That being so and having neither found nor been provided any legitimate reason to delay any longer a decision on lifting the immediate effectiveness of the licensing suspension imposed in July 1979, I believe the Commission has a duty to make its decision now.

Therefore, although I do not doubt the sincerity of the concerns expressed by those who oppose a restart decision now and am aware of but cannot agree with the fears of those who believe the plant should never restart, I will vote to allow restart.

I also join in the comments made by the Chairman in response to the dissenting views of Commissioner Asselstine.

STATEMENT BY COMMISSIONER ZECH

Six years ago, the accident at Three Mile Island Unit 2 changed the course of commercial nuclear power. The accident that was not supposed to happen did happen. During the first few hours and days of the accident, there was considerable confusion as to the danger presented by the damaged Unit 2 nuclear plant. The citizens of Pennsylvania became the victims of lack of information, poor communications and ineffective Licensee and governmental actions. Even though our best evidence now indicates that there were no adverse radiation effects as a result, the emotional impact on the public was substantial. The accident generated widespread fear and a deep mistrust of the Licensee and the responsible regulatory agency — the Nuclear Regulatory Commission.

During those early days of uncertainty, as a precaution, and a proper one in my view, the undamaged nuclear plant at Three Mile Island — Unit 1 — was ordered shut down by the Commission. The Commission then decided that TMI-1 would remain shut down until the problems which led to the TMI-2 accident were identified, debated in a public hearing, and adequately resolved. There has been 6 years of adjudication, investigation, analysis, monitoring, a Presidential inquiry, as well as other actions. As a result of the accident, many lessons have been learned and applied to TMI-1 over the past 6 years. The adequacy of the many changes that have taken place as a result of these lessons has been argued in extensive public hearings held by this Commission's Licensing and Appeal Boards. I believe that as a result we now have the necessary information to decide whether it is proper to allow the undamaged Unit 1 to restart.

While many changes in personnel, procedures and equipment at Three Mile Island and elsewhere have been put in place to enhance safety of operations and to minimize the possibility of another Three Mile Island accident, the question we are facing today is have all the necessary changes been accomplished at Three Mile Island to permit the restart of Unit 1?

It is important, I believe, to separate where possible, the issues involving undamaged Unit 1 and those involving the cleanup of the damaged Unit 2. It is my opinion that the cleanup of Unit 2 could have been managed more efficiently and more effectively. However, it now seems to be progressing in a satisfactory manner and in any event the evidence leads me to conclude that cleanup of TMI-2 will not interfere with the safe operation of Unit 1.

In addition, a very serious consideration must be for the views of the people of central Pennsylvania. Although it appears that many citizens favor starting up the Number One Unit, it also appears that many do not favor a restart and are genuinely concerned for their health and safety.

While respecting this concern, we, as regulators, are faced with a personal responsibility, under the law, which requires that, if we are reasonably assured that the public health and safety will be protected, we must lift the order suspending the license to operate TMI-1. Attempting to arrive at this personal decision concerning the health and safety of our fellow citizens places a very heavy burden of responsibility on each Commissioner. In the case of Three Mile Island, I believe we have a special responsibility. The issues of management competence and integrity have been central in this proceeding. I believe them to be the most important considerations in deciding whether to authorize a restart.

I do not condone some of the conduct or the practices which have occurred at the Three Mile Island site in the past. However, the crux of the matter for me is whether these past occurrences continue to create doubt about the technical competence and integrity of the Licensee's present TMI-1 management team. Both the parent corporate entity and the management team responsible for the operation of TMI-1 have changed substantially. The Licensee's current organizational structure strikes me as sound, with provisions for sufficient checkpoints to assure that safety is paramount. I have given careful consideration towards forming a judgment concerning the technical competence and integrity of the individuals in positions of responsibility. My conclusion is that I have confidence in them in both areas. I emphasize that I have no reservations about the competence and integrity of the people who are directly responsible for the safe operation of TMI-1. If I did, I could not support resumed operation. However, if subsequent events change my judgment, I will dedicate my efforts to prompt correction.

Unfortunately, despite 6 long years of NRC deliberations and Licensee management and organizational changes, public confidence in this Licensee has not been fully restored. In my judgment, it will be up to the Licensee through sustained excellent performance to earn the confidence and respect of Pennsylvania's citizens. While that performance record is being accumulated, continuing vigilance and dedication by both the Licensee and regulator will be required to assure that Licensee carries out its primary responsibility to provide reasonable assurance that the public health and safety is protected throughout the life of the license. I am satisfied that the Licensee has the team in place to provide that assurance. I will do all that I can as a regulator to see that the Licensee main-

tains the requisite competence and integrity. I am also satisfied that all other concerns have been adequately addressed.

My conclusion, after reviewing the record and with the Staff's certification that all Nuclear Regulatory Commission requirements have been met, is that Three Mile Island Unit 1 can be operated with reasonable assurance that the public health and safety will be protected. General Public Utilities has an obligation to ensure, not only now but during the term of the license, that TMI is operated with the greatest of care and with every regard for the public health and safety, that all involved with TMI perform in the most competent manner possible and that they take every measure to earn the special trust and confidence, not only of the citizens of Pennsylvania but of all the citizens of the United States.

I vote for restart of Three Mile Island Unit 1.

In addition, I agree completely with the Chairman's comments on Commissioner Asselstine's dissent.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Christine N. Kohl, Chairman

Gary J. Edles

Dr. Reginald L. Gotchy

In the Matter of

**Docket Nos. 50-352-OL
50-353-OL**

PHILADELPHIA ELECTRIC COMPANY

(Limerick Generating Station,

Units 1 and 2)

May 1, 1985

The Appeal Board reverses a Licensing Board decision dismissing intervenors as a party in this operating license proceeding for failure to file sufficiently specific contentions in a timely fashion, reinstates their status as a party, accords them a period of time in which to file revised contentions, and remands this matter to the Licensing Board for action consistent with this opinion.

RULES OF PRACTICE: ADMISSIBILITY OF CONTENTIONS

Licensing boards are not empowered to accept contentions on a conditional basis. *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-687, 16 NRC 460, 466 (1982).

RULES OF PRACTICE: ADMISSIBILITY OF CONTENTIONS

Contentions based on materials not available until a later point in the proceeding should be adjudged by balancing all five factors governing

late-filed contentions, found at 10 C.F.R. § 2.714(a)(1). *Catawba*, CLI-83-19, 17 NRC 1041, 1045-47 (1983).

RULES OF PRACTICE: ADMISSIBILITY OF CONTENTIONS

Licensing boards are accorded wide latitude in balancing the factors set forth in 10 C.F.R. § 2.714(a)(1). *Washington Public Power Supply System* (WPPSS Nuclear Project No. 3), ALAB-747, 18 NRC 1167, 1171 (1983).

RULES OF PRACTICE: ADMISSIBILITY OF CONTENTIONS

In considering factor two of 10 C.F.R. § 2.714(a)(1) — the availability of other means whereby the petitioner's interest will be protected — informal negotiation among the parties (even under a board's aegis) is not an adequate substitute for a party's right to pursue its legitimate interest in issues on which informal negotiation is unsuccessful. *Cf. Houston Lighting & Power Co.* (South Texas Project, Units 1 and 2), ALAB-799, 21 NRC 360, 384 n.108 (1985) (neither the formal participation by the NRC staff in a licensing proceeding nor the availability of staff review outside the hearing process constitutes an adequate protection of a private party's rights when considering factor two).

ATOMIC ENERGY ACT: HEARING RIGHT

A public hearing on emergency plans for a nuclear power plant, held under the auspices of the Federal Emergency Management Agency, is no more a means to protect an intervenor's interest under section 189a of the Atomic Energy Act, 42 U.S.C. § 2239a, than either informal negotiation or NRC staff review.

RULES OF PRACTICE: SETTLEMENT OF CONTESTED PROCEEDINGS

Commission policy favors legitimate efforts to reach a good faith, mutually satisfactory resolution of issues without the need for litigation. *See* 10 C.F.R. § 2.759. *See also Statement of Policy on Conduct of Licensing Proceedings*, CLI-81-8, 13 NRC 452, 455 (1981).

RULES OF PRACTICE: ADMISSIBILITY OF CONTENTIONS

In determining whether a contention is set forth with adequate bases and specificity in accordance with the requirements of 10 C.F.R. § 2.714(b), consideration of its substantive merits is not appropriate. *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 547-49 (1980); *Alabama Power Co.* (Joseph M. Farley Nuclear Plant Units 1 and 2), ALAB-182, 7 AEC 210, 216-17 (1974).

APPEARANCES

Angus R. Love, Norristown, Pennsylvania, for intervenors, inmates of the State Correctional Institution at Graterford, Pennsylvania.

Troy B. Conner, Jr., Robert M. Rader, and Nils N. Nichols, Washington, D.C., for applicant, Philadelphia Electric Company.

Theodore G. Otto, III, Camp Hill, Pennsylvania, and **Zori G. Ferkin**, Harrisburg, Pennsylvania, for intervenor, the Commonwealth of Pennsylvania.

Donald F. Hassell for the Nuclear Regulatory Commission staff.

DECISION

This appeal involves the continuing efforts by a group of inmates at the State Correctional Institution at Graterford, Pennsylvania, intervenors in this operating license proceeding, to litigate emergency planning issues of concern to them. Specifically, we have before us a request that we set aside Licensing Board rulings (a) dismissing the inmates as a party to the case because they failed to file sufficiently specific emergency planning contentions in a timely fashion, and (b) declining to permit them to reformulate those contentions to take account of the prison emergency plan recently made available to their counsel by the Com-

monwealth of Pennsylvania.¹ Applicant Philadelphia Electric Company (PECo), the Commonwealth, and the NRC staff oppose the appeal.

As explained below, we reverse the Licensing Board's rulings, reinstate the inmates as a party, and accord them a brief period of time to refile their contentions with the Board. We also remand this matter to the Licensing Board for further action consistent with this decision.

I.

The initial round of emergency planning contentions was filed by various parties, including the Graterford inmates, in 1981. The inmates' basic claim at that time was that plans to evacuate the prison in the event of a serious accident at the Limerick nuclear facility (located about eight miles from the prison) are inadequate.² At the applicant's urging, however, the Licensing Board deferred ruling on all the proposed emergency planning contentions because neither PECO's onsite plan nor the offsite plans of the Commonwealth and the local governments had as yet been issued.³ The Board admitted the Graterford inmates' contention conditionally, subject to respecification once the offsite emergency plan for the prison was made available.⁴

The Licensing Board took up offsite emergency planning issues again in 1983 when it appeared that the emergency plans would soon be available. It directed that contentions be submitted 45 days after the draft emergency plans were released.⁵ In due course, it ruled on the admissibility of a large number of offsite emergency planning contentions.⁶ As for the Graterford inmates, however, the Board once again put off consideration of the specifics of their contentions because the inmates had not as yet received a copy of any emergency plan dealing specifically with the prison. The Board was nonetheless concerned that the Commonwealth's failure to develop and to distribute an emergency plan for the prison was already causing delay in the litigation of the case. Thus, it instructed the Commonwealth to make available to the inmates' counsel

¹ See Notice of Appeal From the Licensing Board's Memorandum and Order on Graterford Prisoners' Proposed Contentions (April 18, 1985), and Intervenor Graterford Inmates' Supplemental Petition for Review of Appeal Board Order Dismissing Petition for Directed Certification (April 16, 1985) (hereafter, Inmates' Supplemental Petition). Counsel for the inmates filed the latter document before the Commission, but the Secretary, pursuant to his authority under 10 C.F.R. § 2.772(h), referred it to us by Order of April 23, 1985. Later that day, we entered an order calling for responsive briefs by April 30 directed to both of the inmates' filings.

² See LBP-82-43A, 15 NRC 1423, 1446-47, 1520 (1982).

³ *Id.* at 1519-20.

⁴ *Id.* at 1520.

⁵ Licensing Board Memorandum and Order of May 16, 1983 (unpublished) at 5.

⁶ LBP-84-18, 19 NRC 1020 (1984).

as promptly as possible a “form of the plan . . . close enough to the final form . . . to give the prisoners adequate grounds for deciding whether to file contentions, and if so, what contentions.”⁷ The inmates were given 20 days from the time they received the plan to file their contentions.

The Commonwealth finally released a plan on December 13, 1984. Referred to as Plan 1, it was a highly “sanitized” version of the actual plan and excluded a considerable amount of information that the Commonwealth was reluctant to release for security reasons. The inmates promptly filed a motion with the Licensing Board requesting disclosure of the full plan, under a protective order. They alleged that the abridged version did not provide sufficient information to permit the formulation of adequate contentions. The Board denied the motion in an oral ruling on January 29, 1985.⁸ It confirmed that ruling in a written order issued on February 5 and directed the inmates to file contentions no later than February 18. Following a denial of their request that the Board stay its rulings pending appeal,⁹ the inmates sought our intercession by way of a petition for directed certification. At the same time, however, they proceeded to attempt to formulate litigable contentions.¹⁰

We dismissed the inmates’ petition as premature.¹¹ We observed that discovery rulings, being interlocutory, were generally not reviewable until the end of the case. We also noted that, in any event, the inmates had not yet exhausted all their options: they had indicated that they would attempt to comply with the Board’s direction to submit revised contentions. We urged the parties to work together to resolve the disclosure issues amicably and pointed out the efficacy of protective orders in handling sensitive, but disclosable, material. Our dismissal of the inmates’ petition was expressly without prejudice to a new appeal if or when the effort to litigate the adequacy of the plan proved “*finally* futile.”¹²

Efforts to resolve the disclosure problems went forward in tandem with efforts to particularize the inmates’ specific substantive concerns in light of the limited information available. The inmates tendered a set of contentions based on Plan 1 on February 15, and the Licensing Board convened a conference of counsel on February 27 at which numerous matters involving the plan were clarified. Finally, on March 18, under a protective order issued by the Licensing Board, the Commonwealth

⁷ *Id.* at 1030.

⁸ Tr. 20,479-81.

⁹ Tr. 20,481-82.

¹⁰ Tr. 20,482.

¹¹ Appeal Board Memorandum and Order of February 12, 1985 (unpublished).

¹² *Id.* at 2 (emphasis in original).

provided counsel for the inmates and their "expert" with a copy of Plan 2 — a version tantamount to the entire emergency plan.¹³

Four days later, Plan 2 was the topic of a conference of counsel convened by the Licensing Board. During the course of that March 22 conference, both the inmates and the Commonwealth clarified their respective positions on a number of issues. The inmates also indicated their satisfaction with the Commonwealth's substantive resolution of numerous matters and their corresponding willingness to withdraw the formal request for still further disclosure.¹⁴ Throughout the conference, the inmates requested a final opportunity to revise their contentions to take into account Plan 2 and the clarifications that were made at the February 27 and March 22 sessions. The Licensing Board repeatedly denied these requests¹⁵ and, on April 12, issued a decision dismissing the Graterford inmates as a party to the case. The Board determined that the February 15 contentions were insufficiently specific, and that the inmates had also failed to meet the criteria for filing late contentions.¹⁶

The inmates press two basic arguments on appeal. First, they contend that they have a right to refile their contentions and to respecify the bases for them, in light of the recently released Plan 2. Second, they claim that the Licensing Board failed in any event to apply properly the standards for determining the admissibility of their contentions. In this latter connection, they assert that the contentions should not have been dismissed as either late or insufficiently specific.

II.

A. The Licensing Board's refusal to permit the Graterford inmates to refile their contentions and to respecify the bases for them in light of Plan 2 was arbitrary. As noted earlier, the inmates have been a party to this case from the outset; their standing to intervene is not now at issue. The Licensing Board conditionally accepted their original contention for litigation in 1982, properly recognizing that a contention could not specifically challenge a plan not yet in existence.¹⁷ The Board explicitly

¹³ Tr. 20,612-13.

¹⁴ Tr. 20,613, 20,657. *But see* Tr. 20,675.

¹⁵ Tr. 20,640, 20,657-61, 20,674-75, 20,691-97, 20,702-06.

¹⁶ Licensing Board Memorandum and Order of April 12, 1985 (unpublished).

¹⁷ LBP-82-43A, *supra*, 15 NRC at 1520. We subsequently held that licensing boards are not empowered to accept contentions on a conditional basis. *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-687, 16 NRC 460, 466 (1982). On review of that decision, the Commission held further that contentions based on materials not available until a later point in the proceeding should be adjudged by balancing all five factors governing late-filed contentions, found at 10 C.F.R. § 2.714(a)(1). CLI-83-19, 17

(Continued)

recognized on at least one other occasion that particularization of contentions dealing with protection of the prison population must await the availability of "some adequate form" of the emergency plan.¹⁸ Our February 12 order likewise assumed that, following resolution of the disclosure issues and eventual release of a usable emergency plan, the Graterford inmates would be given a chance to reformulate their contentions. Indeed, there would have been no purpose in our encouraging efforts to resolve the disclosure issues by consent of the parties, and setting out the principles the Licensing Board was to apply in the event the issues could not be resolved by mutual agreement, if the Board was not going to accord the inmates an opportunity to hone their contentions and to respecify their bases in light of the information ultimately revealed.

The Licensing Board has apparently confused a party's request for discovery following admission of a contention with the inmates' legitimate request here for disclosure of the plan "close enough to the final form . . . to give [them] adequate grounds for deciding whether to file contentions, and if so, what contentions."¹⁹ Until an emergency plan complying with that requirement, i.e., Plan 2, was made available to the inmates (on March 18), their obligation to file contentions within 20 days was not triggered.²⁰ That being so, the Board's unexplained reversal of its previously consistent view — that the Graterford inmates must be accorded a reasonable opportunity to reshape their contentions once an adequate form of the prison emergency plan was released — is plainly arbitrary.²¹ The inmates are therefore entitled to refile contentions based on Plan 2.

NRC 1041, 1045-47 (1983). The Licensing Board here, however, did consider the inmates' contentions in light of the five late-contention factors. See LBP-84-18, *supra*, 19 NRC at 1026-27; Licensing Board Memorandum and Order of April 12, *supra*, at 9-13. Thus, any error in the Board's initial *conditional* acceptance of the inmates' emergency planning contention is academic. *But see* p. 1193, *infra*.

¹⁸ LBP-84-18, *supra*, 19 NRC at 1030.

¹⁹ *Ibid*.

²⁰ Contrary to the Commonwealth's suggestion, by no stretch of the imagination can Plan 1 be deemed sufficient to meet the Licensing Board's original requirement. See Response of the Commonwealth (April 29, 1985) at 1-2. Plan 2 is over 80 pages. Plan 1, only 27 pages in length, was so heavily censored as to be unusable. The Licensing Board, applicant, and the staff all acknowledged as much. See Tr. 20,432, 20,468, 20,474. Compare Tr. 20,640.

The fact that the inmates filed contentions on February 15 based on Plan 1 cannot reasonably be construed as a waiver of any future right to refile more specific contentions in the event of the disclosure of a more complete plan. The inmates sought a stay of their obligation to file by February 18 and that request was denied. As they saw it, they had no real option but to file then. See Tr. 20,697, 20,706. We find that to be eminently reasonable action, given that (i) the inmates had no particular expectation at that time that the Commonwealth would ever release more of the plan, and (ii) we encouraged them in our February 12 order to proceed with the filing.

²¹ The staff, which did not object below to the admission of some of the inmates' contentions, argues that the Licensing Board did effectively permit the inmates to revise their contentions during the March

(Continued)

B. Our decision that the inmates may reformulate their emergency planning contentions makes it unnecessary for us to decide if the Licensing Board erred in finding that the February 15 contentions lacked adequate bases and specificity.²² Whether any such contentions may properly be considered at this time under the late-filed contention criteria, however, must be determined. We therefore turn to the Board's decision that a balance of these factors favors denial of admission of the inmates' contentions.

As required by Commission precedent, the Licensing Board considered the following five factors:

- (i) Good cause, if any, for failure to file on time.
- (ii) The availability of other means whereby the petitioner's interest will be protected.
- (iii) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.
- (iv) The extent to which the petitioner's interest will be represented by existing parties.
- (v) The extent to which the petitioner's participation will broaden the issues or delay the proceeding.²³

We accord licensing boards wide latitude when they balance these factors.²⁴ In the instant case, however, we can find no justification for the balance struck, and thus the Board has abused its discretion.

To begin with, the Board found, and we agree, that the "good cause" factor weighs in favor of the inmates because no adequately based contention could have been proffered earlier.²⁵ The Board also recognized, with regard to factor two, that there is no other means by which the inmates could "formally litigate" their concerns about the prison emergency evacuation plan without the admission of their contentions. Nonetheless, it found against the inmates on this factor. In the Board's view, the

22 conference. NRC Staff Brief (April 30, 1985) at 7-8, 28-29. To be sure, the inmates withdrew parts of their February 15 contentions (*see* note 37, *infra*), and some portions of the hearing transcript and Board memorandum and order suggest an attempt to make other parts of the contentions more specific in response to Board questioning. But at many more points, the Licensing Board was unambiguous in its denial of permission to the inmates to revise their contentions. *See* note 15, *supra*; Licensing Board Memorandum and Order of April 12, *supra*, at 4 n.4.

23 We also do not address the inmates' not fully articulated request for even more disclosure of the Graterford emergency plan. *See* Inmates' Supplemental Petition, *supra*, at 4-5. As we understand their point on this score, they are interested in fuller disclosure only as a consequence of the denial of the opportunity to submit revised contentions based on Plan 2. *See, e.g.*, Tr. 20,657, 20,674-75. In view of our reversal of the Licensing Board's ruling, we assume that the inmates no longer seek complete disclosure.

24 10 C.F.R. § 2.714(a)(1), (b). *See* note 17, *supra*.

25 *Washington Public Power Supply System* (WPPSS Nuclear Project No. 3), ALAB-747, 18 NRC 1167, 1171 (1983).

26 Licensing Board Memorandum and Order of April 12, *supra*, at 10.

discussions that had taken place during the course of the two Board-sponsored conferences "constituted an informal litigation" of the inmates' concerns — i.e., another means by which their interest could be protected.²⁶ We find no rationale for the Licensing Board's conclusion that informal negotiation among the parties (even under a board's aegis) is an adequate substitute for a party's right to pursue its legitimate interest in issues on which informal negotiation is unsuccessful. Moreover, we find no precedent — and the Board cites none — for its conclusion.²⁷ We therefore decide that the inmates have prevailed on factor two.²⁸

The Board unequivocally found against the inmates with respect to factor three — the extent to which a petitioner may be expected to assist in the development of the record. Relying in part on our *Grand Gulf* decision,²⁹ the Board determined that the inmates had not sufficiently demonstrated that they possess either the expertise or the desire to assist in developing the record. The Board was influenced in part by the inmates' asserted failure to date to come forward and to specify what the character of their testimony might be.³⁰ But we believe the Board took an unduly broad view of the inmates' responsibility at this stage of the case. Soon after Plan 1 was produced, the inmates engaged an individual to review the plan,³¹ tried to make reasonably clear (given the limited amount of information conveyed in Plan 1) the general issues with which they are concerned, and participated actively in those proceedings directly related to their interests.³² In the circumstances, nothing more

²⁶ *Id.* at 11.

²⁷ *Cf. Houston Lighting & Power Co.* (South Texas Project, Units 1 and 2), ALAB-799, 21 NRC 360, 384 n.108 (1985) (neither the formal participation by the NRC staff in a licensing proceeding nor the availability of staff review outside the hearing process constitutes an adequate protection of a private party's rights when considering factor two).

²⁸ PECO argues on appeal that the inmates, through their counsel, will have a chance to comment on the Graterford emergency plan at a public hearing held under the auspices of the Federal Emergency Management Agency (FEMA), as required by 44 C.F.R. § 350.10. Applicant's Brief (April 30, 1985) at 26-27. But this type of "town meeting" contemplated by the FEMA regulation in question is no more a means to "protect" the inmates' legitimate interest under section 189a of the Atomic Energy Act, 42 U.S.C. § 2239a, than either informal negotiation or NRC staff review.

²⁹ *Mississippi Power and Light Co.* (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-704, 16 NRC 1725, 1730 (1982).

³⁰ Licensing Board Memorandum and Order of April 12, *supra*, at 11-12.

³¹ We need not decide whether the inmates' "expert," Major John Case, would in fact qualify as an expert witness if he sought to testify. We do note, however, that Major Case was for 15 years the warden of the Bucks County Prison and for eight years Director of the Bucks County Department of Corrections. He is currently field director for the Pennsylvania Prison Society and has appeared as a witness in numerous state and federal court proceedings. See Vita of John D. Case, attached to Supplemental Motion of the Inmates at SCIG Regarding Full Disclosure of the Evacuation Plan for SCIG (January 28, 1985). We believe that the engagement of Major Case manifests both a willingness and ability to obtain the requisite expertise to participate effectively, in at least some areas of contention.

³² The Licensing Board is unduly critical of the inmates' failure to attend all of the hearings on offsite emergency planning issues. Licensing Board Memorandum and Order of April 12, *supra*, at 2 n.1. The
(Continued)

was required of them at this stage, and we can find no support for the Board's prediction that the inmates will be unwilling or unable in due course to assist in developing the record. The inmates therefore prevail on the third factor.

As for the fourth factor, the Board acknowledged that no other party to the proceeding directly represents the inmates' interest. The Board observed, however, that two Commonwealth agencies, the Pennsylvania Emergency Management Agency (PEMA) and the Department of Corrections, have emergency responsibilities to the inmates as well as the general public. The Board thus intimated that the participation of these agencies in this proceeding provides some indirect representation of the inmates' interest.³³

The Licensing Board's view, however, is at odds with the facts in this case. Both PEMA and the Department of Corrections have interests and responsibilities that transcend, and at times conflict with, those of the inmates alone. It is not surprising, therefore, that the inmates were separately admitted to this proceeding because of their "special" interest.³⁴ Indeed, as the recent dispute over the disclosure of the emergency plan makes plain, the relationship of the inmates to PEMA and the Department of Corrections is essentially an adversarial one. Thus, neither PEMA nor the Department of Corrections can be reasonably expected to represent all of the inmates' interests and, as a result, the inmates prevail as well on factor four.

Finally, the Board found that the admission of the inmates' emergency plan contentions would delay the case and broaden the issues because hearings on all previously admitted contentions have now been completed and the Board is in the process of drafting its decision.³⁵ Plainly, the admission of any contentions at this stage poses the potential for some delay. However, this factor cannot be controlling in the special circumstances of the case.

First of all, any delay likely to result at this stage cannot be laid at the feet of the Graterford inmates. They entered this case in 1981 and, as far as we can tell, were prepared to go to hearing at that time. The inmates' efforts to litigate their concerns in a timely fashion were thwarted

Board recognized early on that the inmates had "a separable special interest" in this case not embraced within the more general emergency planning issues. See LBP-82-43A, *supra*, 15 NRC at 1520. It is thus unreasonable to expect their counsel to have attended hearing sessions not related to the inmates' special interest. But once the prison issues surfaced, the inmates have actively participated. Moreover, the Licensing Board at one point acknowledged the spirit of cooperation of the inmates' counsel. See Tr. 20,585.

³³ Licensing Board Memorandum and Order of April 12, *supra*, at 12.

³⁴ LBP-82-43A, *supra*, 15 NRC at 1520.

³⁵ Licensing Board Memorandum and Order of April 12, *supra*, at 13.

because the Commonwealth was unable to complete preparation of its prison evacuation plan until late last year. It would be the ultimate "Catch 22" to weigh the delay factor heavily against the inmates in this circumstance.

Moreover, it is far from certain that any additional delay occasioned by consideration of the inmates' concerns would be substantial. Consensual resolution of some or all of the inmates' remaining concerns may still be possible.³⁶ If not, the record suggests that the Board could hold a hearing on any contentions promptly and over a relatively short period.³⁷ Summary disposition may also be appropriate.³⁸

In sum, we hold that the balance of the five factors weighs overwhelmingly in the inmates' favor. Thus, when the inmates refile their contentions, the Licensing Board is to determine only whether they have adequate bases and specificity.³⁹

The Licensing Board's March 22 oral ruling denying the request of the Graterford inmates to submit revised contentions, and its Memorandum and Order of April 12 dismissing the Graterford inmates' contentions, are *reversed*. The inmates are *reinstated* as a party to this proceeding. They may file revised emergency planning contentions (with specific

³⁶ Over the past two months, the Commonwealth and the inmates have cooperated in a largely successful effort to resolve or to narrow their substantive differences. It appears to us that some additional effort by the parties, undertaken in this same spirit, may well resolve some, if not all, of the few remaining areas of conflict without the need for litigation. Commission policy favors such legitimate efforts to reach a good faith, mutually satisfactory resolution of issues. See 10 C.F.R. § 2.759. See also *Statement of Policy on Conduct of Licensing Proceedings*, CLI-81-8, 13 NRC 452, 455 (1981).

³⁷ Tr. 20,698-702. We note in this regard that the inmates have already stated that the plan is satisfactory in a number of respects. See, e.g., Tr. 20,681-83.

³⁸ See 10 C.F.R. § 2.749.

³⁹ See 10 C.F.R. § 2.714(b). In this connection, we note that consideration of the substantive merits of any contention is not appropriate. *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 547-49 (1980); *Alabama Power Co.* (Joseph M. Farley Nuclear Plant Units 1 and 2), ALAB-182, 7 AEC 210, 216-17 (1974).

bases) by *no later than May 15, 1985*. This matter is *remanded* to the Licensing Board for further action consistent with this opinion.⁴⁰

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the
Appeal Board

⁴⁰The Board now has before it applicant's February 7, 1985, request for an exemption from certain of the requirements of 10 C.F.R. § 50.47, in order to permit full power operation during the pendency of any litigation concerning the Graterford inmates' contentions. We offer no views on the propriety of such exemption. We note only that the Licensing Board will obviously need to take this decision into account when ruling on applicant's request.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

**Gary J. Edles, Chairman
Dr. W. Reed Johnson
Dr. Reginald L. Gotchy**

In the Matter of

**Docket No. 50-289-OLA
(Steam Generator Repair)**

METROPOLITAN EDISON COMPANY,

et al.

**(Three Mile Island Nuclear
Station, Unit No. 1)**

May 8, 1985

The Appeal Board affirms the Licensing Board's initial decision (LBP-84-47, 20 NRC 1405 (1984)) authorizing issuance of an operating license amendment to permit the applicant to operate Unit No. 1 at Three Mile Island Nuclear Station (following repair of the steam generator tubes by kinetic expansion) and denies intervenors' motion to reopen the record to explore newly discovered information.

RULES OF PRACTICE: INTERLOCUTORY APPEALS

Licensing Board orders that dispose of some but not all of a party's contentions are considered interlocutory. Appeals from such orders must await the issuance of the board's decision disposing of the remaining issues. *Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2), ALAB-736, 18 NRC 165 (1983).

RULES OF PRACTICE: REOPENING OF RECORD

To prevail on a motion to reopen the record, the movant must demonstrate that its request is timely, that it addresses significant safety or environmental issues, and that a different result might have been reached had the newly proffered material been considered initially. *See, e.g., Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-753, 18 NRC 1321, 1324 (1983), citing Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), ALAB-738, 18 NRC 177, 180 (1983).*

ATOMIC ENERGY ACT: LICENSING DECISION (IMMEDIATE EFFECTIVENESS)

If the Commission makes a determination that a license amendment involves "no significant hazards" pursuant to 42 U.S.C. § 2239(a)(2)(A) (Supp. 1985), the Commission may issue the amendment and make it effective immediately notwithstanding any request for a hearing. The hearing may take place after issuance of the amendment. *See 49 Fed. Reg. 24,231, 24,232 (1983).*

ADJUDICATORY PROCEEDINGS: FINANCIAL ASSISTANCE TO INTERVENORS

A Licensing Board is precluded by law from appointing anyone to assist an intervenor with its case. *See Pub. L. No. 98-360, § 502, 98 Stat. 403 (1984). See also Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1), ALAB-772, 19 NRC 1193, 1247, 1273 (1984), rev'd in part, on other grounds, CLI-85-2, 21 NRC 282 (1985).*

RULES OF PRACTICE: RESPONSIBILITIES OF PARTIES

A person who invokes the right to participate in an NRC proceeding also voluntarily accepts the obligations attendant upon such participation. *Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041, 1048 (1983). Cf. Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit 1), ALAB-772, 19 NRC 1193, 1246-48 (1984).*

LICENSING BOARDS: COMPOSITION

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. *South Carolina Electric and Gas Co.* (Virgil C. Summer Nuclear Station, Unit 1), ALAB-663, 14 NRC 1140, 1156 (1981).

RULES OF PRACTICE: PROPRIETARY DETERMINATIONS

Protective orders and in camera proceedings are the customary and favored means of handling disputes in which one party to a proceeding seeks purportedly proprietary information from another.

RULES OF PRACTICE: PROPRIETARY DETERMINATIONS

Protective orders and in camera proceedings are especially useful as an interim measure to avoid delay in the proceedings pending definitive resolution of whether, and to what degree, information should be withheld from the general public.

RULES OF PRACTICE: PROPRIETARY DETERMINATIONS

The Commission's regulations expressly provide that the Commission may require information claimed to be a trade secret or privileged or confidential commercial or financial information to be subject to inspection under protective order by parties to a proceeding, and that in camera sessions of hearings may be held when the information sought to be withheld is produced or offered in evidence. 10 C.F.R. § 2.790(b)(6)(iii).

RULES OF PRACTICE: REOPENING OF RECORD

A motion to reopen the record to explore newly discovered information need not be granted unless it is likely that a different substantive outcome would result. *Union Electric Co.* (Callaway Plant, Unit 1), ALAB-750, 18 NRC 1205, 1209 (1983). *Cf. Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1096 (1983).

TECHNICAL ISSUES DISCUSSED

Steam Generator Tube Repair (Kinetic Expansion)
Steam Generator Tube Corrosion.

APPEARANCES

Louise Bradford, Harrisburg, Pennsylvania, and **Joanne Doroshow**, Washington, D.C., for intervenor Three Mile Island Alert, Inc.

Bruce W. Churchill, Washington, D.C. (with whom **George F. Trowbridge** and **Evans Huber**, Washington, D.C., were on the brief) for the applicant Metropolitan Edison Company.

Mary E. Wagner (with whom **Mitzi A. Young** was on the brief) for the Nuclear Regulatory Commission staff.

DECISION

Before us is the appeal of intervenor Three Mile Island Alert, Inc. (TMIA), from the Licensing Board's October 31, 1984 initial decision.¹ That decision authorized issuance of an operating license amendment to permit the applicant Metropolitan Edison Company to operate Unit No. 1 at the Three Mile Island Nuclear Station after the steam generator tubes were repaired by kinetic expansion.² Specifically, the appeal challenges the Licensing Board's summary disposition of four of TMIA's contentions, but does not attack the Board's substantive determinations concerning the remaining, litigated contentions.³ However, TMIA does point to the general lack of industry experience with kinetic expansion. It also challenges the validity of several of the Board's procedural rulings.

TMIA has also filed a one-page motion to reopen the record on the basis of new information.⁴ Attached to the motion are copies of portions of six documents recently obtained by TMIA. Inasmuch as the motion to reopen relies upon arguments in TMIA's brief, and the brief in turn refers for support to the attachments to the motion, the two matters before us are completely intertwined. We therefore treat the technical

¹ LBP-84-47, 20 NRC 1405.

² Unit 1 is currently shut down. Although we have the initial responsibility for disposing of appeals on the merits, the Commission will determine if and when the plant should actually be permitted to restart. See CLI-81-19, 14 NRC 304, 305-06 (1981).

³ Memorandum and Order (Rulings on Motions for Summary Disposition) (June 1, 1984) (unpublished) (hereafter Summary Disposition Order). Licensing board orders that dispose of some but not all of a party's contentions are considered interlocutory. Appeals from such orders must await the issuance of the board's decision disposing of the remaining issues. *Cleveland Electric Illuminating Co. (Perry Nuclear Power Plant, Units 1 and 2)*, ALAB-736, 18 NRC 165 (1983).

⁴ Motion to Reopen the Record on the Basis of New Information (Dec. 10, 1984).

issues in the appeal together with the same issues that form the bases for the reopening motion.⁵

On April 3, 1985 we heard oral argument on the appeal and the motion to reopen. For reasons set forth in detail below, we deny the request to reopen the record and affirm the Licensing Board's decision.

I. TECHNICAL ISSUES

Three Mile Island, Unit 1, has been shut down since the accident at Unit 2 in 1979.⁶ During testing of Unit 1 in November 1981, leakage was discovered between the primary and secondary coolant loops, caused by corrosion of the tubes in the plant's two steam generators.

Each of the steam generators has 15,531 tubes through which primary water passes to transfer heat to the secondary coolant system, producing steam. Each tube is 56 feet, 2-3/8 inches in length, with a 0.625-inch outside diameter and a 0.034-inch minimum wall thickness.⁷ The primary coolant enters a plenum at the top of the generator, then passes down inside the tubes, and exits from a bottom plenum. The top and bottom plenums of the generator are separated from the tube bundle region by two-foot thick tubesheets.⁸ The tubesheets also provide top and bottom support for the tubes. During manufacture, the tubes, which pass through holes drilled in the tubesheets, were rolled out tightly against the wall of these holes for a distance of about 1¼ inches at each end. This process (together with a weld on the primary side of the tubesheet surface) fixed the tube to the tubesheet and provided a seal to prevent primary-to-secondary leakage.⁹

Tests following the discovery of the leakage in 1981 revealed that intergranular stress assisted cracking (IGSAC) had taken place, largely in the upper few inches of the tubes, i.e., the portion of the tubes within

⁵ To prevail on a motion to reopen the record, the movant must demonstrate that its request is timely, that it addresses significant safety or environmental issues, and that a different result might have been reached had the newly proffered material been considered initially. *See, e.g., Louisiana Power & Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-753, 18 NRC 1321, 1324 (1983), citing Metropolitan Edison Co. (Three Mile Island Nuclear Station, Unit No. 1), ALAB-738, 18 NRC 177, 180 (1983).*

⁶ *See generally* CLI-79-8, 10 NRC 141 (1979).

⁷ *See* LBP-84-47, *supra*, 20 NRC at 1407.

⁸ The tube bundle region is that portion of the steam generators where the secondary coolant receives heat and is transformed into steam. Cool feedwater enters at the bottom of the bundle, flows upward outside the tubes gaining heat, and (as steam) passes over the uppermost portion of the tubes, then out of the generator.

⁹ *See* LBP-84-47, *supra*, 20 NRC at 1407-08.

the upper tubesheet.¹⁰ Rather than repair the leaks by plugging the cracked tubes, which would have resulted in the removal from service of a very large number of tubes, the applicant proposed a Technical Specification change that would permit tube repair by kinetic expansion. In this process, a long section of the top of the tube within the tubesheet is explosively expanded out against the upper tubesheet (as opposed to the original mechanical roll expansion process). If the length over which this expansion takes place includes the cracked portions of the tube (which it did in most cases), leakage would be stopped as the leakage pathway (the crevice between the tube and the wall of the tubesheet hole) is eliminated.¹¹

Following the applicant's request for the Technical Specification change, the Commission published a notice of an opportunity for a hearing and TMIA was admitted as an intervening party.¹² Thereafter, in response to motions filed by the applicant and the NRC staff, the Licensing Board summarily disposed of several contentions filed by TMIA. On appeal, TMIA argues that the Board erred in granting summary disposition of contentions 1.c, 2.a, 2.b.1, and 2.b.2.¹³ As support for both its appeal and its motion to reopen the record, TMIA relies, for the most part, on new information concerning the discovery of loose plugs in a number of steam generator tubes, transient increases in sulfur and chloride concentrations in the reactor coolant and secondary systems, and indications of additional tube corrosion damage found during recent

¹⁰ This phenomenon was frequently referred to below as intergranular stress corrosion cracking (IGSCC).

¹¹ The kinetic expansion process did not eliminate the need for plugging steam generator tubes. Even before the expansion took place, about 350 tubes with identified defects had been removed from service by plugging. Applicant Topical Report 008, Rev. 3 (non-proprietary version) at 2 and Figure 1-3. Furthermore, tubes with unacceptable defects below the region in which kinetic expansion was an effective repair technique also had to be plugged. *Id.* at 3 and Figure 1-3.

¹² The notice of hearing included a proposal that the license amendment involves a "no significant hazards" determination pursuant to 42 U.S.C. § 2239(a)(2)(A) (Supp. 1985). If such determination is made, the Commission may issue the amendment and make it effective immediately notwithstanding any request for a hearing. The hearing may take place after issuance of the amendment. See 49 Fed. Reg. 24,231, 24,232 (1983). The Commission, however, never made its proposed determination final. See LBP-84-47, *supra*, 20 NRC at 1409 n.2. But, because the staff found that the *repairs themselves* did not involve either an unreviewed safety question or a modification of the applicant's Technical Specifications, the applicant was permitted to complete the repairs without prior NRC approval. See Board Exhibit 1 at 2. Operation of TMI-1 using the repaired steam generators must await issuance of the license amendment itself.

¹³ Brief on Appeal from Initial Decision in TMI-1 Steam Generator Repair OLA and in Support of Motion to Reopen the Record on the Basis of New Information (Dec. 10, 1984) (hereafter TMIA Brief) at 8-11.

eddy current testing (ECT).¹⁴ We discuss in turn the Board's handling of each of TMIA's contentions, including the relevant new information.

A. TMIA Contention 1.c

Contention 1.c reads:

The kinetic expansion repair weakened the tubes. As a result the plugs will not be able to hold and give a good seal, and thus the plant's ability to respond to transients and accidents will be adversely affected.¹⁵

In supporting its contention before the Licensing Board and before us, TMIA points to information that 23 plugs actually leaked. TMIA asserts that this represents strong evidence that the tubes have been weakened.¹⁶ TMIA also argued below (and continues to press on appeal) that the applicant's own Third Party Review Group was concerned that the tubes had been weakened. After considering these arguments, and affidavits submitted by the applicant and the NRC staff purporting to explain the cause of the leaking plugs and detailing remedial measures, the Licensing Board concluded that no genuine issue of material fact existed and granted the motion for summary disposition.¹⁷ The Board's rejection of this contention, TMIA claims, was "arbitrary and capricious."¹⁸ Further, TMIA states that it has discovered new information that 280 out of 1006 tube plugs failed a test of their ability to withstand a pulling force.¹⁹ The applicant and the NRC staff argue that the Licensing Board did not err in granting summary disposition²⁰ and that the new information is not of such significance as to warrant reopening the record.²¹

We find that the Licensing Board properly granted summary disposition of TMIA Contention 1.c. In disposing of the contention, the Board

¹⁴ Eddy current testing is a non-destructive method for determining whether defects exist in a metal object such as a steam generator tube. To perform this test, an electrical coil is passed through a tube to induce eddy currents in the tube material. The presence of a defect above a minimum size affects the conductivity of the tube material such that the defect can be identified by observing the electrical response signal. See Tr. fol. 652, at 6.

¹⁵ See Summary Disposition Order, *supra*, at 33.

¹⁶ TMIA Brief, *supra*, at 8; TMIA Response to Licensee and Staff Motions for Summary Disposition (April 3, 1984) at 32-35.

¹⁷ Summary Disposition Order, *supra*, at 37.

¹⁸ TMIA Brief, *supra*, at 8.

¹⁹ *Id.* at 8-9; see also Attachment 3 to TMIA Motion to Reopen.

²⁰ Licensee's Brief in Opposition to Appeal of TMIA from Initial Decision (Jan. 14, 1985) (hereafter Applicant Brief) at 13-17; NRC Staff Brief in Response to the Appeal by TMIA (Jan. 24, 1985) (hereafter Staff Brief) at 20-24.

²¹ Licensee's Answer to TMIA's Motion to Reopen the Record (Jan. 14, 1985) (hereafter Applicant Response) at 6-9; NRC Staff Response to TMIA Motion to Reopen the Record (Jan. 24, 1985) (hereafter Staff Response) at 9-10.

explicitly took note that 23 of 2500 plugs had indeed leaked. It nevertheless concluded, on the basis of the staff's papers, that this was not unusual for plugging operations of this type and that the leaking plugs had, in any event, been repaired.²²

The Board did not refer directly to the Third Party Review Group's report in reaching its summary disposition decision, but we have examined it.²³ That report does not support TMIA's assertion that the potential for plug failures is increased by the kinetic expansion process. The Review Group acknowledged the possibility that the explosive expansion of the tubes could affect the stress levels "if the process would change the strength or some dimensions of the tubes."²⁴ But, based on the information before it, that group concluded "that the repair process is not expected to affect significantly the stress levels in the tubes in the restart and subsequent operation periods."²⁵ As a result, we conclude that the Licensing Board did not err in granting summary disposition on the basis of the evidence before it.

The new information concerning loose plugs fails to cast doubt upon the Board's decision or warrant reopening the record. The recent plug failures have been fully and reasonably explained as caused by improper installation, rather than the kinetic expansion process.²⁶ In this connection, the fact that the majority of the plug failures occurred in the lower tubesheet — the tubes were kinetically expanded at the upper tubesheet — is strong evidence that the kinetic expansion process was not the cause of the plug failure.²⁷ More important, the improperly installed plugs have now been re-rolled and successfully leak tested.²⁸ Therefore, the discovery of the loose plugs does not constitute a safety-significant issue, nor might this information have caused the Board below to have reached a different conclusion.

B. TMIA Contention 2.a

This contention essentially alleges that the cause of the steam generator tube corrosion has not been identified and, thus, there can be no

²² Summary Disposition Order, *supra*, at 35. See Affidavit of Conrad E. McCracken and Louis Frank in Support of Staff Motion for Summary Disposition of TMIA Contention 1.c at 3, attached to NRC Staff Motion for Summary Disposition of TMIA Contentions 1.a, 1.b, 1.c, 1.d, 2.a, 2.b.1, 2.b.2, and 2.c (Feb. 24, 1984).

²³ See Board Exhibit 1, Attachment 6.

²⁴ *Id.* at 15 (emphasis added).

²⁵ *Ibid.*

²⁶ Applicant Response, *supra*, Affidavit of Branch D. Elam, Jr., at 3.

²⁷ *Ibid.*

²⁸ *Id.* at 3-4.

assurance that the corrosion problem has been corrected.²⁹ Relying on information submitted by the applicant and the staff, including the results of numerous studies and tests, the Licensing Board concluded that the cause of the corrosion had been properly identified and that there was reasonable assurance that corrosion would not begin again.³⁰ None of TMIA's arguments undermines the Board's decision.

TMIA challenges the Board's result on three principal grounds. First, it claims that the applicant's motion for summary disposition demonstrates uncertainty regarding the actual contaminant and failure scenario.³¹ In this regard, TMIA points to statements by the applicant that "sulfur *possibly* coupled with chloride was the *suspected* corrodent" and that two laboratories had "provided a description of the failure scenario which they *believed* was responsible for the damage observed, based on the facts uncovered."³² When read in context, these statements are fully consistent with the applicant's conclusions regarding the cause of the tube damage. Both statements are contained in the affidavit of the applicant's expert, F. Scott Giacobbe. The first was part of a description of the deliberative process followed to determine the corrosive agent.³³ That process led Mr. Giacobbe to the following conclusions:

The review of TMI-1 operational records, the literature surveys concerning IGSAC of Inconel 600 and the results of the independent failure analyses indicated conclusively that the IGSAC was sulfur-induced, and ruled out all other known possible sources of cracking.³⁴

We consider this clear evidence that the applicant is confident that the corrosive agent and failure scenario have been properly identified.

²⁹ TMIA Contention 2.a reads as follows:

Neither Licensee nor the NRC Staff has demonstrated that the corrosion which damaged the steam generator and other RCS components and systems will not reinitiate during plant operation and rapidly progress, attacking either the steam generator or elsewhere in the primary pressure boundary, thus providing no reasonable assurance that the operation of TMI-1 with the as-repaired steam generator can be conducted without endangering the health and safety of the public for the following reasons:

- (a) There is no assurance that the causative agent or the source of initiation or the conditions under which initiation originally occurred have been properly identified, thus undermining any conclusion that the causative agent has been removed from the system, and undermining the reliability of any proposed clean-up process, procedures meant to eliminate the corrosive environment, or the reliability of the Licensee and staff stress analysis as to when corrosion could reoccur.

See Summary Disposition Order, *supra*, at 56 (footnote omitted).

³⁰ *Id.* at 62-68. See also Board Exhibit 1 at 4-8.

³¹ TMIA Brief, *supra*, at 9-10.

³² *Id.* at 9 (emphasis added in brief).

³³ See Licensee's Motion for Summary Disposition of Each of TMIA's and Joint Intervenors' Contentions (Feb. 24, 1984), Affidavit of F. Scott Giacobbe at 9.

³⁴ *Id.* at 14.

The other statement is from a summary description of the independent investigations performed by two laboratories. Quoted more fully, the summary reads:

On the basis of their independent examinations of these tubes, both laboratories produced an in-depth characterization of the cracking morphology. They each also identified and analyzed any form of surface attack which was present and evaluated fracture and tube surface film composition and material properties. Finally, they each provided a description of the failure scenario which they believed was responsible for the damage observed, based on the facts uncovered. The results and conclusions of these two independent analyses were in agreement in all material respects.³⁵

This summary does not imply uncertainty as to the true failure scenario. Rather, it confirms that the correct scenario has been determined.

Next, TMIA alleges that an NRC staff consultant, Dr. Digby D. Macdonald, believed that something other than the identified sulfur species, i.e., thiosulfate, might have been responsible for the corrosion in the steam generators. Dr. Macdonald did, indeed, indicate that a volatile polysulfur species (which can form from thiosulfate) must have been present in the primary coolant system.³⁶ When he hypothesized the possible presence of some other sulfur species, however, he did not indicate that something other than sodium thiosulfate was, in fact, the contaminating agent. Rather, he suggested only that the presence of volatile polysulfur species could explain the corrosion in other regions of the primary system that, unlike the steam generators, were not exposed to a liquid environment. Indeed, in setting out his summary and conclusions, Dr. Macdonald basically endorsed the applicant's position. He observed that the intergranular stress assisted cracking in the steam generator tubes "most probably resulted from contamination of the . . . [reactor coolant system] with sodium thiosulfate."³⁷ In sum, nothing in TMIA's arguments raises unresolved factual issues or warrants a reversal of the Licensing Board's disposition of Contention 2.a.

To support its request to reopen the record, TMIA points to recent, temporary increases in sulfur and chloride levels in the primary and secondary systems, and the applicant's alleged uncertainty as to their cause, as additional evidence that the Board improperly determined that the corrosion problem has been solved.³⁸ We find no basis for doubting the Board's conclusion that the corrosion problem has been solved.

³⁵ *Id.* at 4.

³⁶ Board Exhibit 1, Attachment 4 at 20-25.

³⁷ *Id.* at 26.

³⁸ TMIA Brief, *supra*, at 9. In this connection, TMIA also charges that the applicant failed to inform the Licensing Board of these concerns. *Id.* at 11.

The temporary increases in impurity levels in the primary system were extremely small and the applicant has provided a reasonable explanation for them.³⁹ For example, major changes in the pH (i.e., the alkalinity or acidity) of the reactor coolant can result in an increase in the solubility of sulfur. The process of draining and refilling the steam generators can also cause an increase in impurity concentrations due to the drying and re-wetting of the tube surfaces. These increases were anticipated and promptly lowered by the plant's purification systems.⁴⁰ Perhaps more important, corrosion is not likely to begin anew because only a small concentration of impurities occurred and the environment in which they existed would not support further corrosion.⁴¹ Thus, we see no safety concern regarding these minor and temporary increases in sulfur and chloride levels in the primary system.

The temporary increases in sulfur concentration levels on the secondary side of the steam generator have no bearing on the primary side corrosion at issue in this proceeding. Moreover, the staff states that the sulfur levels reported for the secondary side are typical and do not present a significant corrosion concern.⁴² As a result, this information on secondary side sulfur concentrations is not safety-significant. In the circumstances, we conclude that the temporary increases in sulfur and chloride levels do not raise a significant safety issue and fail to satisfy the test for reopening the record.

C. TMIA Contentions 2.b.1 and 2.b.2

TMIA Contentions 2.b.1 and 2.b.2 challenge the efficacy of the applicant's proposal for removing the sulfur from the steam generators. Relying on an analysis provided by NRC staff consultant R.L. Dillon, TMIA first contended that the cleaning process would release a large inventory of sulfur into solution, thus enhancing the likelihood that corrosion will

³⁹ Applicant Response, *supra*, Affidavit of F. Scott Giacobbe (hereafter Giacobbe Affidavit) at 2-5. See also Staff Response, *supra*, Affidavit of Paul C.S. Wu and Conrad E. McCracken (hereafter Wu/McCracken Affidavit) at 12.

⁴⁰ Giacobbe Affidavit, *supra*, at 2-3.

⁴¹ *Id.* at 4; Wu/McCracken Affidavit, *supra*, at 12. When the concentration ratio of lithium to sulfur in the primary coolant system rises above ten, corrosion is inhibited. See Board Exhibit 1 at 27, Attachment 2 at 4, Attachment 3 at 8-9, Attachment 4 at 6. Our review of the applicant's Technical Data Report (TDR) 638 indicates that the lithium to sulfur ratio was greater than ten throughout the time period when the increases in sulfur and chloride concentrations occurred. Applicant Response, *supra*, Technical Data Report 638 (Jan. 14, 1985) (hereafter TDR 638) at 38, 40, 42, 44, 46, and 48.

⁴² Wu/McCracken Affidavit, *supra*, at 7.

be reinitiated.⁴³ It next contended that even if the proposed cleaning process itself posed no risk, there was no assurance that it would be successful.⁴⁴

By the time the motions for summary disposition were filed, the cleaning process had been completed and the applicant had put into place a variety of controls intended to prevent a reoccurrence of corrosion. As it turned out, the sulfur concentration that actually occurred (0.45 parts per million (ppm)) during cleaning was lower by at least a factor of 10 than the level postulated by Mr. Dillon (5-10 ppm).⁴⁵ Furthermore, a full temperature and pressure hot functional test of the reactor coolant system was conducted after the cleaning process. No additional corrosion was detected.⁴⁶ Based on this information, the Board concluded that there was no genuine issue of material fact, and summarily disposed of Contention 2.b.1.⁴⁷ The Board also accepted the applicant's arguments, which TMIA did not seriously challenge, that the control procedures put in place will prevent the unique combination of temperature and oxidizing conditions necessary to form aggressive sulfur species from any residual sulfur. As a result, the Board found that no material facts were present that needed to be litigated with respect to Contention 2.b.2, and granted summary disposition for the applicant.⁴⁸

On appeal, TMIA asserts that the discovery of defects during recent eddy current testing (ECT) reveals that the cracking has begun again and that Mr. Dillon's theory that the cleaning process might release a large inventory of sulfur into solution cannot be ruled out as the cause.⁴⁹ Although not clear from the brief, TMIA apparently believes that the

⁴³ TMIA Contention 2.b.1 reads:

The Staff's own consultant on this issue, R.L. Dillon, believes that the risk associated with cleaning, i.e., that a relatively large inventory of sulfur compounds will be put into solution, are greater than simply "living with large S inventory in the system," supporting a conclusion that the only two possibilities being considered by the Licensee and Staff pose substantial risk that corrosion will reinitiate.

Summary Disposition Order, *supra*, at 68.

⁴⁴ TMIA Contention 2.b.2 reads:

Even if the proposed cleaning process presented no risks, there is no assurance that the proposed process can remove more than 50-80% of the contamination, thus there can be no assurance that the contamination which would be left after the process is complete will not cause reinitiation.

Id. at 71.

⁴⁵ *Id.* at 68-69; TDR 638, *supra*, at 37. See also Board Exhibit 1, Attachment 3 at 6 and 12.

⁴⁶ Summary Disposition Order, *supra*, at 68-70.

⁴⁷ *Id.* at 71.

⁴⁸ *Id.* at 79-80.

⁴⁹ TMIA Brief, *supra*, at 10-11. We note, parenthetically, that TMIA has incorrectly assumed that ammonium hydroxide was added to the primary system to dislodge sulfur from metal surfaces. *Id.* at 10. In actuality, ammonium hydroxide is used to raise the pH of the reactor coolant during wet layup conditions. Giacobbe Affidavit, *supra*, at 4. This error by TMIA, however, does not significantly alter the thrust of its argument.

new ECT indications discredit the applicant's claim that the residual sulfur in the primary system after cleaning would not cause new corrosion.⁵⁰

We find that TMIA has failed to cast doubt upon the Licensing Board's summary disposition of TMIA Contentions 2.b.1 and 2.b.2. The staff authorized cleaning of the primary coolant system to eliminate residual sulfur under controlled conditions.⁵¹ Mr. Dillon's concerns about high sulfur concentrations during cleaning turned out to be unwarranted as the concentrations during that process were much lower than he postulated.⁵² In addition, the stable, non-corrosive form of sulfur remaining in the primary system, and the tight procedural controls placed on the primary coolant chemistry, make further corrosion highly unlikely.⁵³

We also believe that the information on the recent ECT indications does not warrant reopening the record. First, contrary to TMIA's view, the concerns of staff consultant Dillon regarding the potential for substantially increasing the sulfur concentration during the cleaning process are unrelated to the recent ECT indications. As noted above, the sulfur concentration that actually occurred was far below that postulated by Dillon and subsequent tests demonstrated that corrosion has not recurred.⁵⁴

From a detailed analysis of the ECT indications, the applicant has determined that they are the result of intergranular attack (IGA) pitting that occurred at the same time as the intergranular stress assisted cracking in 1981.⁵⁵ Long-term corrosion tests of actual TMI-1 steam generator tubes conducted by the applicant indicated that, under normal reactor coolant conditions, corrosion would not reoccur.⁵⁶ These tests, and the history of the coolant chemistry since 1981, convince us that the determination of the cause of the ECT indications is correct and that corrosion has not been reinitiated in the steam generator tubes.⁵⁷

The reasons assigned for the inability to detect this damage earlier are the small size of the IGA pits and the fact that this type of corrosion allowed the metal grains to remain in place for some time after the attack

⁵⁰ TMIA Brief, *supra*, at 10-11.

⁵¹ Summary Disposition Order, *supra*, at 69.

⁵² *Ibid.*

⁵³ *Id.* at 73-80.

⁵⁴ See Giacobbe Affidavit, *supra*, at 4; Wu/McCracken Affidavit, *supra*, at 8.

⁵⁵ Giacobbe Affidavit, *supra*, at 5. See generally TDR 638, *supra*. See also Technical Data Report 666, attached to letter to us from applicant counsel (April 11, 1985) (hereafter TDR 666) at 4-5.

⁵⁶ TDR 638, *supra*, at 11-12.

⁵⁷ *Id.* at 16-17.

had occurred.⁵⁸ Thermal strain and hydraulic loads imposed on the tubes during two post-repair hot functional tests are likely to have caused the affected grains to be removed, so that the defect could be identified by ECT.⁵⁹

To determine whether the corrosion that occurred in 1981 (including then-undetected IGA) had adversely affected the mechanical properties of the steam generator tubes, samples were removed from the steam generators and tested for yield strength, hardness, and ductility.⁶⁰ From this testing, it was concluded that the actual tubes were equivalent in their ability to withstand loads to archival tubes that had not been installed in the steam generators and, hence, had not been subjected to the corrosive attack.⁶¹ The tests also showed that the yield strength of the actual tube material meets or exceeds the minimum allowable strength criterion established by the appropriate industry standard.⁶² Therefore, the IGA damage has not resulted in any significant loss in strength of the steam generator tubes.

The long-term corrosion tests performed by the applicant provide additional evidence that the IGA damage has not resulted in any immediate reduction in the ability of the tubes to maintain their integrity during plant operation. In subjecting actual TMI-1 tube specimens to six heatup/cool-down cycles, these corrosion tests closely simulated the typical operating environment of the steam generator tubes during steady state and transient conditions.⁶³ The tests showed that, in the normal reactor coolant environment, corrosion would not recur in the steam generator tubes.⁶⁴ These tests, which took one year, demonstrated that actual tubes would perform satisfactorily during plant operations for at least six heatup/cool-down cycles.⁶⁵

With respect to any long-term effect of the IGA damage, the applicant is required to conduct an eddy current examination either 90 calendar days after reaching full power, or 120 calendar days after exceeding 50 percent power operation, whichever comes first.⁶⁶ These eddy current

⁵⁸ Giacobbe Affidavit, *supra*, at 6.

⁵⁹ *Id.* at 6-7. We appreciate that some additional grain dropout may occur. But the staff does not expect it to be significant. See Letter of John F. Stolz, Chief, Operating Reactors Branch #4, Division of Licensing, to Henry D. Hukill, Vice-President and Director, TMI-1 (April 17, 1985), attached to Office of Nuclear Reactor Regulation Safety Evaluation Regarding 1984 TMI-1 Steam Generator Tube Indications, at 6. The possibility of additional dropout does not justify a reopening of the record.

⁶⁰ Tr. 349, 461-62, 474-75, 514-16, 526-29.

⁶¹ Tr. 349, 461-62, 514-16, 527-28, 668-69.

⁶² Tr. 547-48.

⁶³ Tr. fol. 231, at 4; Tr. fol. 589, at 11-13; TDR 638, *supra*, at 11-12.

⁶⁴ TDR 638, *supra*, at 12. See also TDR 666, *supra*, at 4.

⁶⁵ TDR 638, *supra*, at 11-12; Tr. fol. 231, at 4 and 9; Tr. 364-65.

⁶⁶ LBP-84-47, *supra*, 20 NRC at 1423.

tests will detect any additional IGA damage that may become evident during the early stages of plant operation.⁶⁷

The IGA pits found thus far are, for the most part, shallow and roughly circular in dimension, with over 80 percent of them extending less than one-ninth of the circumference of the tube (i.e., 0.19 inches).⁶⁸ Any tubes having defects that are greater than 40 percent through-wall (regardless of the length) will be plugged in accordance with Technical Specifications.⁶⁹ To place this requirement in perspective, the tube wall would retain sufficient strength to withstand the design basis event (i.e., a main steam line break) even if the cracking went completely through the tube wall and extended for one-third of the circumference of the tube.⁷⁰ Similarly, for a tube to rupture during a main steam line break, it would have to be degraded by greater than 70 percent of its wall thickness around its entire circumference.⁷¹

Because additional corrosion is not taking place, it is unlikely that any undetected IGA pit would progress completely through the tube wall. Even if it did, however, the strength of the tube would not be seriously affected because of the characteristically small, lateral extent of the defects. With respect to larger defects, a crack of a size that could cause tube rupture during a main steam line break would be detectable by either ECT or leak rate monitoring.⁷² TDR 638 provides data indicating that the depth-to-length ratio of the newly identified IGA pits is such that it is likely that a progressing defect would penetrate the complete tube wall (with subsequent detectable leakage) before the pit achieved a sufficient lateral size to cause a tube rupture under accident conditions.⁷³

⁶⁷ The Licensing Board further imposed a license condition that, in the event of plant operation for an extended period at less than 50 percent power, the staff shall require an assessment by the applicant of the need for eddy current testing before the end of the refueling cycle. *Id.* at 1434.

⁶⁸ Technical Data Report 652, attached to letter to Appeal Board from applicant's counsel (April 11, 1985) (hereafter TDR 652) at 20, 60. In TDR 638, it is indicated that 90 percent of the defects extend less than 0.19 inches. TDR 638, *supra*, at 9. *But see also* TDR 666, *supra*, at 2 and 15. Uncertainty as to the exact size of these small defects is understandable. The eddy current testing technique can cause a defect to be assigned a circumferential length much greater than is actually the case because of the overlap of detection coils. That is, for the particular ECT probe here, each coil has a circumferential range that overlaps with another coil. A small defect may be just large enough to be detected by the overlapping coil and, thus, be characterized as a defect that extends to the upper limit of the overlapping coil. *See* TDR 666, *supra*, at 9, 18.

⁶⁹ Tr. fol. 589, at 3. The applicant has requested permission to modify the tube plugging criteria but defective tubes are currently being plugged in accordance with the 40 percent through-wall criterion in the existing Technical Specifications. *See* letter to Appeal Board from Bruce W. Churchill (April 9, 1985). We have not considered the applicant's proposed revision to the plugging criteria and take no position regarding its acceptability.

⁷⁰ Tr. fol. 652, at 8; Tr. 674.

⁷¹ Tr. fol. 589, at 2; Tr. 627; Tr. fol. 652, at 4 and 7.

⁷² Applicant Topical Report 008, Rev. 3 (non-proprietary version) at 74-89. *See also* TDR 666, *supra*, at 8-9; TDR 652, *supra*, at 47.

⁷³ TDR 638, *supra*, at 10. *See also* TDR 666, *supra*, at 9.

A pit that progressed through the tube wall would involve a much smaller leakage rate than a full tube rupture. Primary-to-secondary leakage can be detected by monitoring radiation at the discharge line of the main condenser air removal system.⁷⁴ This system (RM-A5L) is very sensitive⁷⁵ and will detect a continuous leak rate of 0.07 gallons per hour (gph) during power operation and 0.2 gph during plant cooldown.⁷⁶ A plant license condition requires plant shutdown if leakage exceeds 6 gph above a leakage rate baseline.⁷⁷ Thus, the RM-A5L monitor is capable of detecting leakage from a steam generator tube well before the license condition limit is reached. Further, the Licensing Board imposed a condition that a duplicate RM-A5L monitor, or equivalent, be installed so that one of the monitors will be continuously operable during plant operation.⁷⁸

To summarize, the recent ECT indications are the result of IGA that occurred in 1981 and are not the result of new or a different form of corrosion. The IGA pitting does not appear to be growing and does not significantly affect the strength of the tubes because of the geometry and small size of the defects. In the event that an IGA pit does progress completely through the tube wall, the continuous leak rate monitor is capable of detecting the leakage. Finally, performance of the required eddy current testing within three or four months of achieving power levels greater than 50 percent provides assurance that any further degradation of the tubes will be identified. As a result, we find that the new information on IGA pitting does not raise a significant safety issue that warrants reopening of the record.⁷⁹

⁷⁴ Tr. fol. 224, at 9.

⁷⁵ *Id.* at 8.

⁷⁶ *Id.* at 10.

⁷⁷ LBP-84-47, *supra*, 20 NRC at 1419-20.

⁷⁸ *Id.* at 1434.

⁷⁹ TDR 666 indicated that eight steam generator tubes were rolled following kinetic expansion in order to stop leakage in the expansion joint. TDR 666, *supra*, at 6. From the record, it is clear that any possible detrimental effects (such as hardening) of kinetic expansion following the original rolling of the tubes was adequately considered. *See, e.g.*, Tr. 411-13; Tr. fol. 423, at 4; Tr. fol. 425, at 5; Tr. 441-42, 465, 506. However, we have not discovered any specific discussion of the effects of additional rolling after kinetic expansion of a tube. Nevertheless, we believe that this matter is properly left for the staff to address. In the kinetic expansion region, there is no capability for a catastrophic tube rupture because of the confinement provided by the tubesheet. Any leakage that occurred would be far below that postulated for an unrestricted tube break. Tr. 508-09. Further, there is evidence that the kinetic expansion joint would slip under an axial load before tube rupture occurred. Tr. fol. 425, at 4. As a result, we see no need to initiate sua sponte review in an area with no significant safety implications.

D. Industry Experience

Apart from its arguments regarding its specific contentions, TMIA notes generally that “there had been virtually no industry experience with the kinetic expansion process used as a repair method for the steam generators in a nuclear power plant in the United States.”⁸⁰ That is so, as the Licensing Board acknowledged.⁸¹ TMIA does not point us to any specific concern that arises from this general lack of experience, and we find none. The Licensing Board found, with support in the record, that experience existed in the use of kinetic expansion in the manufacture and repair of heat exchangers other than steam generators.⁸² The record also reveals decades of relevant experience in the use of kinetic expansion in the manufacture of steam generators in the United States and the manufacture of steam generators and the repair of tubes in other countries.⁸³ We agree with the import of the Licensing Board’s observation that the specific lack of experience in this country with the use of kinetic expansion as a repair method for steam generators in nuclear plants does not affect the resolution of TMIA’s contentions.

II. PROCEDURAL ISSUES

TMIA challenges several of the Licensing Board’s procedural rulings. To begin with, it objects to the Board’s refusal to appoint an “expert panel” to evaluate the steam generator repairs and submit recommendations to the Board.⁸⁴ Next, it asserts that the Board twice interfered with the presentation of its case by improperly protecting from public disclosure information that the applicant claimed was proprietary — first, by issuing a protective order in connection with some of the applicant’s documents which “effectively precluded TMIA from gaining proper discovery,”⁸⁵ and, second, by expunging certain material from the public record.⁸⁶ Finally, it claims that the Board erred in refusing to permit it to question witnesses on the subject of loose and missing plugs.⁸⁷ We find no basis for upsetting these Board rulings.

⁸⁰ TMIA Brief, *supra*, at 14.

⁸¹ LBP-84-47, *supra*, 20 NRC at 1416.

⁸² *Id.* at 1416, 1430.

⁸³ Tr. 238-39, 512-13, 620-21, 630-32.

⁸⁴ TMIA Brief, *supra*, at 7-8.

⁸⁵ *Id.* at 6.

⁸⁶ *Id.* at 12-13.

⁸⁷ *Id.* at 11-12.

A. Appointment of an Expert Panel

TMIA asked the Board to appoint a special panel of four experts, one selected by each of the parties, who “would be paid by the NRC, and would act as quasi-investigators, quasi-Special Masters, to investigate, take evidence informally in the form of oral or written presentations by other experts in this field . . . [and] report to the Board with their recommendations.”⁸⁸ Such special procedure was necessary, TMIA argued, because of its lack of expertise and resources to pursue the highly technical issues involved in this case, and the “extraordinarily high level of distrust for both the Licensee and the NRC.”⁸⁹ The Board denied the request.⁹⁰ On appeal TMIA points to no error on the Board’s part. Rather, it reiterates a claim made to the Board that “without such assistance, TMIA would be forced to enter the hearings with a fatally flawed case.”⁹¹

We recognize the difficulties encountered by intervenors with limited funds and expertise. Nonetheless, the Board was correct in concluding that it was precluded by law from appointing anyone to assist TMIA with its case.⁹² Moreover, as the Commission has pointed out, “a person who invokes the right to participate in an NRC proceeding also voluntarily accepts the obligations attendant upon such participation.”⁹³ And, as we have observed: “[U]nlike 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.”⁹⁴ Upon review of the record, we are satisfied that the Licensing Board developed a full record and accorded fair consideration to all safety-significant issues. The Board did not err in declining to reshape the established procedures for the conduct of NRC proceedings as requested by TMIA.

⁸⁸ TMIA Motion for Appointment of Special Panel (Jan. 25, 1984) at 3-4.

⁸⁹ *Id.* at 1.

⁹⁰ Memorandum and Order (Denying TMIA Motion for Appointment of Special Panel) (Feb. 24, 1984) (unpublished).

⁹¹ TMIA Brief, *supra*, at 8.

⁹² See Pub. L. No. 98-360, § 502, 98 Stat. 403 (1984). See also *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 1), ALAB-772, 19 NRC 1193, 1247, 1273 (1984), *rev'd in part, on other grounds*, CLI-85-2, 21 NRC 282 (1985). Cf. *Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 & 2), ALAB-805, 21 NRC 596, 601 (1985) (NRC has not in the past used public money to pay for testimony of a witness where intervenor could not assume the expense itself).

⁹³ *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041, 1048 (1983). Cf. *Three Mile Island*, ALAB-772, *supra*, 19 NRC at 1246-48.

⁹⁴ *South Carolina Electric and Gas Co.* (Virgil C. Summer Nuclear Station, Unit 1), ALAB-663, 14 NRC 1140, 1156 (1981).

B. Confidential Treatment of Proprietary Information

TMIA asserts that the Board improperly accorded confidential treatment to certain information during the course of prehearing discovery and the hearing. As explained below, we disagree.

1(a). During the discovery process, TMIA made a blanket request for all proprietary documents that the applicant had earlier withheld. The applicant was willing to turn over all of the requested documents as long as TMIA agreed to protect the information against disclosure to the general public. TMIA refused. Given the stalemate, TMIA filed a motion to compel disclosure and the applicant asked for a protective order.⁹⁵

Relying on information submitted by the applicant (including supporting affidavits from its supplier, Babcock & Wilcox), the Licensing Board determined that the applicant had shown sufficient cause at that stage of the litigation to justify an order protecting the proprietary information.⁹⁶ The Board considered — and rejected — TMIA’s arguments that any restriction on the use of the information would “hinder TMIA’s ability to do research, often conducted by relatively uninvolved TMIA members who at various times, with little or no notice, can offer research assistance . . .” and “create an entirely unnecessary and extremely intimidating condition for TMIA members. . . .”⁹⁷ At that juncture, the Board found it unnecessary to make a definitive determination as to whether each bit of allegedly proprietary information contained in the 35 documents was actually privileged proprietary data.⁹⁸ Rather, it elected to await TMIA’s review of the documents and any decision on their use before undertaking a detailed evaluation of their proprietary status.⁹⁹ TMIA refused to receive or inspect any of the documents under the protective order issued by the Board and now asserts that its discovery was compromised.¹⁰⁰

1(b). At the hearing, TMIA pursued a line of questioning dealing with the number of times certain of the tubes may have been kinetically

⁹⁵ TMIA Motion for Order Compelling Discovery (Jan. 25, 1984); Licensee’s Motion for Protective Order and Answer to TMIA’s Motion for Order Compelling Discovery (Feb. 6, 1984).

⁹⁶ Memorandum and Order (Denying TMIA’s Motion to Compel; Granting Licensee’s Motion for Protective Order) (March 2, 1984) (hereafter Board Order of March 2, 1984) at 5-6 (unpublished).

⁹⁷ *Id.* at 4-5.

⁹⁸ *Id.* at 5-7.

⁹⁹ TMIA sought reconsideration of the Board’s decision, arguing basically that the information was not proprietary and not entitled to confidential treatment. The Board denied reconsideration. Order (Denying TMIA Motion for Reconsideration) (May 1, 1984) (unpublished).

¹⁰⁰ See Tr. 443-45. The documents themselves and supporting affidavits were submitted to the Board but not served on TMIA.

expanded. On cross-examination, one of the applicant's witnesses disclosed information that counsel for the applicant believed to be proprietary. Following an off-the-record bench conference, the Board ordered that two questions and one of the answers be physically expunged from the public record.¹⁰¹ The Board nonetheless scheduled an in camera session to give TMIA the opportunity to pursue this line of questioning.¹⁰² If, following the in camera session, the Board determined that the material was not proprietary and should not be withheld from public disclosure, it would order the transcripts of the in camera session released to the public.¹⁰³ TMIA refused to participate in any in camera session, asserting that "Commission regulations support closing the public hearing only when there is an absolute justification for doing so . . . [and that] there has been no justification presented in this particular case."¹⁰⁴ It essentially reiterates that position on appeal.

2. We find that the Board's prehearing decision to deny TMIA's motion to compel but to grant the applicant's request for a protective order pending more detailed examination of the documents, and its decision during the hearing to receive certain information only in camera, were proper. Any prejudice to TMIA's litigation capability was the result of its own refusals to receive or to inspect the documents under the terms imposed by the Board, and to cross-examine the applicant's witness at the in camera session.

Disputes frequently arise in which one party to a proceeding seeks purportedly proprietary information from another. Protective orders and in camera proceedings are the customary and favored means of handling such disputes. They are especially useful as an interim measure to avoid delay in the proceedings pending definitive resolution of whether, or to what degree, information should be withheld from the general public.¹⁰⁵ The Commission's regulations expressly provide, in part:

The Commission may require information claimed to be a trade secret or privileged or confidential commercial or financial information to be subject to inspection . . . under protective order, by parties to a proceeding, pending a decision of the Commission on the matter of whether the information should be made publicly available In camera sessions of hearings may be held when the information

¹⁰¹ Tr. 442.

¹⁰² Tr. 442-43.

¹⁰³ Tr. 449.

¹⁰⁴ Tr. 445.

¹⁰⁵ 10 C.F.R. § 2.790(b)(6). See also *Commonwealth Edison Co.* (Zion Station, Units 1 and 2), ALAB-196, 7 AEC 457, 469 (1974).

sought to be withheld is produced or offered in evidence. If the Commission subsequently determines that the information should be disclosed, the information and the transcript of such in camera session will be made publicly available.¹⁰⁶

The Board's rulings come squarely within the terms of the regulation.¹⁰⁷ Before issuing the protective order, the Board reasonably determined that the applicant had made out a prima facie case for protection. Its rejection of TMIA's claim that any restriction on use of the information would hamper discovery was not an abuse of its discretion. Similarly, the Board acted reasonably in concluding, at least preliminarily, that a public discussion of the number of expansions involved in the kinetic expansion process could reveal proprietary information. It properly agreed to allow the cross-examination in camera but to release the transcripts if it turned out that the information should be made available to the public. That being so, we find no prejudice resulting from the Board's rulings.¹⁰⁸

C. Contention 1.c Issues

The Licensing Board confined Contention 1.c to the issue of whether the kinetic expansion repair had weakened the tubes so that the plugs would not retain their seal.¹⁰⁹ As discussed above, Contention 1.c was resolved at the prehearing stage by summary disposition.¹¹⁰ While the hearing was in progress, additional information regarding missing or loose

¹⁰⁶ 10 C.F.R. § 2.790(b)(6)(iii). See also *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Unit 1), ALAB-696, 16 NRC 1245, 1261 (1982) (the Commission's rules contemplate a resolution of proprietary information disputes after the merits are resolved in order to avoid delay in proceedings).

¹⁰⁷ For present purposes, we assume that the term "in camera" in 10 C.F.R. § 2.790 is intended to mean "in private," i.e., "when all spectators are excluded." Black's Law Dictionary 684 (5th ed. 1979). On occasion the term appears to be equated with "ex parte," i.e., "without notice to, or contestation by, any person adversely interested." *Id.* at 517. See, e.g., 10 C.F.R. § 2.744(c). Because the Board was prepared to make all information available to all parties under a protective arrangement, we are not here confronted with problems that may arise when information is unavailable to one or more of the parties and ordinary adversarial exploration is impossible. See generally *Pollard v. FBI*, 705 F.2d 1151, 1153-54 (9th Cir. 1983).

¹⁰⁸ Given our determination that the Board's rulings were proper when made, it is of no moment that, in light of TMIA's refusal to proceed with discovery under the protective order or participate in in camera proceedings, the Board at the end of the hearing found it unnecessary to decide whether, in fact, all the information was proprietary. Tr. 675-77. See *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-788, 20 NRC 1102, 1176-79 (1984) (party may be found in default where it refuses to proceed in accordance with a lawful and reasonable board ruling). Cf. *Point Beach, supra*, 16 NRC at 1261 (party may not complain of inadequate time for preparation of its case where its refusal to sign a protective agreement concerning proprietary information was the cause of the abbreviated time period).

¹⁰⁹ Memorandum and Order (Partially Granting Licensee's Motion for Reconsideration) (Jan. 9, 1984) at 4-5 (unpublished).

¹¹⁰ See Summary Disposition Order, *supra*, at 33-37. See also pp. 1201-02, *supra*.

plugs, and tube leakage, came to light. TMIA asked the Board to permit it to question applicant and staff witnesses regarding the new information. TMIA's representative stated:

TMIA's contention on plugging had gone exactly to the retention of plugs in the steam generator tubes after the kinetic expansion. There is not enough information here for me [to] determine if these plugs were loosened as a result of kinetic expansion. However, TMIA would like to question further on this issue.¹¹¹

The Board denied the request because the issue of tube plugging was no longer in litigation¹¹² and TMIA now asserts that the Board's refusal to allow it to explore the new information was improper.¹¹³ We affirm the Board's result.

Because the issue of the effect of kinetic expansion on the ability of the tubes to retain their plugs had been removed from litigation through summary disposition, TMIA's request was in the nature of a motion to reopen the record to explore newly discovered information. Such motions need not be granted unless it is likely that a different substantive outcome would result.¹¹⁴ The reports relied on by TMIA indicated, first, that the NRC's resident inspector discovered that one tube plug was missing and another was loose, and, second, that there was a small increase in the primary-to-secondary leakage rate.¹¹⁵ We have fully considered the matters of missing plugs and primary-to-secondary leakage. As explained above, we are satisfied that (1) there is no connection between the kinetic expansion repair and the failure of some tubes to retain their plugs, and (2) kinetic expansion has not weakened the tubes. The Licensing Board properly disposed of Contention 1.c summarily and a reopening of the record on this score is not justified.

¹¹¹ Tr. 208.

¹¹² Tr. 208-09.

¹¹³ TMIA Brief, *supra*, at 12-13.

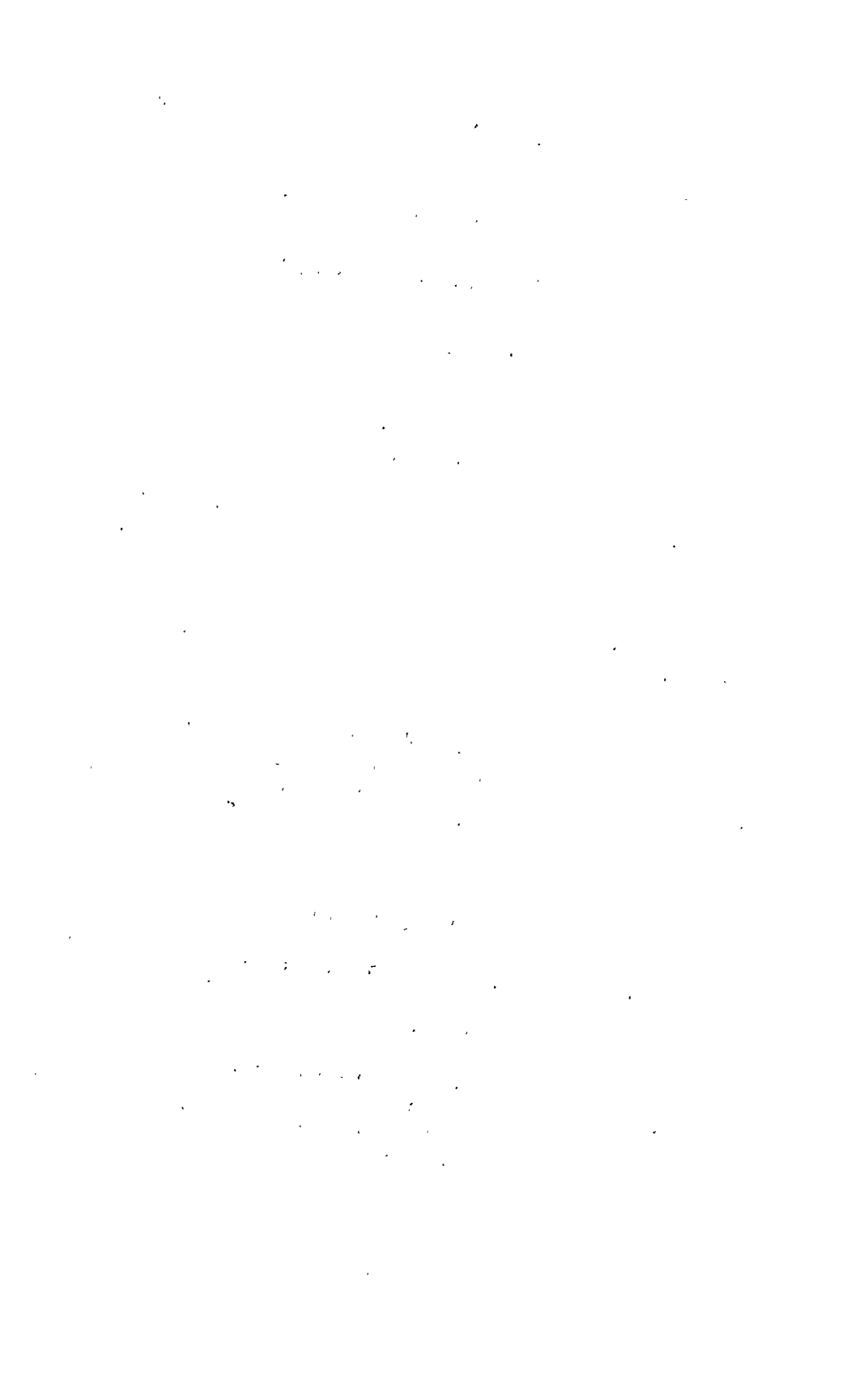
¹¹⁴ *Union Electric Co.* (Callaway Plant, Unit 1), ALAB-750, 18 NRC 1205, 1209 (1983). *Cf. Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1096 (1983).

¹¹⁵ Preliminary Notification PNO-I-84-56A (July 9, 1984) and Board Notification BN-84-131 (July 13, 1984).

TMIA's motion to reopen the record is *denied*, and the Licensing Board's initial decision 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 BOARD

Before Administrative Judges:

**Helen F. Hoyt, Chairperson
Dr. Richard F. Cole
Dr. Jerry Harbour**

In the Matter of

**Docket Nos. 50-352-OL
50-353-OL**

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

May 2, 1985

In this Third Partial Initial Decision, the Licensing Board concludes its consideration of seventeen offsite emergency planning issues, concluding as to those issues that there is reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

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THIRD PARTIAL INITIAL DECISION ON OFFSITE EMERGENCY PLANNING

I. INTRODUCTION

This is the Third Partial Initial Decision (“PID”) issued by this Atomic Safety and Licensing Board (“Licensing Board” or “Board”)¹ in this proceeding.² Except for offsite emergency planning contentions, the first PID and second PID decided all issues admitted for litigation before this Licensing Board and resolved them in favor of Applicant. The third PID now disposes of those remaining issues in favor of Applicant except for any issue which may arise from the inmates of the State Correctional Institution at Graterford (*see* ALAB-806, 21 NRC 1183 (1985)).

On March 17, 1981, Applicant applied for operating licenses for the Limerick Generating Station, Units 1 and 2, which are located in Limerick Township, Montgomery County, Pennsylvania. As stated in Applicant’s Final Safety Analysis Report at 1.1-1, Applicant sought licenses to operate two boiling water nuclear reactors, each with a rated core power level of 3293 megawatts thermal and a net electrical output of 1055 megawatts.

¹ By notice issued September 25, 1984, the Board was reconstituted to comprise the present members, replacing Judge Brenner and Dr. Morris with Judge Hoyt and Dr. Harbour.

² The first PID was issued on March 8, 1983, and resolved the litigated issues in favor of Applicant Philadelphia Electric Co., subject to certain conditions. LBP-83-11, 17 NRC 413 (1983), *aff’d in part, remanded in part*, ALAB-785, 20 NRC 848 (1984). The remanded issues relating to the appeal from the first PID were resolved in favor of Applicant without the need for an evidentiary hearing. “Memorandum and Order on Del-Aware’s Remanded and Revised Environmental Contentions V-14 and V-16” (Nov. 8, 1984), *appeal pending*. The second PID was issued on August 29, 1984. LBP-84-31, 20 NRC 446 (1984), *appeal pending*. The second PID decided all issues in controversy which were prerequisite for authorization of the low-power operating licenses requested by Applicant pursuant to 10 C.F.R. § 50.57(c).

Pursuant to notice of receipt of the application published in the *Federal Register*,³ two intervenors, Limerick Ecology Action ("LEA") and Friends of the Earth in the Delaware Valley ("FOE") (admitted as a joint party with its representative Mr. Robert L. Anthony), proposed contentions relating to the offsite emergency plans for Limerick.⁴ Because the various jurisdictions within the plume exposure emergency planning zone ("EPZ") for Limerick had not yet issued draft emergency plans intended to conform to the emergency planning requirements under 10 C.F.R. § 50.47 and the regulatory guidance under NUREG-0654, the Licensing Board deferred consideration of the proposed offsite emergency planning contentions.⁵ Once draft offsite plans suitable for framing issues were available for review, intervenors proposing offsite emergency planning contentions were required to refile and respecify their proposed contentions.⁶

At a prehearing conference held the week of March 5, 1984, the Licensing Board ruled on the admissibility of the proposed contentions. A number of contentions were admitted on behalf of LEA. One contention was admitted on behalf of FOE and combined with a related LEA contention, for which LEA was designated the lead intervenor.⁷ The contentions proposed by other intervenors were either rejected or subsequently settled.⁸ Following a period of discovery and the Board's final respecification of the admitted contentions,⁹ 37 days of evidentiary hearings on the contentions were held between November 19, 1984 and January 29, 1985 in Philadelphia, Pennsylvania.

II. BASIC PRINCIPLES OF EMERGENCY PLANNING

At the outset the Board sets forth certain principles of emergency planning that arise out of the NRC regulations and case law.

³ 46 Fed. Reg. 42,557 (Aug. 21, 1981).

⁴ LBP-82-43A, 15 NRC 1423, 1439-40 (1982).

⁵ *Id.* at 1519.

⁶ "Memorandum and Order Confirming Schedules Established During Prehearing Conference," slip op. at 4-5 (May 16, 1983) (unpublished).

⁷ LBP-84-18, 19 NRC 1020, 1069 (1984).

⁸ A contention admitted on behalf of the Commonwealth of Pennsylvania ("Commonwealth"), relating to the adequacy of dosimetry for emergency workers, was subsequently withdrawn upon agreement by Applicant to purchase the necessary dosimetry. See Appl. Ex. E-104. On January 25, 1985, the City of Philadelphia withdrew its two admitted contentions related to the protection of the City's public water supplies on the basis of an agreement reached with Applicant. Tr. 20,350-52.

⁹ "Memorandum and Order Ruling on Reworded and Respecified Offsite Emergency Planning Contentions" (Sept. 24, 1984) and "Memorandum and Order on LEA's Deferred and Respecified Offsite Emergency Planning Contentions" (Oct. 26, 1984) (both unpublished).

The regulations and adjudicatory decisions of the Nuclear Regulatory Commission ("Commission" or "NRC") provide that offsite emergency planning contentions are to be decided somewhat differently than other contentions admitted for hearing. Further, as discussed below, the Board's adjudicatory findings on any admitted contentions are only part of the overall findings which the NRC must make with regard to emergency preparedness prior to the issuance of a full-power operating license. The rules governing emergency planning for the NRC are contained in 10 C.F.R. § 50.47 and 10 C.F.R. Part 50, Appendix E. Under the NRC's regulations, issuance of an operating license for a nuclear power reactor requires that the NRC find that there is reasonable assurance that adequate protective measures both on and off the facility site can and will be taken in the event of a radiological emergency.¹⁰ With regard to the adequacy of offsite emergency planning, the NRC must "base its findings on a review of the Federal Emergency Management Agency ('FEMA') findings and determinations as to whether State and local emergency plans are adequate and whether there is reasonable assurance that they can be implemented."¹¹

Pursuant to the Presidential Order of December 7, 1979, FEMA is to assume lead responsibility for all offsite nuclear emergency planning for fixed nuclear facilities.¹² Generally, the guidance and criteria for judging the adequacy of onsite and offsite emergency response plans are contained in NUREG-0654,¹³ which is cited in 10 C.F.R. § 50.47(b) as appropriate guidance. NUREG-0654 does not constitute the only method of meeting applicable regulatory requirements for emergency planning. In the absence of other evidence, however, adherence to NUREG-0654 may be sufficient to demonstrate compliance with the Commission's emergency planning regulations.¹⁴ The role of FEMA in NRC licensing is set forth in the "Memorandum of Understanding Between NRC and FEMA Relating to Radiological Emergency Planning and Preparedness" (executed on November 3-4, 1980) ("MOU").¹⁵ Under the MOU, FEMA is required, in addition to any responsibilities under 44 C.F.R. Part 350 for final, formal approval of State and local emergency plans, to provide "findings and determinations on the current status of emergency

¹⁰ 10 C.F.R. § 50.47(a)(1).

¹¹ 10 C.F.R. § 50.47(a)(2).

¹² See note 16, *infra*.

¹³ NUREG-0654, FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Rev. 1, November 1980.

¹⁴ *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit No. 1), ALAB-698, 16 NRC 1290, 1298-99 (1982); *Southern California Edison Co.* (San Onofre Nuclear Generating Station, Units 2 and 3), LBP-82-39, 15 NRC 1163, 1270 (1982), *aff'd*, ALAB-717, 17 NRC 346 (1983).

¹⁵ 45 Fed. Reg. 82,713 (Dec. 16, 1980).

preparedness around particular [nuclear power plant] sites . . . for use as needed in the NRC licensing process.”¹⁶ As distinguished from the final findings under 44 C.F.R. Part 350, such determinations are typically referred to as “FEMA interim findings.”

We touch on this briefly because considerable testimony was adduced from the FEMA witnesses as to the rendering of FEMA interim findings for Limerick. As discussed below, the Board does not regard the completion of those findings as necessarily dispositive of the issues presented in this case. Although FEMA interim findings are to be given the weight of a rebuttable presumption in an NRC licensing proceeding,¹⁷ the MOU recognizes that the most current interim findings may not be available at the time offsite emergency planning contentions are decided in an evidentiary hearing. Accordingly, the MOU further provides that FEMA routine support for the NRC licensing process “will include providing assessments of State and local plans,” and that, “[t]o support its findings and determinations, FEMA will make expert witnesses available,” *inter alia*, before NRC licensing boards.¹⁸

Accordingly, it is the responsibility of the NRC, taking due regard of the FEMA interim findings related to the offsite plan, to make the findings required under 10 C.F.R. § 50.47(a)(1) for issuance of a full-power operating license. A licensing board is limited to considering only those emergency planning issues in controversy among the parties.¹⁹ This Licensing Board is not required to await FEMA interim findings, but rather bases its own findings, as to any admitted contentions, on all of the evidence in determining whether reasonable assurance exists that offsite emergency plans are adequate and capable of being implemented. This includes the testimony of technical experts and consultants, governmental emergency planners and other officials, and any other individual with relevant, material and reliable testimony.²⁰ This Board also has considered any approved emergency plans, the current version of draft plans in preparation for adoption, and other documents which bear upon the adequacy or implementability of those plans. Accordingly, our evidentiary findings are independent of the FEMA interim findings.

Another distinction is crucial to the Board’s analytical framework. Unlike other safety-related findings by a licensing board, offsite

¹⁶ *Id.* at 82,714.

¹⁷ 10 C.F.R. § 50.47(a)(2).

¹⁸ 45 Fed. Reg. at 82,714.

¹⁹ 10 C.F.R. § 2.760a; 10 C.F.R. Part 2, Appendix A, § VIII.

²⁰ 10 C.F.R. § 2.743(c).

emergency planning findings are predictive rather than merely descriptive in nature. Recognizing that development of offsite emergency plans is a dynamic, evolving process, the Commission's regulations require only a finding that the plans are adequate and capable of being implemented, not that they have been finally approved or adopted by the respective State and local governments.

This distinction has been emphasized by the Appeal Board in several cases. For example, in *San Onofre*, the Appeal Board noted that plans need not be complete prior to the close of hearings, stating:

Substantively, the evidence must be sufficient for the Board to conclude that the state of emergency preparedness "provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency." 10 C.F.R. § 50.47(a)(1). The Commission has stressed that this conclusion may be a *predictive* one, rather than a reflection of the actual state of emergency preparedness at the time of the Board's decision. 47 Fed. Reg. at 30233.²¹

The Appeal Board reiterated this important distinction in the *Waterford* proceeding, noting that, at one time, the Commission's regulations required a finding that "the *state* of onsite and offsite emergency preparedness provides reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency."²² The Appeal Board pointed out that the reference to the "state" of emergency preparedness was deliberately eliminated from the regulations.²³ In the same rulemaking, the Commission emphasized that "there should be reasonable assurance prior to license issuance that there are no barriers to emergency planning implementation or to a satisfactory state of emergency preparedness that cannot feasibly be removed."²⁴ In *Waterford*, the Appeal Board concluded that, for purposes of licensing decisions, offsite emergency plans "need not be 'final,' " but only "sufficiently developed to permit the board to make its 'reasonable assurance' finding."²⁵

Finally, the Appeal Board in *Fermi* expressly held that NRC regulations do not "mandate either a final local government emergency plan or a final evaluation of offsite preparedness by FEMA, the agency that has the principal responsibility to conduct such an evaluation."²⁶ Noting

²¹ *San Onofre*, *supra*, ALAB-717, 17 NRC at 380 n.57 (emphasis added).

²² *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1103 (1983).

²³ *Id.*

²⁴ *Id.* at 1104, *citing* 46 Fed. Reg. 61,135 (Dec. 15, 1981).

²⁵ *Id.*

²⁶ *Detroit Edison Co.* (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-730, 17 NRC 1057, 1066 (1983).

earlier decisions that hearings may be based upon plans “sufficiently developed” to support affirmative findings, the Appeal Board stated that “it is plain from the Commission’s regulatory requirements that offsite plans need not be complete, nor finally evaluated by FEMA prior to conclusion of the adjudicatory process.”²⁷

These principles have important application here, given the status of offsite emergency planning for Limerick. As discussed below, practically all of the various school district, municipal and county emergency plans (Appl. Exhs. E-1 to E-61; Chester County/Commonwealth Exh. E-1) were awaiting formal adoption at the time of the hearing. Moreover, the Pennsylvania Emergency Management Agency (“PEMA”) had not at that point formally received the plans admitted in evidence for its review. *See* Commonwealth Exhs. E-13a, b, c. Under the formalized procedures for receipt and review of offsite emergency plans from PEMA, FEMA had likewise not yet commenced its review of the draft plans received into evidence. Kinard, Tr. 20,328. As the FEMA witnesses testified, it is FEMA policy to review only those plans and related documents which it receives from either PEMA (*see* LEA Exh. E-1, at 1; LEA Exh. E-71, at 1), or the NRC upon a formal request to review those materials. Asher, Tr. 20,167-68; Kinard, Tr. 20,308, 20,322-23. On the basis of that formal request and review, FEMA expects to forward supplemental interim findings²⁸ to the NRC pursuant to the NRC/FEMA MOU. Asher, Tr. 20,167-68.²⁹

Inasmuch as the FEMA witnesses had not yet had an opportunity to review the current draft plans received in evidence (Asher, Tr. 20,304; Kinard, Tr. 20,330), they were simply not in a position in several instances to address the adequacy or implementability of several aspects of the plans challenged by the LEA and FOE contentions. They acknowledged that their testimony would be changed just on the basis of other testimony before the Board. Asher, Tr. 20,330. The Board notes, however, that the basic planning principles and procedures for the municipal

²⁷ *Id.* The Board notes that none of the offsite emergency plans for the five nuclear power plants in Pennsylvania has yet received formal approval from FEMA under 44 C.F.R. Part 350. Hippert, Tr. 19,571-72.

²⁸ The Regional Assistance Committee (“RAC”), Region III, FEMA, forwarded an informal evaluation of the offsite plans to the NRC in April 1984, based upon its review of plans submitted by PEMA in December 1983. FEMA Exh. E-6. The RAC review resulted in the issuance of an initial set of interim findings by FEMA, dated April 17, 1984. FEMA Exh. E-7. As discussed below, the plans received into evidence were far more advanced than those reviewed by FEMA.

²⁹ The Board received on April 17, 1985, two memoranda: (1) March 29, 1985 — FEMA Updated Interim Findings on Offsite Radiological Emergency Preparedness for the Limerick Generating Station; and (2) April 9, 1985 — FEMA Supplemental Interim Finding on Offsite Radiological Emergency Preparedness for the Limerick Generating Station. The Board received on April 25, 1985, FEMA Region III Interim Findings of Offsite Radiological Emergency Preparedness for the Limerick Generating Station — March 1985. We have considered these FEMA documents as related to our findings herein.

and county plans have been essentially in place since the beginning of the planning process. Bradshaw, Tr. 17,364. Furthermore, there have been very few instances where municipalities objected to or revised the basic procedures in the plans. Nonetheless, the FEMA witnesses generally testified that applicable planning standards would be satisfied if the plans in evidence now reflect the information provided by the testimony of Commonwealth, county, municipal, school district and expert witnesses, which updated the status of planning in the various jurisdictions. Thus, incompleteness of the FEMA review at this time, including the receipt of any further planning documents necessary for that review, does not impede this Board's ability to make the necessary predictive findings.³⁰ However, the Board addresses the outstanding Category A deficiencies found by FEMA as reflected in its written evaluation of the July 25 and November 20, 1984 Limerick exercises (FEMA Exhs. E-4, E-5) to the extent they pertain to the admitted contentions in this proceeding because a "Category A" deficiency is the type that precludes a finding of reasonable assurance. FEMA Ex. E-5, at 9.

The Board is satisfied that there is ample evidence upon which to make sound predictive findings. Applicant presented Robert Bradshaw, John Cunningham and Robin Wenger as a panel of witnesses from Energy Consultants, retained by Applicant in 1982 to assist local governments within the Limerick EPZ in preparing adequate emergency plans. Energy Consultants has been actively engaged in that support function for 2 years by preparing draft plans for the risk counties, municipalities and school districts, utilizing prototype plans approved by PEMA and input from each respective unit of government. Based upon their consultant and liaison responsibilities, the Energy Consultant witnesses possessed detailed knowledge of the emergency plans and training programs. The Board found them to be qualified by position, training and experience to explain the status and content of those plans and has relied on their testimony. The Board found Robert Klimm, who prepared an Evacuation Time Estimate study for the Limerick EPZ, to be knowledgeable and qualified in the area of transportation and traffic engineering and has also relied on his testimony.

The NRC Staff, FEMA and Commonwealth of Pennsylvania also presented witnesses whom the Board found to be knowledgeable, competent and credible. Their reviews are in progress. Accordingly, the Board has

³⁰ Nor is it the Board's task to address FEMA's review of outstanding deficiencies noted in Region III's April 1984 interim findings (FEMA Ex. E-7) and its written evaluations of the July 25 and November 20, 1984 Limerick exercises (FEMA Exhs. E-4, E-5), except as they pertain to specific contentions.

relied on their testimony to the extent the witnesses were conversant with the present status of plans and planning within the Limerick EPZ.

LEA subpoenaed a number of municipal officials to explain the status of planning in the respective townships. Those officials had almost entirely delegated responsibility for the development of a workable plan to their respective emergency coordinators, who were charged with submitting and recommending approval of a workable plan. Accordingly, those municipal officials had not yet reviewed their plans in great detail. While those witnesses attempted to be helpful, there were many instances in which they simply lacked an understanding of basic emergency planning assumptions as well as the plans themselves. The Board has given their testimony appropriate weight. Certain nongovernmental witnesses sponsored by LEA were uncooperative and appeared unwilling to learn about emergency planning for their facilities. Hence, some witnesses knew very little about existing plans which have addressed to some extent their concerns.

A number of the contentions challenge the adequacy of particular aspects of emergency preparedness, such as notification of emergency workers, or the adequacy of planning for particular categories of the population, such as schoolchildren and children enrolled in day care facilities. Other contentions more broadly challenge the capability to implement the plans and question whether the plans will in fact be adopted. Accordingly, the Board has not addressed the admitted contentions in numerical order, but rather in a sequence which provides the clearest understanding of the issues in controversy.

On January 28, 1985, we issued an order (unpublished) setting forth the schedule for filing of proposed findings of fact and conclusions of law. That schedule was modified on March 4, 1985. All parties have submitted proposed findings of fact and conclusions of law. The Board has considered all of the proposed findings of fact and conclusions of law filed by the parties. Those not incorporated directly or inferentially in this Decision are rejected as unsupported by fact or law or as unnecessary to the rendering of this Decision.

Time Constraints on Examination and Cross-Examination of Witnesses

Before turning to the Board's findings, we address the claim by FOE that time constraints imposed by the Board for the parties' examination and cross-examination of witnesses were unduly restrictive. Initially, on November 19, 1984, the Board imposed no such restrictions. It became increasingly apparent, however, as the hearing progressed that some

limitation was necessary. For example, LEA's cross-examination of Applicant's witness panel, the first witnesses, consumed 5 hearing days. Tr. 12,766-13,536.³¹ From the examination of subsequent witnesses, it became increasingly apparent that LEA was taking a disproportionately lengthy time.³² On that basis, the Board noted that LEA had not demonstrated an effective use of its time and that time restrictions for further examination might be imposed. Tr. 14,242-43.

As a result of those concerns, the Board later conducted an off-the-record discussion with counsel and representatives of the parties as to the schedule for hearing future witnesses and the parties' estimate of the time needed to fairly examine and cross-examine the approximately sixty witnesses which LEA intended to call. Tr. 14,727. We note that this action took place on December 6, 1984, after 14 hearing days in which the Board's increasing concern on the lengthy and repetitive cross-examination mounted in spite of repeated cautions from the Board to LEA/FOE representatives. The limitations thereafter imposed on the basis of the parties' representatives were clearly more lenient toward intervenors than any other party.³³ Although the day after the discussion, LEA objected to the Board's characterization of these limitations as based upon the agreement of the parties (Tr. 14,734-36), the Board asserts that the limitations were based upon a candid and good-faith esti-

³¹ FOE's only admitted contention in the area of offsite emergency planning covered the same allegations raised by LEA with respect to the Valley Forge National Park/King of Prussia locale. Under those circumstances, the Board admitted and consolidated both the LEA and FOE contentions (LEA-24/FOE-1) and designated LEA as the lead intervenor. FOE was directed to coordinate its litigation of this contention with LEA. See LBP-84-18, *supra* note 7, 19 NRC at 1069. The Commission has expressly endorsed this approach. See *Statement of Policy on Conduct of Licensing Proceedings*, CLI-81-8, 13 NRC 452, 455 (1981). See also *Portland General Electric Co. (Trojan Nuclear Plant)*, ALAB-496, 8 NRC 308, 310 (1978); *Cleveland Electric Illuminating Co. (Perry Nuclear Power Plant, Units 1 and 2)*, LBP-81-35, 14 NRC 682, 687-88 (1981). Accordingly, the Board would have been justified in insisting that LEA conduct all examination of witnesses on behalf of the consolidated intervenors with regard to their joint contention. Nonetheless, the Board permitted the FOE representative, Mr. Anthony, to cross-examine separately those witnesses with testimony relevant to LEA-24/FOE-1. The apportionment of cross-examination time permitted Intervenor between FOE and LEA was a matter for their representatives to decide between themselves. However, FOE and LEA were either unable or unwilling to follow the Board's orders and Mr. Anthony insisted upon additional time, thus attempting to acquire unfair treatment of his case.

³² Thus, Applicant presented the direct testimony of Mr. A. Lindley Bigelow, the Montgomery County Director of Emergency Preparedness, which took only 33 transcript pages, while LEA's cross-examination took approximately 165 pages.

³³ With respect to subpoenaed witnesses, Intervenor was accorded 1½ hours of direct examination, the Applicant was given 1 hour of cross-examination and the NRC, Commonwealth and FEMA were given 30 minutes of cross-examination. LEA was given 30 minutes for re-direct examination. For witnesses with pre-filed testimony, Applicant was accorded 30 minutes for cross-examination and the NRC, the Commonwealth and FEMA were extended 20 minutes of cross-examination. LEA was given 20 minutes for re-direct. Tr. 14,727-28. The Board's grant of more time to Intervenor was in recognition that the lay representatives were not skilled attorneys and their examination of witnesses was less likely to be sharply focused.

mate by the parties as to the time actually needed to fully and fairly examine the witnesses. Tr. 14,736.

The Board also observes that intervenors wasted valuable hearing time through lack of preparation, repeated and nearly daily changes in their designated sequence of witnesses, and an inability or unwillingness to adhere to the evidentiary rulings of the Board. The Board frequently came to the hearing prepared to hear subpoenaed witnesses who prior to the hearing were dismissed without the Board's knowledge by LEA or set for testimony on another day. Our hearing schedule became a movable one which without restraints would have left the intervenors free to conduct a hearing fair only to themselves. Most direct and cross-examination by LEA and all by FOE was conducted by their lay representatives. Their questions inevitably prompted valid objections to the improper form of questions, repetitive questions, lack of evidentiary foundation and other objections which added to the length of the hearing without producing probative evidence. The Board repeatedly sustained such objections and explained to the intervenors how the objections could be avoided, usually to no avail. For example, during Mr. Anthony's cross-examination of one township official, the Board sustained nineteen of twenty-one evidentiary objections raised by counsel. Tr. 17,406-56. The good-faith attempt to give broad latitude to the lay representatives, in the conduct of their case, was also rewarded with an abuse of the subpoena powers of this Board including changes on the face of the subpoena signed by the Board and failure to properly execute service if at all.

In any event, the Board is satisfied that the time limitations imposed were proper and reasonable. Such authority has long been recognized.³⁴ Our time limitations were certainly no more stringent, considering the number of witnesses subpoenaed by intervenors, than those imposed by the Licensing Board in *Catawba*, which stated the basis of its actions as follows:

Such authority is recognized in the federal district courts. See *MCI Communications Corp. v. AT&T*, 85 F.R.D. 28 (N.D. Ill. 1979), *aff'd*, 708 F.2d 1081, 1170-73 (7th Cir. 1983). We believe that time limit authority for Licensing Boards is fairly inferable from the federal cases, the NRC Rules of Practice (which include authority to "prevent . . . repetitious, or cumulative cross-examination" (10 C.F.R. § 2.757(c)) and to "[r]egulate the course of the hearing" (10 C.F.R. § 2.718(e)), and from the Commission's *Statement of Policy on Conduct of Licensing Proceedings*, CLI-81-8, 13 NRC 452 (1981). The whole thrust of that *Statement* is toward fair but timely hearings, and Boards are explicitly directed to "set and adhere to reasonable schedules." *Id.*

³⁴ *Consumers Power Co.* (Midland Plant, Units 1 and 2), LBP-75-39, 2 NRC 29, 113 (1975).

at 454. A Licensing Board can hardly be expected to adhere to a "reasonable schedule" if the time for cross-examination, the most time-consuming part of the process, is beyond its control.³⁵

As *Catawba* states, the Board's imposition of time limitations is supported by the approval of similar restrictions by federal appellate courts. In addition to the authority cited in *Catawba*, the United States Court of Appeals for the Ninth Circuit held in *United States v. Brutzman*, 731 F.2d 1449, 1452 (9th Cir. 1984), that limitation of cross-examination is sometimes necessary to "avoid time-wasting exploration of collateral matters." See also *Austin v. Loftsgaarden*, 675 F.2d 168, 180 (8th Cir. 1982).

III. FINDINGS OF FACT

A. Applicant's Evacuation Time Estimates Study

LEA-23

The draft county plans are deficient because they do not contain reliable evacuation time estimates.

LEA-24/FOE-1

There is no assurance that plans for evacuation of the ten mile radius will not be impeded by traffic congestion in the vicinity of Marsh Creek State Park, Exton area (involving Route 100) and Valley Forge Park, King of Prussia area.

These areas should either be included in the Emergency Planning Zone or adequate plans for traffic control and direction should be made to avoid adverse effects on EPZ evacuation.

1. a. *Methodology and Validity of Evacuation Time Estimates Study*

1. The Licensing Board noted in its April 20, 1984 Order that LEA-23, LEA-24, and FOE-1 are concerned with vehicular traffic and the reliability of the Applicant's evacuation time estimates. LBP-84-18,

³⁵ *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), LBP-84-24, 19 NRC 1418, 1428 (1984). Further, we agree with that Board's conclusion that "our experience with time limits in this case indicated that a cross-examiner under some time pressure to get his questions asked tended to present a more effective cross-examination than one whose questioning is limited only by his stamina and imagination." *Id.* We also note that the Licensing Board in *Shoreham* found it necessary to modify the normal procedure for cross-examination of witnesses by requiring the parties to conduct cross-examination, re-direct and re-cross by means of public prehearing depositions without the presence of the Board, which the Appeal Board found "both lawful and reasonable." *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-788, 20 NRC 1102, 1178 (1984), *aff.g.* LBP-82-107, 16 NRC 1667 (1982).

19 NRC 1020, 1064-67 (1984). With regard to LEA-23 the Board ruled that only two aspects of the asserted contention were acceptable for litigation — aspect number one which questions the bases for the assumption in the Applicant's evacuation time estimates study that "up to one hour may be required to assemble buses, transport vehicles and to load students onto buses" and aspect number six which deals with an asserted discrepancy between ECI [public] survey figures concerning the transit-dependent population and Census figures. Licensing Board Order dated October 26, 1984, slip op. at 7. With regard to LEA-24 and FOE-1 the Board ruled in its April 20, 1984 Order that the contentions be admitted "to the extent they call for planning against the effect traffic congestion in the areas outside the EPZ they name could have on evacuation of the plume exposure pathway EPZ." LBP-84-18, *supra*, 19 NRC at 1066. The specific areas of traffic congestion the Board limited litigation to are the Marsh Creek State Park, Exton area, and Valley Forge National Historic Park, King of Prussia area. *Id.* at 1067. The Board noted that the central issue joined by the two contentions is "whether the emergency plans provide reasonable assurance that traffic congestion in the four [or two] named areas will not significantly impede evacuation of the EPZ." *Id.* FEMA testified that Planning Standard J, Elements J.10.i and J.10.l, calling for "projected traffic capacities of evacuation routes under emergency conditions" and "time estimates for evacuation of various sectors and distances based on a dynamic analysis and for the plume exposure pathway emergency planning zone" were the standards applicable to LEA-23, LEA 24/FOE-1. Asher and Kinard, ff. Tr. 20,150, at 8 (Deferred Contentions), 32 (Admitted Contentions). Applicant retained HMM Associates, Inc. ("HMM Associates") of Concord, Massachusetts, to prepare an evacuation time study of the Limerick EPZ. HMM Associates thereafter prepared "Evacuation Time Estimates for the Limerick Generating Station Plume Exposure Emergency Planning Zone — Final Draft" (May 1984) ("ETE study"). Klimm, ff. Tr. 13,794, at 1; Klimm, Tr. 13,795; Appl. Exh. E-67.

2. Robert Klimm, an employee of HMM Associates, served as the project manager for the ETE study and was the principal author of that study. Klimm, Tr. 13,795, 13,799. The Board accepts Mr. Klimm as an expert in the area of traffic and transportation engineering. Klimm, Tr. 13,813-14. He has been personally involved in most of the twenty or more site evacuation time estimate studies prepared by HMM Associates. Klimm, Tr. 13,816. In fact, most traffic and transportation engineering studies conducted by HMM Associates since 1980 have been performed under Mr. Klimm's direct supervision. Klimm, Tr. 13,818.

3. Mr. Klimm was one of the principal developers of the NETVAC computer simulation traffic model used in the ETE study. Klimm, Tr. 13,820. This model was developed by HMM Associates in conformance with NUREG-0654 and has been reviewed and found acceptable by the NRC at several nuclear power plants, including Susquehanna. Klimm, Tr. 14,050, 14,086.

4. NETVAC is a state-of-the-art traffic simulation model which accurately accommodates a wide range of population densities and traffic flows expected during a large-scale evacuation. Essentially, the model simulates the movement of vehicles along a roadway network, utilizing accepted traffic engineering principles and practices. Model inputs are variables that take into account the population, vehicle loading and actual roadway characteristics. Klimm, Tr. 13,821-23.

5. Validation tests of the NETVAC model against real-life data and results developed using other models establish that it is accurate in simulating traffic flow. Accordingly, the time estimates developed using the NETVAC model are accurate. Klimm, Tr. 13,905-07. The ETE study was not intended to develop specific estimates for each evacuation route but rather time estimates for various segments of the Limerick EPZ as well as the entire EPZ. The number of evacuating vehicles along each route could, however, be calculated on the basis of the data contained in the ETE study. Klimm, Tr. 13,836-37.

6. The methodology and assumptions used in the ETE study have been utilized at numerous sites throughout the country and have been determined to adequately address the criteria established in NUREG-0654. Klimm, Tr. 13,990, 14,050. The NRC Staff's witness, Thomas Urbanik, an expert in the evaluation of evacuation time estimates prepared for fixed nuclear facilities in the United States, agreed that the ETE study is prepared consistent with the assumptions and methodologies of NUREG-0654, Appendix 4. Urbanik, Tr. 19,223. He also testified that the evacuation time estimates contained in the ETE study were reasonably developed and soundly based. He added that while the ETE study met all the guidelines, such guidelines cannot be applied in isolation. He testified that there must be support for the assumption implicit in the ETE study that there is traffic control beyond the EPZ to allow people who reach the EPZ boundary to continue to move. Urbanik, Tr. 19,277-78.

7. Contrary to LEA's assertion, Dr. Urbanik did not testify that the ETE study "could have an error of 10-20%." LEA Proposed Finding 38. Rather, Dr. Urbanik testified that the ETE study would still provide a useful basis for protective action recommendations even if the time estimates erred in the range of 10-20%. Urbanik, Tr. 19,211-12.

8. The methodology and assumptions (including the assumptions regarding control of access of vehicles onto evacuation routes beyond the EPZ (Tr. 13,884-86, 13,904 and Board Finding (Bd. Fdg.) 74) utilized for the ETE study were reviewed with PEMA officials and emergency preparedness officials from Chester, Montgomery and Berks Counties. As a result of those meetings, the ETE study included input from State and local emergency planning officials, including those officials and planners cognizant of the Valley Forge National Park/King of Prussia area and the Marsh Creek State Park/Routes 100 and 113 area. Subsequent to its meetings with PEMA and county officials, HMM Associates developed a draft of the ETE study and reviewed it with those jurisdictions with regard to assumptions, methodology and input which had previously been discussed and offered a further opportunity for comment prior to submission of the final draft ETE study. Klimm, Tr. 13,883, 13,910.

9. Consequently, while the overall methodology for simulating traffic flow conforms to NUREG-0654, the details on evacuation routing, roadway characteristics and traffic flow were site-specific. Klimm, Tr. 13,871-73, 13,884.

10. HMM Associates did not participate in the designation of evacuation routes for the EPZ. Those routes had been established by the Pennsylvania Department of Transportation ("PennDOT") and were reviewed by Commonwealth and county officials. Nonetheless, upon commencing its study, HMM Associates reviewed the designated routes and found them reasonable. Klimm, Tr. 13,893.

11. LEA asserts that the ETE study does not follow the regulatory guidance set forth in NUREG-0654, Appendix 4, as to format and content. In essence, LEA asserts that certain tables and maps have been omitted. LEA Proposed Findings 60-64. The Board notes, however, that NUREG-0654 states that the suggested format provides "only a few typical tables" of those which might be included in an acceptable study and that discussion of the contents of an evacuation time estimate study is "intended to be illustrative of necessary considerations and provide for consistency in reporting." NUREG-0654, Appendix 4, at 4-1. The NRC has held that reasonable discretion exists in the precise content of evacuation time estimate studies. Moreover, the NRC Staff's expert has categorically testified that the ETE study utilized methodologies consistent with NUREG-0654. Bd. Fdg. 6.

12. In any event, the ETE study contains the information which LEA alleges to be missing, i.e., an evacuation roadway network map (Appl. Exh. E-67, at 4-3) and a table indicating evacuation route segments and characteristics, including capacity. Appl. Exh. E-67, Appendix

10. Contrary to LEA's assertion, the ETE study accurately summarizes all evacuation time estimates in each of ten different sectors as well as the three risk counties and the entire EPZ, and those estimates include expected delays. Appl. Exh. E-67, at 6-3 to 6-8, Table 6.1. Anticipated queuing is described in the text and shown on a series of maps which depict anticipated traffic conditions at various intervals of interest throughout the simulated evacuation. Appl. Exh. E-67, at 6-2 to 6-5, Appendix 11; NUREG-0654, Appendix 4, at p. 4-9.

13. LEA also asserts that the ETE study does not follow the guidance of NUREG-0654, Appendix 4, at p. 4-10, because it does not include specific recommendations for actions that could be taken to significantly improve evacuation time, including preliminary estimates, if significant, of the cost of implementing those recommendations. LEA Proposed Finding 64. This particular allegation is well beyond the scope of the admitted contention and was not addressed at the hearing. Nonetheless, there is no evidence to suggest that there are any actions which could, in fact, significantly improve evacuation times. Moreover, the ETE study reflects that improvements, such as the designation of additional traffic control points within the EPZ are being reviewed as part of the municipal radiological emergency response planning (RERP) development process. Appl. Exh. E-67, at 7-7.

b. PennDOT Study

14. In developing the ETE study, HMM Associates also reviewed an earlier evacuation time estimate study for Limerick prepared by PennDOT in 1983. The results of that study were documented in an "Evacuation Plan Map" for Limerick. The PennDOT study was primarily a manual calculation of roadway capacities, which related expected vehicle demand to the roadway capacity. Although not inadequate for its purpose at the time it was developed, the study was not an attempt to follow the guidance of NUREG-0654, Appendix 4. Klimm, ff. Tr. 13,794, at 1; Tr. 13,828; LEA Exh. E-16. For example, NUREG-0654 does not require a presentation of data in the format utilized by the PennDOT study to reflect the number of vehicles evacuating particular routes, but does require time estimates for evacuating various sectors of the entire EPZ, which PennDOT did not calculate. Klimm, Tr. 13,834.

15. The data developed by HMM Associates were more comprehensive than that contained in the PennDOT study. For example, HMM Associates recalculated the number of vehicles for various segments of the population within the Limerick EPZ, based upon more recent data than that used by PennDOT. Klimm, Tr. 13,832. Accordingly, there is no

validity to LEA's attempt to compare traffic flows and estimated evacuation times contained in the PennDOT and ETE studies. LEA Proposed Finding 77. No witness was offered to validate the data, methodology or assumptions used in the PennDOT study, nor is there any other evidence of record which would make such a comparison meaningful.

16. Further, the Board excluded from evidence two traffic studies prepared for Uwchlan Township and Upper Merion Township because there was no sponsoring testimony to support the relevance of those documents to the contentions. Tr. 19,067, 19,190.

c. Data Base for the Evacuation Time Estimates Study

17. Roadway capacity is the maximum number of vehicles able to traverse a particular roadway or travel through an intersection. Roadway capacities vary, depending on the type and geometrics of the roadway. Capacity, as a determination of the maximum flow along a roadway, is independent of actual demand, i.e., it is always the same for a particular roadway at any given time. Klimm, Tr. 17,063.

18. Given general characteristics for a two-lane road or multi-lane divided expressway, certain assumptions may be made about roadway capacity. However, those assumptions do not yield roadway capacities which are as specific as those reflecting actual field records of lane widths, approach widths, traffic control and other data. Klimm, Tr. 13,830.

19. All roadway network data which appear in the various appendices to the ETE study were field-recorded. Each roadway link and intersection was measured; no values were assumed and no values were adopted from earlier studies. The measured data included distances for lanes and approach widths, distances to obstructions and various other roadway network data. Klimm, Tr. 13,872-73.

20. In determining roadway capacity, the ETE study also took into account the geometric characteristics of each intersection and adjusted them to account for the effect of right- and left-turning vehicles. "Geometrics" refers to the physical configuration of a particular roadway or roadway sections and includes consideration of the number of lanes and the distance to obstruction or shoulder width, curvature of the roadways, grade and any other permanent factors affecting travel speed along the particular roadway. Traffic control measures present at each relevant intersection were also considered. Klimm, Tr. 13,900, 17,056-57.

21. Intersection approach calculations were performed on the basis of several variables, e.g., approach capacity, type of traffic control (stop sign or signal), amount of green time at the intersection and the effect

of right- and left-turning vehicles. Klimm, Tr. 13,900-01. The acuity of any particular intersection angle, while not specifically measured, was taken into account implicitly by the effect on intersection capacity that right- and left-turning vehicles had on traffic flow, i.e., the higher the percent of turning vehicles, the lower the capacity for through movement. Klimm, Tr. 13,901-02. Typically, the field data teams also recorded movement at the most restricting or confining point along that road, which would frequently be a curve. Klimm, Tr. 13,902-03. Thus, contrary to LEA's assertion (LEA Proposed Findings 19-20), the ETE study appropriately incorporates specific capacity-limiting characteristics of intersections and roadways, including slopes and curves.

22. Having collected these data, HMM Associates then utilized the Transportation Research Board's Highway Capacity Manual (1965) and Transportation Research Board Circular 212 (1980) as sources for the algorithms used in the NETVAC model to define (1) the relationship between the speed of evacuating vehicles versus traffic density, and (2) actual roadway capacities, including intersection capacities. This methodology for application of site-specific data represents standard traffic engineering practice. Klimm, Tr. 13,874-76, 13,881.

23. The time estimates for Limerick are reasonable, given the current radiological emergency response plans, including plans for traffic control and access control. Klimm, Tr. 13,974. However, identification of certain traffic control points beyond the EPZ associated with the Route 363-Pennsylvania Turnpike corridor, and provision of plans to man them, is necessary to support the implicit assumption in the ETE study that traffic leaving the EPZ can continue to move. Urbanik, Tr. 19,278; Bd. Fdg. 68.

24. LEA asserts that the ETE study does not evaluate projected highway availability, business and residential development, or other anticipated changes in the roadway network and demography within the EPZ. LEA Proposed Finding 151. Under NUREG-0654, Appendix 4, at 4-1, "evacuation time estimates should be updated as local conditions change." Anticipated changes have been considered to the extent possible. Appl. Exh. E-67, at 7-7, 7-17, 7-18. The ETE study is an evolving, dynamic document, which will be periodically revised to account for changes in the evacuation roadway network, demography and other variables. Bd. Fdg. 116. The Chester-Montgomery link (LEA Proposed Finding 309) is an example of a highway which, when constructed, will be added to emergency planning.

d. Vehicle Occupancy

25. The vehicle occupancy rate of three persons per vehicle used in the ETE study (Appl. Exh. E-67, at 3-2) is the same factor utilized by PEMA in its assessment of permanent population vehicle demand at other nuclear power plant sites in Pennsylvania. It is therefore considered appropriate with respect to Limerick. Klimm, Tr. 13,980, 14,061.

26. The ETE study assumption of an average of three persons per vehicle for permanent residents is also consistent with NUREG-0654, Appendix 4. Klimm, Tr. 17,071-72. Inasmuch as three persons per vehicle is an average, some vehicles will carry more or fewer than three passengers. Accordingly, the Board finds that the data cited by LEA from a prior draft of the Chester County plan, which show a range of 2.53 to 3.22 passengers (LEA Exh. E-40; LEA Proposed Finding 114), are not inconsistent with this assumption.

27. As to LEA/FOE's concerns regarding the assumed vehicle occupancy rate, empirical and historical data indicate the tendency of families to unite prior to evacuation and to evacuate in the best available vehicle. These data also indicate that families will not utilize a second car to evacuate. Klimm, Tr. 17,041-42; LEA Proposed Finding 114.

28. It is realistic to assume that vehicles with only one or two (or even three) occupants would have excess capacity to transport friends or neighbors. Even if additional vehicles were loaded on to the evacuation network to accommodate transportation-dependent individuals, that particular category comprises such a small percentage of total vehicle demand within the EPZ that slight variations would not affect evacuation time estimates significantly. Klimm, Tr. 13,980-81, 17,376-77.

e. Representative Fair and Adverse Weather Conditions

29. The primary purpose of evacuation time estimates is to serve as a tool in the protective action decisionmaking process by providing a framework within which decisionmakers can incorporate input on evacuation characteristics and traffic flows at the time of an actual emergency. As such, pursuant to NUREG-0654, time estimates are intended to be representative and reasonable so that any protective action decision based on those estimates would reflect realistic conditions. An overly conservative estimate could result in an inappropriate decision. Klimm, Tr. 13,871, 13,908, 17,046.

30. Neither NRC regulations nor NUREG-0654 establish a standard for effectuating evacuations within a given time. Stated differently, the purpose of an evacuation time estimate study is to indicate the range of

times required to evacuate the EPZ under a limited number of commonly occurring events so as to permit decisionmakers in an actual emergency to make an informed decision as to the appropriate protective action, based upon actual conditions. An evacuation time estimate study does not attempt to predict exact conditions during an evacuation. Rather, it attempts to indicate the sensitivity of the analysis to a limited number of commonly occurring events. Urbanik, ff. Tr. 19,203, at 3-4; Urbanik, Tr. 19,240-41; Asher and Kinard (Admitted), ff. Tr. 20,150, at 33.

31. Therefore, it is not the intent of NUREG-0654 to require the analysis of a "worst-case" scenario. Rather, the intent of NUREG-0654 is simply to present representative evacuation times for fair and adverse weather conditions which can be used by decisionmakers. Klimm, Tr. 13,908, 14,034, 17,046. A worst-case adverse weather scenario is beyond the realm of usefulness for planners. Urbanik, Tr. 19,227.

32. A reduction in roadway capacity of 30% for adverse weather was assumed in the ETE study. Klimm, Tr. 13,860, 13,907. This reduction factor was based upon empirical data and reviewed to ensure that site-specific characteristics were considered. The 30% capacity reduction factor, which was used at other nuclear power plants in the Commonwealth, was also reviewed with both PEMA and county planning officials, who considered it appropriate. Klimm, Tr. 13,908-09, 14,062, 17,047.

33. A 30% reduction in roadway capacity and travel speeds for adverse weather conditions represents a condition where it might be snowing and visibility would be impaired, roadway speed would be reduced and driving conditions in general would be degraded. This situation would translate into an inch or two of snow and includes possibly icy roadway conditions. Klimm, Tr. 13,907-08, 17,046-47. There is no assumption in the ETE study that the roadways in question would be plowed during a storm. Klimm, Tr. 13,907, 17,044-45. A reduction factor of greater than 30% would not provide useful input because that would represent a storm where snow plowing would be necessary and the unpredictable time associated with snow plowing would have to be incorporated. Klimm, Tr. 17,078.

34. The time needed to clear roads of snow might vary significantly depending upon the weather, precipitation, temperature, and available resources. Officials of the agency responsible for snow plowing, the Pennsylvania Department of Transportation ("PennDOT"), would be stationed at both the Commonwealth and county Emergency Operations Centers (EOCs). Information as to road conditions would be factored into the decisionmaking process to decide the appropriate protective action recommendation at the time. Klimm, Tr. 17,044-45.

2. Findings on Contention LEA-23

a. Public Survey of Transportation-Dependent

35. The special needs (medical, transportation, notification) of the resident population within the Limerick Generating Station plume exposure pathway emergency planning zone were determined by means of a public survey. The survey was conducted by the three risk counties through the respective emergency management agencies and utilized a two-part form. A cover letter was provided to explain the survey and a pre-addressed/pre-posted envelope was enclosed for a response. Individuals were instructed to return the form if they or any member of their household had a special need. Individuals with questions were advised to contact the county office of emergency management. Bradshaw, ff. Tr. 17,191, at 17.

36. Survey materials were distributed by mail to addresses in the EPZ. County social services agencies and municipal offices also made the survey available. The news media provided information about the survey. Responses were then compiled and needs were listed for each municipality. Names, addresses, telephone numbers and the indicated special needs were catalogued. The lists were filed in the respective municipal emergency operations centers for use at the time of any emergency. Many of the municipalities reviewed their lists and verified their accuracy by telephone calls during the July 25 and November 20, 1984 Limerick exercises. Bradshaw, ff. Tr. 17,191, at 18.

37. Original estimates for transit-dependent population were obtained from the 1980 Census of Population and Housing, Work and Travel-to-Work characteristics. Estimates for mobility-impaired individuals were obtained through a United States Department of Health and Human Services document entitled "Prevalence of Selected Impairments — U.S. 1977." *Id.*

38. An Applicant's witness testified that previous estimates for mobility-impaired individuals, based upon the federal estimates, closely approximate actual survey results, supporting the comprehensiveness of the survey. *Id.*

39. Rita Banning, a Montgomery County Commissioner, testified that she was concerned about the accuracy of the survey. Banning, ff. Tr. 17,752, at 2, 3. She testified that this concern was merely her opinion and was not based on any knowledge or information and that she was not familiar with different methods of conducting surveys. Banning, Tr. 17,637, 17,680. She testified that Attachment G of draft 4 of the Pottstown Borough plan indicated that there were an estimated 4175 residents needing transportation assistance in the event of an evacuation, based

on the 1980 Census Data. She further testified that this number as reported in Attachment G of draft 6 of the Pottstown Borough plan was reduced to 605 residents requiring transportation, based on data from the public survey. Banning, ff. Tr. 17,752, at 3; Banning, Tr. 17,636.

40. The Applicant's witness testified that the difference between transportation statistics in the U.S. Census and the transportation needs determined by the county surveys is explained by the fact that the U.S. Census lists households without personal transportation, while the survey asks if the household has private transportation "available." Many residents did not request assistance even if they had no "personal" transportation because other private transportation was available to them through friends, neighbors, or relatives. The survey data support this interpretation of the difference between the Census and actual survey data on available transportation in that the largest differences were in urban areas where more friends, neighbors or relatives would live in close proximity. In less populated areas, the survey results and Census estimates are comparable. Bradshaw, ff. Tr. 17,191, at 18-19.

41. LEA asserts that there is an inconsistency between the 1980 United States Census data reported in earlier draft plans and data reporting the results of general public surveys to determine the number of transportation-dependent individuals, included in the most recent drafts. In essence, LEA asserts by its own calculations that the difference between the two sets of data cannot be explained by a decision by those not owning a car to obtain rides from relatives, neighbors or friends. LEA Proposed Findings 139-140. There is no testimony to substantiate exactly what the Census data represent or the purpose for which they were collected or how they were extended to the EPZ population. While other factors may explain part of the difference between Census and survey figures (Bd. Fdg. 42), the Board rejects LEA's questionable calculations because they were based on assumptions not in evidence. LEA Proposed Findings 139-140; Bradshaw, ff. Tr. 17,191, at 18-19.

42. Additionally, numbers of transportation-dependent individuals contained in earlier plan drafts represent projections of only a sample of the populace. Bradshaw, Tr. 17,349. Further, inclusion of all Census data would result in double counting individuals who will be evacuated from other institutions for which planning exists, e.g., schools, nursing homes and hospitals. Chester County/Commonwealth Exh. E-1, Annex I, Appendices I-2 and I-3; Appl. Exh. E-3, Annex I, Appendix I-3.

43. The needs survey conducted by the counties provides more appropriate data for planning purposes than data from the U.S. Bureau of Census. Empirical data from past evacuations indicate that many households without access to vehicles will obtain rides with friends or neigh-

bors and will not rely upon public transportation assistance. In any event, utilizing the vehicle demand data associated with this population from the 1980 Census would not affect the evacuation time estimates. Bradshaw and Klimm, ff. Tr. 17,191, at 19.

44. FEMA witnesses testified that consistent with Appendix 4 to NUREG-0654 (at 4-2) a survey can be an acceptable technique for measuring the transport-dependent population within the Limerick EPZ. Asher and Kinard, ff. Tr. 20,150, at 9.

b. Conclusion

45. Based on the evidence in the record we find that the public survey conducted by the counties and used to identify transport-dependent individuals in the Limerick EPZ is accurate and is not inconsistent with the data from the U.S. Census. Accordingly, this aspect of Contention LEA-23 is without merit.

c. Preparation and Mobilization Times

46. The ETE study also accounted for the possibility that people at work outside the EPZ would return to the EPZ and then leave from their homes. This was done by incorporating a distribution of preparation and mobilization times into that study. Accordingly, the ETE study does not instantaneously load vehicles onto the evacuation routes at the time of notification to evacuate. Rather, there is a distribution of times which allows for varying preparation and mobilization periods for different members or segments of the population, including those who may return to the EPZ prior to evacuating. Klimm, Tr. 13,869-70, 14,037-38. Section 5 of the ETE study describes the evacuation preparation and mobilization times for each population category. Klimm, Tr. 13,967-68. Various appendices identify major population categories, including permanent residents, transients and special facilities, based upon the population, vehicle demand and location. Klimm, Tr. 13,835, 13,999. The evacuation preparation and mobilization time assumptions for each population category provide a range of times, which includes those who will return to the EPZ before commencing their evacuation. Mobilization time for buses which evacuate transportation-dependent residents was included within the time frame for mobilizing the entire permanent resident category. Klimm, Tr. 17,261-62.

47. Based upon discussions with PEMA and county officials, it was assumed that no vehicles would begin to evacuate during the 15-minute notification period plus the minimum preparation/mobilization time of

15 minutes for all population sectors. Klimm, Tr. 14,062. On the same basis and with regard to site-specific data, it was determined that preparation and mobilization times in the event of an accident would range from 30 minutes to 150 minutes after notification. Klimm, Tr. 13,869-70, 14,038-39.

48. The ETE study utilizes a 1-hour mobilization time period (30 to 90 minutes following notification) for school buses. At page 5-5 of the ETE study it states:

For school facilities, it was assumed that up to one hour may be required to assemble buses, transport vehicles to schools and to load students onto buses. Vehicles stationed at the facilities at the time of the ordered evacuation could be loaded [onto the buses] in as little as 15 minutes following notification. Allowing 15 minutes, also, for notification to the schools, school buses were loaded onto the evacuation network from the period between 30 and 90 minutes following the decision to evacuate.

Klimm, ff. Tr. 17,191, at 16-17. Mr. Klimm testified that the 1-hour mobilization time for school buses is site-specific for the Limerick EPZ and was developed and concurred with by the three risk county emergency preparedness offices, and PEMA, and was deemed to be representative and realistic. It includes the total time required to drive the buses to the schools and load students onto them. As a worst-case scenario, driver mobilization time in a few cases would exceed 1 hour. For the ETE study, however, a worst-case scenario was not desirable. Klimm, Tr. 17,260; Cunnington, Tr. 17,258-59; Klimm and Cunnington, Tr. 17,373-74.

49. LEA attempted to infer a discrepancy between the 1-hour mobilization period utilized in the ETE and the unit mobilization times stated by bus providers in the Montgomery County plan. LEA Proposed Finding 31; Appl. Exh. E-67, at 5-5; Appl. Exh. E-3, Annex I, at I-2-5 to I-2-15. These two mobilization periods are not, as LEA assumes, identically defined. As noted, the ETE study's mobilization period of up to 1 hour includes travel time from a bus provider's garage to an assignment, and loading time. Bd. Fdg. 48. Unit mobilization times under the Montgomery County plan include the time necessary to obtain drivers and have buses ready to depart from a provider's garage. The two time periods might overlap, but are not congruent. Cunnington and Klimm, Tr. 12,955, 17,258-60. Thus, unit mobilization information in the plan does not contradict the 1-hour estimate used in the ETE study for bus mobilization.

50. Even if the ETE study had analyzed unit mobilization information in the Montgomery County plan, no different conclusion would

have resulted. Under the plans, the counties will notify bus providers at the alert stage. Chester County/Commonwealth Exh. E-1, Annex I, at I-2; Appl. Exh. E-3, Annex I, at I-2. At the site emergency and general emergency stages, the counties have the option to position buses at transportation staging areas. Chester County/Commonwealth Exh. E-1, Annex I, at I-2, I-3; Appl. Exh. E-3, Annex I, at I-2, I-3. Accordingly, the most likely scenario, which the ETE study accurately depicts, is that bus providers have been notified and buses are positioned at their assigned locations prior to an order to evacuate. Appl. Exh. E-67, at 5-5.

51. Only a small minority (six of thirty-two) of bus providers for Montgomery County have stated that up to 2 hours will be necessary for unit mobilization. Further, that 2-hour period represents a range to include up to the last bus provided, and none of the estimates exceeds 2 hours. Unit mobilization times for daytime requests do not exceed 1 hour. Cunnington, Tr. 12,955-56; Appl. Exh. E-3, Annex I, at I-2-5 to I-2-15. The up to 2-hour unit mobilization times stated by a minority of bus providers is therefore not inconsistent with the calculation of a 1-hour mobilization period commencing 30 minutes from notification of an evacuation. Cunnington, Tr. 17,258-59; Klimm, Tr. 17,260-61. Nor is the experience of the Owen J. Roberts school district, with delay of a few buses' arrivals during early dismissals, inconsistent. Claypool, Tr. 15,879-81. Even a 100% increase in the ETE study's mobilization time period for schools would not significantly increase evacuation time estimates. Klimm, Tr. 17,267.

52. Traffic flow simulation in the ETE study treats buses the same as other vehicles, except that buses are deemed to be the equivalent of two automobiles. Klimm, Tr. 17,264. School evacuation would not affect evacuation time estimates because vehicle demand associated with schools is insignificant compared with overall traffic flow. Moreover, the preparation and mobilization times associated with schools is significantly less than those for permanent residents. Klimm, Tr. 17,375. Because it is unlikely that buses would be among the last vehicles to enter the evacuation network, buses are not critical in determining evacuation time estimates for the entire EPZ. Klimm, Tr. 17,265-66.

53. Ample lead time by way of early notification is likely to exist in the event of a radiological emergency. If any buses were to be late arriving, it would be known to county and/or school district staff. Other buses could be dispatched. Cunnington, Tr. 16,943-44. In any event, "worst-case" scenarios simply do not constitute a valid planning approach and, as recognized by the Staff (NRC Staff Proposed Finding 266), would not affect evacuation time estimates in any event. Klimm, Tr. 17,260.

d. Conclusion

54. Based on the foregoing, the Board finds that the bases for the assumption in the ETE study of a 1-hour period for mobilization of school buses, during the period 30-90 minutes following notice to evacuate, are reasonable; hence, this aspect of Contention LEA-23 lacks merit. Bd. Fdgs. 46-53.

3. Findings on Contentions LEA-24/FOE-1

a. Preexisting Traffic Flows

55. The ETE study did not assume a preexisting flow of traffic on particular roadway links. Instead, *all* vehicles within the EPZ were considered by simulating their movement from their respective points of origin. This was done whether the vehicles were actually in the area at the time of notification or were outside the area and driven into the EPZ before departing. Klimm, Tr. 13,866, 13,869, 17,062. The movement of vehicles driven by permanent residents was simulated from their homes. The movement of vehicles by others, e.g., transients and those at schools, nursing homes and other special facilities, was simulated from their exact location. Accordingly, the ETE study accounts for all vehicles likely to be in the Limerick EPZ under a variety of conditions, at different seasons of the year, at different times of day, and under different weather conditions. Klimm, Tr. 13,866-67, 14,035. To simulate evacuation traffic superimposed on existing traffic would have resulted in a double counting of those vehicles, which would represent an inaccurate base flow. Klimm, Tr. 13,866-67, 13,870; Urbanik, Tr. 19,215, 19,224.

56. LEA misinterprets Mr. Klimm's explanation of the assumption in the ETE study of a zero base flow of traffic at the time an evacuation commences. LEA Proposed Findings 12-14. That assumption, which was intended to avoid counting the same vehicles twice, was not dependent upon any site-specific knowledge of traffic on evacuation corridors during an actual evacuation, including those in the Valley Forge National Park/King of Prussia area. Normal traffic volume and direction, though well understood, were not relevant to the zero base flow assumption. Klimm, Tr. 13,866-70.

57. It is not useful to compare actual peak-hour traffic with predicted flows in the evacuation network analyzed in the ETE study. There is simply no correlation between traffic patterns which would be associated with evacuation of the Limerick EPZ and those associated with commuter travel at peak times. Klimm, Tr. 17,040. Evacuation scenarios are not comparable to peak-hour traffic conditions because vehicle origin and

destination as well as traffic control measures would differ. Klimm, Tr. 13,911, 17,062. Likewise, the total daily vehicle count along a particular route is irrelevant to an evacuation analysis because daily flows constitute two-way, 24-hour flows. Klimm, Tr. 17,053. Contrary to LEA's assertion that the Staff witness agreed that peak traffic flows should be included in the ETE study (LEA Proposed Finding 59), Dr. Urbanik simply stated generally that no information should be excluded. He cited no specific use or relevancy of peak-hour flows.

b. Inbound Traffic

58. The ETE study accounted for traffic entering the EPZ upon notification of an evacuation by utilizing a range of preparation and mobilization times to include those who would reenter the EPZ to unite with families before evacuating. Klimm, Tr. 17,048; Bd. Fdg. 47. The NETVAC model simulated traffic control described in the Limerick off-site plans, i.e., that unauthorized access to the EPZ would be restricted, but not prohibited. Klimm, Tr. 13,999. The ETE study did, in fact, simulate the flow of vehicles inbound to the EPZ, which would be distributed over a significant period of time, depending on the time of day, day of week and season. Klimm, Tr. 14,060. It was determined that any intermittent queuing that might occur inbound on Route 363 would not affect the movement of outbound vehicles along that evacuation corridor. Klimm, Tr. 14,060.

59. Any member of the general public would be permitted to reenter the EPZ during the initial phases of an evacuation in order to implement an evacuation of their families. Two-way traffic will be maintained for emergency vehicles and members of the public who must enter the EPZ to implement a family evacuation. The ETE study assumes existing roadway utilization and traffic control devices as advised by PEMA. Klimm, Tr. 14,087-88; Appl. Exh. E-67, at 2-3. Inbound roadways are not used for evacuation and are thus available for vehicles reentering the EPZ. In addition, traffic controllers would be located throughout the evacuation network and along all evacuation corridors to control movement in the inbound as well as the outbound direction. Accordingly, outbound traffic would not be affected by the inbound traffic. Klimm, Tr. 14,000-01, 14,059, 17,087; Appl. Exh. E-67, at 2-3.

60. A reverse peak flow reentering the EPZ upon notification to evacuate, equal in size to the evacuating flow, constitutes an extremely unrealistic scenario. Klimm, Tr. 14,053, 14,055. It would be totally unreasonable to assume either an instantaneous entry of vehicles from outside the EPZ or an instantaneous evacuation from within the EPZ. For

either entry into or departure from the EPZ, a realistic time distribution should be assumed. Klimm, Tr. 14,055.

c. Vehicle Queuing

61. Traffic congestion predicted in an evacuation time estimate study does not indicate an inability to evacuate an area in a timely fashion. As stated in the ETE study, significant traffic queuing will occur during an evacuation. Traffic congestion indicates a short-term capacity deficiency which, with time, is eliminated. Urbanik, ff. Tr. 19,203, at 4.

62. Appendix 11 of the ETE study provides several graphical representations of the EPZ to illustrate roadway sections where vehicle queuing would likely occur, i.e., those locations where some vehicles would not be moving at that particular time. Those graphics illustrate locations of queuing, not the magnitude of queuing at that time (Klimm, Tr. 13,845, 13,925, 14,026), and merely represent a "snapshot" of traffic flows at an instantaneous point in time. By comparing the graphics, one sees locations at which queuing would occur consistently throughout a simulated evacuation. Klimm, Tr. 13,926-27. With respect to queuing depicted in Appendix A-11, the fact that vehicles might be stopped on any particular link does not mean that there are not also vehicles moving on that link inasmuch as the appendix is merely meant to provide a graphical representation of one particular time frame. Klimm, Tr. 14,025.

63. The evacuation time for the entire EPZ (Analysis Area 14) and Montgomery County is controlled by the time required to evacuate along the Route 363-202-Pennsylvania Turnpike corridor. "This evacuation time is influenced primarily by the capacity limitations of access ramps to Route 363 and to the Pennsylvania Turnpike in the extreme southeast corner [sic] of the EPZ (i.e., just east of Valley Forge Park)." Appl. Exh. E-67, at 6-7 to 6-8. Route 363, in part, runs along the southeastern boundary of the EPZ. Access to Route 363 at the junction with the Schuylkill Expressway Extension is just inside the EPZ, and the ramps at the Route 202, I-76, and I-276 interchanges are outside the EPZ. Appl. Exh. E-92. Consistent queuing is indicated at 90 and 180 minutes into the simulated evacuation at these ramps (except at the Route 202/I-76 interchange) under summer fair weather conditions and winter weekday fair weather conditions. Queuing is shown to have dissipated at 270 minutes into the simulated evacuation. Appl. Exh. E-67, at A11-2 to A11-7.

64. In the Marsh Creek State Park/Exton area, consistent queuing outside the EPZ is not indicated on either Route 100 or on Route 113.

Queuing is indicated on the Route 100 link outside the EPZ at 90 minutes into the simulated evacuation under summer fair weather conditions, where traffic is diverted onto Route 113. *Id.* The general evacuation time estimated for traffic using the Route 100/Route 113 evacuation routes (Analysis Area 10) is shorter by 20 to 70 minutes than for the entire EPZ under comparable weather and seasonal traffic conditions. Appl. Exh. E-67, Table 6.1, at 6-2.

d. Traffic Control and Access Control Points

65. Table 7.2 of the ETE study contains traffic control point (TCP) locations derived from the three county plans. Those locations were determined by Commonwealth and county authorities on the basis of local information. Klimm, Tr. 14,083. Traffic control and access control points for the county and municipal plans have been designated and staffed through direct coordination with the Pennsylvania State Police. This information was presented to the municipalities, which determined whether other areas needed traffic or access control. The municipalities applied their own resources to those points and referred any unmet staffing needs to the counties. Bradshaw, Tr. 17,297. However, while Table 7.2 of the ETE study identifies eight traffic control points external to the EPZ in the Route 100/Route 113 corridor serving the Marsh Creek State Park/Exton area (in Caln, East Caln, West Whiteland and Uwchlan Townships), only three traffic control points outside the EPZ (in Upper Merion Township) are identified in the Valley Forge/King of Prussia area. Appl. Exh. E-67, Table 7.2, at 7-9 to 7-10, 7-14. The Montgomery County RERP, however, identifies five traffic control points in this area. Appl. Exh. E-3, Annex K, at p. K-2-10.

66. In selecting traffic control points, it is necessary to distinguish between day-to-day traffic flows and anticipated traffic in an evacuation. Urbanik, Tr. 19,204, 19,206-07.

67. The ETE study took into account each of the traffic control points listed in Table 7.2 and assumed that those points would be manned. Klimm, Tr. 14,083. To the extent traffic control points were established by local authorities in developing their plans from which HMM Associates took these basic data, this information was reliable. Klimm, Tr. 13,975-77. While specific locations for traffic control points outside the EPZ have not all been identified, sufficient personnel will be available to perform the appropriate traffic control duties for evacuation of the EPZ. Klimm, Tr. 13,971-74, 14,079-80. At the time of the July 25, 1984 exercise, seventy-one police officers were made available by police departments outside the Limerick EPZ to meet a need of about

twenty officers to man traffic control and traffic access points within the Limerick EPZ. Montgomery County has estimated that it would have double or triple the actual number of police officers required for traffic control and access control responsibilities in the county in an actual emergency. Cunnington, Tr. 17,298-99.

68. Traffic control measures would be in place at the time an evacuation would commence, which would not be until about half an hour after notification. That would allow ample time to mobilize and station required traffic control personnel. Klimm, Tr. 13,941. Traffic control measures are not intended to eliminate queuing, but to improve efficiency in the management of traffic throughout the roadway network. Klimm, Tr. 14,091. An underlying assumption of the ETE study is that traffic control would be in place during the course of the evacuation. Klimm, Tr. 13,941.

69. Existing Commonwealth traffic regulations will be enforced during an evacuation. The documented history of disaster responses shows that evacuations are generally orderly. Bradshaw, Tr. 13,369-70. The historic record indicates that evacuating individuals ordinarily obey traffic officers at traffic control points and traffic access control points. It would be useless to make any other planning assumption. Urbanik, Tr. 19,225.

70. The Staff witness Urbanik testified that there is a need to identify additional traffic control points outside the EPZ, particularly in the southeastern area, to provide priority to evacuating traffic and to control traffic on routes other than the primary evacuation routes. Urbanik, ff. Tr. 19,203, at 3; Urbanik, Tr. 19,228, 19,277-78. There is no problem in establishing additional traffic control points for any areas beyond the EPZ for which they may be necessary. Urbanik, Tr. 19,228-29; Bd. Fdgs. 78, 94, 100, 103-107. Dr. Urbanik added that such identification of traffic control points would support the implicit assumption in the ETE study that traffic leaving the EPZ can continue to move. Urbanik, Tr. 19,278. FEMA testified that the study should include all pertinent data. Asher and Kinard, ff. Tr. 20,150, at 33. Given the far greater number of traffic access and control points already identified in the ETE study and county plans, for which adequate arrangements have already been made (Appl. Exh. E-67, Tables 7.1 and 7.2; Appl. Exhs. E-1, E-2, E-3 (Annex K)), the Board sees no difficulty in establishing additional control points beyond the EPZ.

e. Review of Areas Outside the EPZ

71. HMM Associates reviewed the road systems external to the EPZ to determine the potential effect that congestion outside the EPZ might have on vehicles exiting the EPZ. Klimm, Tr. 13,825, 13,904. However, the impact of an evacuation outside the EPZ in every instance was not assessed. The intent was to develop realistic evacuation time estimates based on NUREG-0654 guidance. Klimm, Tr. 13,972-73. The impact was assessed where it was determined that site-specific impacts in areas located adjacent to the EPZ might significantly affect evacuation times or where concern was expressed by the Commonwealth or counties. Klimm, Tr. 13,811, 13,825-26, 13,883, 13,885, 13,970-71. As part of its site-specific review, HMM Associates conducted field surveillance of areas outside the EPZ which it had determined might possibly give rise to operational or geometric constraints affecting vehicle evacuation from the EPZ. Klimm, Tr. 13,811.

72. HMM Associates also examined traffic at a distance outside the EPZ to determine if there were any roadway restrictions located along evacuation corridors which could have an impact upon evacuating vehicles. For example, it examined highway ramps which, during periods of evacuation, would act as capacity constraints and result in queuing and congestion along a given corridor. Klimm, Tr. 13,937.

73. Except for particular areas along main evacuation routes where traffic control would be necessary to effectuate an evacuation of the EPZ, such as near the Valley Forge National Park and Marsh Creek State Park, the Applicant determined that, for purposes of the ETE study, there was no need to consider traffic originating from areas beyond the EPZ. This was because evacuation along corridors from outside the EPZ would not significantly affect evacuation times of vehicles leaving the EPZ, due to the distance of population centers from the EPZ or excess roadway capacities. Furthermore, the Applicant assumed that, for areas located outside the EPZ, evacuation would not be at the same time as evacuation occurring within the EPZ. Given those factors and the level of traffic control assumed in the ETE study, congestion which might occur would not significantly affect evacuation along the corridors from the EPZ. Klimm, Tr. 13,952, 13,955-56, 13,970-73.

74. LEA relied upon the prefiled testimony of the FEMA witnesses that they were unable to determine whether the areas of concern adjacent to the EPZ were included in the ETE study. Asher and Kinard, ff. Tr. 20,150, at 32; LEA Proposed Findings 33-34. The Board, however, has heard ample evidence to confirm that those areas were indeed considered, and there is no evidence that the NETVAC model utilized to prepare the ETE study excluded any relevant variable, including roadway

network data pertinent to the area adjacent to the EPZ. Bd. Fdgs. 71-73, 75, 78, 82-85, 93, 100, 105, 107.

*f. Marsh Creek State Park and the Route 100/Route 113
Evacuation Corridors*

75. Based upon discussions with PEMA and county planning officials, HMM Associates did not assume that there would be a spontaneous evacuation of areas outside the EPZ. It did, however, review different corridors and take into account some locations outside the EPZ, such as the Marsh Creek State Park, where it was thought that exiting traffic might have some impact on traffic evacuating from the EPZ, in that instance, along Routes 100 and 113 South. Klimm, Tr. 13,952-53.

76. Due to the high number of Marsh Creek State Park visitors, particularly during the summer months, and the fact that most visitors would enter the park from Route 100, inclusion of this population category in the evacuation analysis was considered appropriate by Chester County planning officials. Klimm, ff. Tr. 13,794, at 2-3. Accordingly, the ETE study utilized estimates of park attendance for both peak summer weekends and winter weekday conditions, which bound visitor population at other times of the week or seasons of the year. Population and vehicle demand associated with the Marsh Creek State Park were included in the analysis for both winter and summer evacuation scenarios for the immediate area of Chester County and the entire EPZ. Appl. Exh. E-67, at 3-25, 3-26, A6-3.

77. Although an alternative means exists to evacuate traffic from the park away from Route 100, it was decided, based upon discussions with Chester County planning officials, to assume that park visitors would exit by way of Park Road (the main park entrance) to Route 100 and be directed south. Klimm, ff. Tr. 13,794, at 3; Klimm, Tr. 13,967, 13,970, 17,055. Accordingly, the ETE study assumes that a peak traffic flow of 4250 vehicles might be evacuated by this route along with other traffic directed south along Route 100. Klimm, ff. Tr. 13,794, at 3; Appl. Exh. E-67, at A6-3.

78. An access control point has been established immediately beyond Marsh Creek Park at the intersection of Park Road and Moore Road to provide the capability to divert traffic from east on Park Road to south on Moore Road. If this option were utilized, an additional traffic control point could be established at the intersection of Moore Road and Dorlan Road directing traffic southwest on Dorlan Mills Road to Route 282, where another traffic control point could be established to divert traffic south. Thus, traffic exiting the park would never enter the EPZ.

Klimm, ff. Tr. 13,794, at 3, Tr. 13,967; Appl. Exh. E-69. See Board Figure 1 following.

79. It was also assumed in the ETE study that preparation and departure times for visitors to the Marsh Creek State Park would be consistent with those of other transients within the EPZ. Klimm, Tr. 13,968. As demonstrated, visitors exiting from the park would not significantly delay evacuating traffic. Bd. Fdgs. 75-78. Therefore, the EPZ evacuation time estimate does not depend upon whether visitors to the Marsh Creek State Park actually receive notification of an evacuation order. The same is also true for the Valley Forge National Park, discussed below. Klimm, Tr. 14,086-87.

80. Accordingly, the analysis of traffic movement towards the intersection of Routes 100 and 113 includes assumptions as to the peak number of visitors at the Marsh Creek State Park. The effect of traffic generated by the Marsh Creek State Park was therefore considered and analyzed in the ETE study. Klimm, ff. Tr. 13,794, at 2-3; Klimm, Tr. 13,966.

81. Traffic flows along Routes 100 and 113 South were fully analyzed on the same basis as other main evacuation corridors. Traffic control points were established to preclude a bottleneck at their intersection, which is outside the EPZ. Bd. Fdgs. 82-85.

82. Evacuees from Spring City Borough, East Vincent Township, East Pikeland Township, and West Pikeland Township would evacuate via local roads to Route 113 South, to Gordon Drive, to Route 100 South, to the West Whiteland Township building (previously Exton Mall). Klimm, ff. Tr. 13,794, at 4; Appl. Exh. E-67, at 4-7, 4-8. Traffic control points have been designated at the intersections of Gordon Drive and Route 113 (Traffic Control Point No. 2903) and Gordon Drive at Route 100 (Traffic Control Point No. 2902) to control and expedite the flow of evacuating vehicles along this corridor. Evacuees using this route will not be permitted to continue south on Route 113 past Gordon Drive. Klimm, ff. Tr. 13,794, at 4, Tr. 13,950, 14,064; Appl. Exh. E-67, at p. 7-10; Appl. Exh. E-69.

83. As further indicated in the ETE study, evacuees from West Vincent Township, Upper Uwchlan Township, Uwchlan Township, and the eastern portion of East Nantmeal Township would use local roads to Route 100 South, to Route 113 South, to the Downingtown High School. Appl. Exh. E-67, at 4-7, 4-8. A traffic control point will be established at the intersection of Route 113 and Route 100 (Traffic Control Point No. 2901) to ensure that evacuees using this corridor would not merge with those evacuating from the previously identified townships.

Id. at p. 7-10. Those evacuees using this route, including those evacuating the Marsh Creek State Park, would use Route 100 South and would be required to turn onto Route 113 South. Thus, these evacuees would not be permitted to continue on Route 100 South to the West Whiteland Township Building. The use of traffic control points to direct and divert traffic flows as indicated thereby avoids mixing evacuating traffic originating inside the EPZ from Routes 100 and 113, and precludes unanticipated traffic volume in the direction of West Whiteland Township Building. Klimm, ff. Tr. 13,794, at 4-5, Tr. 13,950, 14,064; Appl. Exh. E-69; Bd. Fdg. 82.

84. Possible traffic congestion at the intersection of Route 100 South and the Downingtown interchange of the Pennsylvania Turnpike was considered. It was determined, based upon discussion with PEMA, PennDOT and county officials, that most vehicles evacuating along that route would continue south on Route 100. No Commonwealth or county official has yet determined a need for traffic control at that intersection. Klimm, Tr. 17,056.

85. Evacuation routes identified in the ETE study represent the primary routes to be used by evacuees. Use of other roadways would certainly be expected in the event of an emergency evacuation. Thus, the ETE study did not assume that all vehicles evacuating southward along Routes 100 and 113 would continue on the planned evacuation routes once out of the EPZ. The ETE study assumed that some vehicles evacuating south on Route 100 might utilize the Pennsylvania Turnpike as an alternative at the Downingtown interchange, and traffic on either route might choose to use Route 30 further south, even though these roadways are not identified as primary evacuation routes. Neither choice away from Route 100 would have any impact on the EPZ evacuation time estimate. Klimm, ff. Tr. 13,794, at 3-4, Tr. 13,954-55, 14,082.

86. LEA posited that problems would arise during an evacuation as a result of a change in the location of a reception center from Exton Square Mall to the West Whiteland Township Building. LEA Proposed Findings 109, 113. HMM Associates determined that this change would not affect the evacuation time estimates contained in the ETE study (Klimm, Tr. 13,809) because: (1) only about 50% of evacuating vehicles using Route 100 would stop at the West Whiteland reception center (Klimm, Tr. 13,807-08, 13,813, 14,075); (2) the exit from Route 100 to the West Whiteland reception center is a free right turn (Klimm, Tr. 13,808); (3) the West Whiteland reception center is a considerable distance outside of the EPZ (Klimm, Tr. 13,809); (4) a reception center is merely a check-in location where a driver would pick up a strip map directing him to a mass care facility and would not remain for very long

(Klimm, Tr. 14,075-76, 14,085); (5) the parking area of the West Whiteland Township Building is irrelevant in terms of the flow of evacuating traffic because the ETE study provides a considerable time frame over which arrivals and departures would occur; actual turnover, not the number of spaces available, would therefore define traffic capacity in that area. Campbell, Tr. 19,930-31; Klimm, Tr. 13,812.

g. Upper Uwchlan Township

87. Robert W. Fetters is the Township Constable and the Emergency Management Coordinator for Upper Uwchlan Township. Fetters, Tr. 14,701. Although Mr. Fetters expressed concern regarding the number of vehicles which would evacuate via Route 100 from the Marsh Creek State Park on a summer day, and rush-hour traffic conditions on Route 100 between Eagle Road and Route 113, he apparently did not know how the ETE study had analyzed the exit of Marsh Creek Park visitors and evacuation traffic along Routes 100 and 113 South. Fetters, Tr. 14,716-20.

88. Mr. Fetters acknowledged that, in the event of an evacuation, traffic could be diverted from the Marsh Creek State Park south along Moore Road, Dorlan Mills Road and Creek Road away from the EPZ if appropriate traffic control points were designated. Fetters, Tr. 14,756-57. He testified that there was traffic congestion along Route 100 at the Downingtown interchange of the Pennsylvania Turnpike. However, he did not relate this congestion to any traffic flow or traffic pattern which would exist in the event of an actual evacuation due to a radiological emergency. Fetters, Tr. 14,747-48; Bd. Fdg. 57.

89. Mr. Fetters asserted that Upper Uwchlan Township had insufficient staff to man the traffic control points identified in the Upper Uwchlan Township plan. Fetters, Tr. 14,752. He relied upon a belief that assigned personnel from the Uwchlan Police Department, which provides police services for Upper Uwchlan Township, would be otherwise occupied in an emergency. Fetters, Tr. 14,762. To the contrary, the Upper Uwchlan plan clearly describes traffic and access control provisions, existing resources and assignments made by the State Police and the Uwchlan/Upper Uwchlan police department. Appl. Exh. E-37, at 15, D-1, O-1, P-1; Appl. Exh. E-38, at D-1, O-1.

90. Finally, Mr. Fetters asserted that Routes 100 and 113 are paralyzed by any light covering of snow. Fetters, Tr. 14,712. The Applicant's witness, Mr. Klimm, testified that the effect that adverse weather would have on any given roadway would depend upon weather conditions, rate of precipitation and ground temperature. Traffic flow analyses do not

assume that any given route is automatically “paralyzed” by any amount of snowfall. Klimm, Tr. 17,053-54. Although Mr. Feters complained that PennDOT was slow in plowing State roads in Upper Uwchlan Township after snows (Feters, Tr. 14,750), he did not take into account the concerted efforts which would be made to plow those roads in the event it were necessary to facilitate an evacuation because of a radiological emergency at Limerick. Bd. Fdgs. 364-370). Moreover, he conceded that Upper Uwchlan Township has the capability to plow or cinder those roads if need be. Feters, Tr. 14,750.

h. Conclusion

91. The Board finds that there is reasonable assurance that evacuation of the 10-mile radius of the EPZ will not be significantly impeded by traffic congestion in the Marsh Creek State Park/Exton area and that the ETE study has accurately and reliably predicted evacuation times along the Route 100 and Route 113 corridors in this area. We also find that the level of traffic control used in the ETE study for these evacuation corridors, both inside and outside the EPZ boundary is sufficient for implementation of evacuation within the times estimated in the ETE study. Further, we find no evidence in the record that would compel inclusion of the Marsh Creek State Park/Exton area in the Emergency Planning Zone, or to indicate that any significant safety benefits would accrue from so doing.

i. Valley Forge National Park and the Route 363 Evacuation Corridor

92. Only a very small part of the Valley Forge National Park north of the Schuylkill River lies within the EPZ. There is nothing there other than a small parking lot and trailhead. Fewlass, Tr. 14,563-64, 14,649, 14,657; Appl. Exh. E-92. The National Park Service informed planners that only very limited recreational activity exists in that portion of the park. Fewlass, Tr. 14,696. The National Park Service did not ask PEMA to incorporate any portion of the park within the EPZ. Fewlass, Tr. 14,659.

93. Representatives of the National Park Service have met approximately four times with various representatives of the Commonwealth, Chester County and Montgomery County to discuss notification procedures and the responsibility of the National Park Service in facilitating traffic flow through the park as it leaves the EPZ. Fewlass, Tr. 14,563, 14,566.

94. The National Park Service will receive notification at the alert stage from Chester County. The Park Service would then inform park visitors of the alert so as to give them the opportunity to take whatever action they felt prudent. This could be accomplished by the various public address systems in the park's buildings and patrol vehicles. The capability exists to establish traffic control points within the park to facilitate traffic flow at that point just as is done on a routine basis on busy weekends. Fewlass, Tr. 14,680-83.

95. LEA erroneously asserts that it would take 1 hour to establish traffic control points within the Valley Forge National Park because rangers assigned that responsibility would first be involved in notifying park visitors. LEA overlooks the fact, however, that park rangers would notify visitors at the alert stage (Fewlass, Tr. 14,680-81), and that traffic control points are not activated until a general evacuation has been ordered (Appl. Exh. E-3, at K-2, K-3). Moreover, only one or two officers are necessary to man a traffic access or control point. Appl. Exh. E-3, Appendices K-2, K-4. The Board is satisfied that park rangers responsible for manning those points would give appropriate priority to that responsibility.

96. In the opinion of the National Park Service, the majority of park visitors informed of an emergency at the alert stage would voluntarily evacuate the park at that time. The National Park Service has not, however, seen the need to adopt a formal plan to evacuate park visitors. Fewlass, Tr. 14,594, 14,602-03, 14,648.

97. The park can be rapidly evacuated. During a recent celebration where approximately 2000 automobiles were concentrated in the vicinity of the park amphitheater, it took only 45 minutes for those vehicles to exit the park. Fewlass, Tr. 14,608.

98. Preexisting park traffic was not loaded onto evacuation routes for the ETE study because most of the park, especially the portion primarily used by visitors, lies outside the Limerick EPZ. Bd. Fdg. 92. Moreover, it is easy to control or restrict access of vehicles from the park onto evacuation routes and most park visitors notified at the alert stage would leave prior to notice of evacuation of the EPZ. Klimm, Tr. 13,884-85; Fewlass, Tr. 14,594.

99. With the exception of a small portion north of the Schuylkill River, Valley Forge National Park lies outside the EPZ. To its east, Valley Forge National Park is bordered by the Route 363 County Line Expressway. Most of the park's entire southern border is bounded by the Pennsylvania Turnpike. The Schuylkill Expressway Extension passes through or along the northern extremity of the park. Route 252, the

evacuation route from southern Schuylkill Township, traverses the western end of the park and is located some distance within the park boundary on that side. Commonwealth Exh. E-9; Appl. Exh. E-92. See Board Figure 2 following.

100. The National Park Service has agreed to provide traffic control assistance at the intersection of Routes 23 and 252 and, if requested by the counties, at other locations, such as the intersection of Routes 23 and 363. Fewlass, Tr. 14,567, 14,683-84. Vehicles along Route 252 would be restricted from turning into the park if it would impede the flow of evacuation traffic. Klimm, Tr. 17,048. Vehicles may be permitted to enter the park by Route 23 East if, in the judgment of park officials, it would not create additional traffic problems. Fewlass, Tr. 14,569. Even if some unforeseen problem were to occur, the National Park Service has stated that it will continue to cooperate with Commonwealth and county planning officials with regard to any matter concerning the park. Fewlass, Tr. 14,679.

101. The normal queuing which occurs during rush-hour traffic at the intersections of Routes 23 and 252 and Routes 23 and 363 is not related to the traffic patterns which would exist at the time of an evacuation along those routes in an actual emergency. Fewlass, Tr. 14,576; Klimm, Tr. 13,911, 17,040, 17,062. Traffic control points are not in place at those intersections during normal rush hours. Fewlass, Tr. 14,682-84.

102. Figures for average daily vehicle counts entering the Park on Route 23 at its western boundary are unrelated to traffic flows or patterns which would exist in the event of an actual radiological emergency. This is also true of other vehicle counts reported by the National Park Service or the total number of park visitors. Fewlass, Tr. 14,613-14, 14,635-37, 14,642. The National Park Service representative admitted that he could only speculate as to traffic congestion along Route 23 through the park in the event of an actual emergency in any event. Tr. 14,588-89.

103. Access to Route 252 on the west side of the Valley Forge Park area could be controlled very easily, although from the standpoint of developing evacuation time estimates for the entire EPZ, Route 252 is not a critical evacuation corridor. Even if vehicles from the park were permitted to enter that corridor, they would not significantly affect the time estimates. South of the Park boundary, evacuation traffic using Route 252 would turn west and follow Route 202 south. Klimm, Tr. 13,887; Commonwealth Exh. E-9.

104. With adequate traffic control in place, traffic congestion outside the EPZ along the Route 363/County Line Expressway/Pennsylvania Turnpike evacuation corridor, which passes the eastern boundary of the

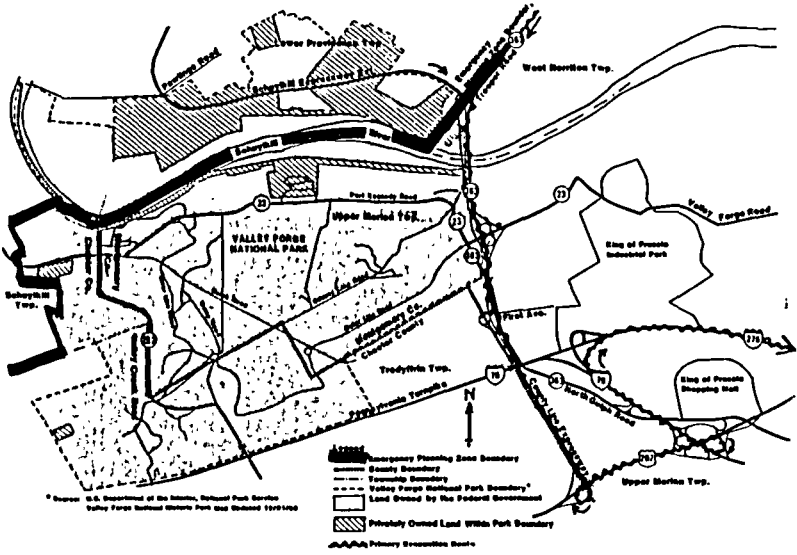


FIGURE 2. (From Appl. Exh. E-92)

Valley Forge National Park (Appl. Exh. E-92), will not impede an evacuation of the EPZ. Vehicles evacuating from the Upper Providence and Lower Providence Townships would use local roads to Route 363 South. Route 363 extends along the southeastern boundary of the EPZ as Trooper Road and runs south to the interchange with the Schuylkill Expressway Extension just inside the EPZ boundary; it then extends south as a limited-access expressway to an interchange with Route 23. Thereafter, the primary evacuation route continues south as the County Line Expressway to the interchange with Route 202 North, thence to interchanges with I-76 North, and then I-276 East. (Route 363 exits the expressway at the Route 23 interchange.) Thus the Route 363/County Line Expressway evacuation corridor follows limited access expressways southward and eastward from the EPZ. Access to and from this corridor is available only at Route 23 (Valley Forge Road), 1st Avenue, Route 202 (DeKalb Pike), Warner Road, and I-76. Klimm, ff. Tr. 13,794, at 5-6; Appl. Exh. E-92. Access to this evacuation corridor will be restricted in the event of an emergency. Klimm, Tr. 13,869.

105. It was a planning assumption reviewed with both PEMA and the counties that control of access to evacuation routes near the Valley Forge National Park would be required and could easily be put in place to restrict access to those routes from the park area. The same planning principle applies to those routes in the King of Prussia industrial park area and shopping mall areas. Klimm, Tr. 13,885-86, 13,939-40.

106. To control access to evacuation corridors in the Valley Forge National Park/King of Prussia area, only a small number of access control points would have to be manned. It would therefore be easy to restrict access to the main evacuation corridor. Accordingly, such restriction is a valid planning assumption to include in the ETE study. Klimm, Tr. 13,886.

107. The ETE study considered traffic flows outside the EPZ along Route 363, the County Line Expressway, east on Route 202, north on Route 76 and onto Route 276. Klimm, Tr. 13,936. Even if one assumes an evacuation of the Valley Forge National Park and populated areas outside the EPZ along the Route 363 evacuation corridor, it would not have any effect upon time estimates contained in the ETE study because of traffic access controls. Klimm, Tr. 14,087-88, 17,047. LEA's assertion that the ETE study did not reflect the traffic control arrangements assumed for evacuating traffic on Route 202 which travels west instead of

east to the Schuylkill Expressway (LEA Proposed Finding 155)³⁶ lacks merit. The ETE study expressly recognizes that evacuating traffic might utilize Route 202 West, either by choice or as directed by traffic controllers (Appl. Exh. E-67, at 6-1, 6-3).

108. Evacuation time estimates would not be affected by vehicles entering the Valley Forge Park since they would be restricted by park rangers from subsequently entering primary evacuation corridors. Klimm, Tr. 17,049.

j. Schuylkill Township

109. Norman Vutz is a Township Supervisor of Schuylkill Township, which is governed by a five-man Board of Supervisors. Vutz, Tr. 14,432. He also serves as the Emergency Management Coordinator for Schuylkill Township. Vutz, Tr. 14,432. He had not discussed the ETE study with any representative of HMM Associates or any emergency planning official with regard to traffic concerns, nor had he discussed any of the designated evacuation routes for Schuylkill Township, i.e., Route 23 East and Route 29 East, with PennDOT or PEMA officials. Vutz, Tr. 14,460, 14,485.

110. Mr. Vutz had not reviewed the ETE study with respect to the methodology and assumptions prescribed under NUREG-0654 and could not, therefore, state whether his particular concerns were based upon some perceived deficiency in the study or the requirements of NUREG-0654. Vutz, Tr. 14,527-30. More basically, Mr. Vutz incorrectly asserted that evacuation time estimates should be based upon worst-case meteorology, including, for example, the blizzard of 1978 or some other conditions which rendered the roads impassable. Vutz, Tr. 14,451, 14,521-23.

111. Mr. Vutz was principally concerned with the geometry of the intersection of Valley Park Road and Route 23, which results in queuing during the normal morning rush hour. Vutz, Tr. 14,441-42. He was also concerned about whether the principle of "dynamic route selection," as used in the ETE study, implies that drivers have advance knowledge of road conditions beyond their view and with the formula in the ETE study for calculating road capacity. Vutz, Tr. 14,446.

112. "Dynamic route selection" as used in the ETE study means that a driver may choose one of several alternative routes, depending

³⁶ LEA's Proposed Findings were not paginated and a few of the pages, as submitted, were recognizably out of sequence. Also, many of the paragraphs were un-numbered, or the paragraph numbers were illegible on the copies provided to the Board. This presumably is the same reference that the Applicant cited as LEA Proposed Finding 155.1. Appl. Reply Findings of Fact, Proposed Finding 70, March 14, 1985.

upon traffic conditions (i.e., congestion) immediately upstream. There are only several locations within the EPZ, based upon discussions with PEMA and PennDOT officials, at which evacuees would reasonably be expected to make such alternative choices, as identified in § 6 of the ETE study. Otherwise, it was determined that the prescribed evacuation routes would be followed. Klimm, Tr. 14,022, 14,027-28. Mr. Vutz's concerns therefore lack merit.

113. Mr. Vutz expressed his belief that the ETE study is flawed, relying on "a hunch" that it would take more than 6 hours to complete evacuation for Schuylkill Township under adverse weather conditions. Vutz, Tr. 14,547. Mr. Vutz misunderstood the NETVAC model simulation of loading vehicles onto the evacuation network. He erroneously equated this simulation with an assumption that roads would in fact be empty at the time of an actual evacuation. Vutz, Tr. 14,454-55; Bd. Fdg. 4.

114. Mr. Vutz did not disagree with the designation of the traffic control points for Schuylkill Township or assert that they had been inaccurately assessed in the ETE study. Vutz, Tr. 14,457-58. He was unprepared to recommend adding further traffic control points to the Schuylkill Township plan without first consulting the police chief. Vutz, Tr. 14,510. Even if additional traffic control points were necessary, Schuylkill Township has the capability to man those points. Vutz, Tr. 14,517.

115. Mr. Vutz also expressed concern that congestion along Route 23 during peak hours might be aggravated by the possible construction of an office condominium development in Schuylkill Township. Vutz, Tr. 14,469-70. Subject to a zoning amendment, he represented that the size of Schuylkill Township's population would be doubled by this development. If this development were constructed, there would obviously be a need to increase road capacity in the area, regardless of any possible evacuation of Schuylkill Township residents. Vutz, Tr. 14,470, 14,494.

116. NUREG-0654, Appendix 4, states that evacuation time estimates should be updated as local conditions change. A significant population increase in one area would be one case requiring such an evaluation. Population increases would generally coincide with roadway improvements to accommodate the particular development. Depending on its magnitude, this might require reevaluation at a later time. Such changes, however, would not occur instantaneously and could be evaluated on an annual basis. Klimm, Tr. 17,043-44.

117. John Lukacs, a member of the Schuylkill Township Planning Commission, criticized the plans to evacuate the southeast portion of the EPZ on the basis of traffic surveys in Schuylkill Township. He stated that Schuylkill Township roads are relatively low load capacity and already badly overcrowded. His discussion of the existing and projected

roadway network, including roadway capacities, provided no information of any evidentiary value. Lukacs, ff. Tr. 14,774, at 1-2. Mr. Lukacs showed no familiarity with the planning principles and assumptions of NUREG-0654 or Annex E, nor did he state that he had even reviewed the ETE study with regard to its analysis of roadway capacities and traffic flows along evacuation corridors in the southeastern portion of the EPZ. He erroneously equated normal commuter traffic patterns with simulated evacuation flows. Lukacs, ff. Tr. 14,774, at 1-2; Bd. Fdg. 57.

k. Upper Merion Township

118. Ronald Wagenmann is the Township Manager of Upper Merion Township (Wagenmann, Tr. 17,414), which is outside the EPZ. Commonwealth Exh. E-9. He has no formal education in traffic engineering, transportation or traffic flow simulation modeling. He was not familiar with basic traffic flow engineering texts and has never performed a traffic engineering analysis. Nor was he familiar with the methodologies and assumptions for preparing evacuation time estimate studies under NUREG-0654. Wagenmann, Tr. 17,457-58.

119. While Mr. Wagenmann testified as to the roadway capacity of certain arteries passing through Upper Merion Township, e.g., North Gulph Road, which he indicated handles approximately 26,000 to 29,000 vehicles a day, he confused roadway capacity with level of service. Wagenmann, Tr. 17,433, 17,463-64. Mr. Wagenmann properly conceded that he knew of no relationship between peak commuter traffic flow along township roads and the traffic flow associated with a Limerick emergency evacuation. Wagenmann, Tr. 17,465-66, 17,468; Bd. Fdg. 57.

l. Conclusions

120. The Board finds that in the absence of any affirmative showing that the Marsh Creek State Park/Exton area or the Valley Forge State Park/King of Prussia area should be included within the Emergency Planning Zone, there is no reason to so include them. The Board finds, based on the evidence of record, that there is reasonable assurance that the Applicant's Evacuation Time Estimates (ETE) study is consistent with the assumptions and methodologies of NUREG-0654 and meets the appropriate elements of Planning Standards J.10.i and J.10.l therein. The Board further finds that there is reasonable assurance that evacuation of the 10-mile radius of the EPZ will not be impeded by traffic congestion in the Marsh Creek State Park/Exton area or in the Valley Forge National Park area, and that the level of traffic control used in the Appli-

cant's ETE study for these evacuation corridors, both inside and outside the EPZ boundary, is sufficient for implementation of evacuation within the time estimated for the EPZ in the ETE study. The Board finds that there is no impediment to identifying and staffing traffic control points outside the EPZ in the King of Prussia area to assure that evacuation along the Route 363-to-Pennsylvania Turnpike corridor can be accomplished within the time estimated in the ETE study. However, based on the testimony of the Staff's witness, Dr. Urbanik, the Board is concerned that the excess capacities of Route 202, the Schuylkill Expressway segment of I-76, and Pennsylvania Turnpike (I-76 and I-276) that were assumed in the ETE study will not actually be available for traffic evacuating the EPZ without traffic control beyond the five TCPs identified in the Montgomery County plan. Prior to operation above 5% of rated power, the Director, Office of Nuclear Reactor Regulation, shall receive verification of plans to implement a level of traffic control in the King of Prussia area sufficient to assure that all the traffic evacuating along the Route 363-to-Pennsylvania Turnpike corridor can continue to move upon reaching the EPZ boundary, as implicitly assumed in NUREG-0654 Planning Standard J.10.1. The Board finds that all other aspects of Contention LEA-23 and Contentions LEA-24/FOE-1 lack merit. Bd. Fdgs. 1, 6, 15, 23, 45, 54, 56, 63, 65, 67, 70, 82-83, 91-108.

B. Special Population Groups

1. Schools

a. LEA-11

The draft Chester and Montgomery County and School District RERPs are deficient in that there is insufficient information available to reasonably assure that there will be enough buses to evacuate the schools, both public and private, in one lift.

121. This contention was admitted by the Board in its Special Pre-hearing Conference Order of April 20, 1984 (LBP-84-18, *supra*, 19 NRC at 1053) and further defined in its Memorandum and Order of September 24, 1984 (unpublished), slip op. at 5-7. In admitting this contention, the Board specifically ruled out: (1) provisions for transportation from host schools to mass care centers; (2) any mention of required mobilization time; (3) issues regarding assumption in the Evacuation Time Estimate Study concerning the time it would take to assemble and load buses; and (4) whether there should be traffic control measures at the schools. *Id.* at 6-7. The contention was construed to allege that the plans

should show either that there were enough buses, or that a mechanism adequate for requiring them existed. *Id.*

(1) ONE-LIFT PRINCIPLE AND DETERMINING TRANSPORTATION NEEDS

122. In the Commonwealth, should an evacuation of schools in the plume EPZ become necessary, arrangements must be in place to ensure the action can be accomplished in a timely manner by using one lift, rather than multiple bus trips. Hippert, ff. Tr. 19,498, at 9.

123. The one-lift standard is unique to Pennsylvania. It is the only State in FEMA Region III where it is necessary to remove schoolchildren in a one-lift evacuation. Asher, Tr. 20,306-07. The principal FEMA witness testified that in his professional opinion, the procedure for a one-lift evacuation provides reasonable assurance that adequate protective measures can be taken to protect that segment (schoolchildren) of the population. *Id.*, Tr. 20,325.

124. The initial step in determining transportation resources is for each risk school district to determine how many buses it will require and the number that are readily available, taking into account whether the buses are owned by the district or provided by an outside supplier. The risk county is then informed of the school district's resources and any shortages or "unmet needs." If the risk county cannot meet these shortages from within the county, the county reports its total school bus shortages as an "unmet need" to PEMA. Hippert, ff. Tr. 19,498, at 9.

125. In accordance with Pub. L. No. 1332, PEMA, on behalf of the Commonwealth and in coordination with the Pennsylvania Department of Transportation (PennDOT), is responsible for making feasible and effective arrangements to ensure reported unmet needs for school evacuation will be filled. PEMA will seek to fill these unmet needs by arranging to utilize bus resources from counties outside the plume EPZ. Failing this, PEMA will solicit assistance from FEMA in securing transportation resources from adjoining States. Hippert, ff. Tr. 19,498, at 9 and 10.

(2) MONTGOMERY COUNTY

(a) *Compilation of Bus/Driver Resource Data from Providers*

126. The Montgomery County Office of Emergency Preparedness ("OEP") determined that there are thirty-three bus providers in Montgomery County which could provide transportation resources in an emergency. All thirty-three providers were contacted to determine the kinds and number of vehicles operated, equipment and manpower resources, garage location and notification information. The Montgomery

County OEP met directly with twenty-nine providers. The remaining four were contacted by Energy Consultants. All the bus providers were advised that the Montgomery County OEP wished to obtain current resource data, including buses and drivers, for use in any emergency, man-made or natural, and specifically including an accident at the Limerick Generating Station. Bigelow, Tr. 14,124, 14,126, 14,185, 14,236; Cunnington, Tr. 13,132, 16,923-24.

127. Virtually all bus providers contacted were cooperative and provided the necessary information regarding the resources available, number of drivers (full- or part-time) and bus capacities. Information was also obtained as to normal bus runs during school sessions and the availability of buses during those periods and at other times. Bigelow, Tr. 14,124-25; Cunnington, Tr. 16,923-24.

128. Each provider was asked, given a request at certain times of the day or week, how many buses and drivers could be provided should an emergency require their use at different times, i.e., daytime, evening, or weekends. Montgomery County specifically informed each bus provider that it was not looking for the highest number of buses and drivers that could be assured, but rather the most conservative number that could be provided. Bigelow, Tr. 14,125, 14,196; Cunnington, Tr. 16,923-24. Bus providers were advised that no particular goals had been set and that the numbers provided should be very conservative. Bigelow, Tr. 14,235; Cunnington, Tr. 12,971-72. Thus, to the extent bus companies would give priority to their ordinary commercial operations at the time of an emergency, the bus survey accounts for this priority in reflecting the number of buses and drivers that would be available. Bradshaw and Cunnington, Tr. 12,978.

129. The information obtained in meetings with individual providers was entered onto bus provider survey forms prepared by the Montgomery County OEP. Those forms were then returned to the provider for verification and adjustments or corrections. Cunnington, Tr. 12,972, 13,129; Bigelow, Tr. 14,183-84; Appl. Exhs. E-75, E-83, E-86, E-87, E-90.

130. Subsequently, the Montgomery County OEP sent the identified bus providers a confirmation letter containing the relevant survey information. An accompanying letter of understanding was also provided (e.g., LEA Exhs. E-4, E-14) to confirm the bus provider's intention to furnish buses and drivers consistent with the previous discussion between county planners and bus provider representatives, i.e., that buses and drivers would be provided to the maximum extent possible in the event of an actual emergency. Bigelow, Tr. 14,125-26; Bradshaw and Cunnington, Tr. 12,970-71.

131. The letters of understanding which were transmitted to the appropriate bus provider authorities had previously been discussed with the bus provider representatives. Accordingly, they understood the purpose for which the survey information was being sought and the basis upon which Montgomery County would rely upon it. Bigelow, Tr. 14,231-32.

132. As of December 3, 1984, the Montgomery County OEP had received about twenty-one signed agreements from transportation providers. Bigelow, Tr. 14,127, 14,345, 14,366. Although more buses are required for implementation of the one-lift principle than are currently under signed agreement, the Montgomery County OEP believes that an adequate number of buses will be available. *Id.*, Tr. 14,366.

133. Subsequently, Montgomery County sent bus providers a followup letter requesting updated information for the school year 1984-1985. When that information is furnished, it will be added to Annex I of the Montgomery County RERP to provide current information on the availability of buses and drivers in Montgomery County. Such updating will be conducted annually. Bigelow, Tr. 14,176-77, 14,345; Kowalski, Tr. 16,197; Cunningham, Tr. 12,972; Appl. Exhs. E-76, E-99.

(3) FORMAT OF LETTERS OF AGREEMENT

134. The Montgomery County OEP adopted a standard format for all letters of understanding with transportation providers. The format was based upon a review of twenty-five to thirty different bus provider agreements used elsewhere in Pennsylvania and other States, and was approved by the Montgomery County solicitor. Other formats were considered to be too detailed and legalistic and were rejected as less workable. Bigelow, Tr. 14,229-30; Bradshaw, Tr. 12,968. The standard agreement states that the provider "agrees to provide buses and drivers to the maximum extent possible, for the use during an emergency, for transportation of individuals should an evacuation be required of Montgomery County residents affected by man-made or natural disasters, including an incident at the Limerick Generating Station" (*e.g.*, LEA Exh. E-4).

135. The FEMA panel testified that the letters of agreement utilized by Montgomery and Chester Counties satisfy the planning standards of NUREG-0654. Asher, Tr. 20,163, 20,196, 20,199. A FEMA witness stated that, aside from FEMA standards, he personally felt the number of buses should be specified in the agreement. Nonetheless, FEMA acknowledged that the absence of such numbers in letters of agreement

would not preclude it from making a finding that the planning has been adequately addressed. Asher, Tr. 20,196-97.

136. With regard to agreements with school districts outside the Limerick EPZ for buses and drivers, the Montgomery County OEP specifically mentioned in discussions with school district transportation representatives that authorization to enter into the letter of understanding would have to be made by the school district superintendent and perhaps by the school board. It was understood that the transportation representative lacked that authority. The County dealt directly with the school district transportation representatives because they had precise knowledge as to the number of vehicles and drivers and the kinds of buses which could be made available and were therefore best able to provide a conservative estimate of available support in an emergency. Bigelow, Tr. 14,200-01.

137. The Montgomery County OEP has no reason to doubt the validity of the letters of understanding signed by the various bus providers who agreed to make their buses and drivers available to the maximum extent possible in an emergency. Bigelow, Tr. 14,201.

138. Based upon discussions with private bus providers and the transportation representatives of public school districts, the Montgomery County OEP believes that even without written or verbal agreements the transportation providers will support the county and an adequate number of buses would be available in an actual emergency. Verbal assurances of support have been received from transportation providers who have not yet executed letters of understanding. Bigelow, Tr. 14,216-18.

139. The historical record demonstrates that providers will respond in an emergency to the best of their capability as they always have, with or without an agreement. Bigelow, Tr. 14,366-67; Cunningham, Tr. 12,977-78.

140. The counties do not rely upon their agreements with bus providers as contractually enforceable. Rather, the purpose of the agreement is to reasonably determine and confirm the available resources and to assure that the providers are capable of providing those resources. This purpose is in accord with the criteria outlined in NUREG-0654, Criterion A.3. When PEMA and FEMA reviewed the draft plans in December 1983, neither agency indicated dissatisfaction with the format of the agreements and simply stated that, upon completion, the agreements would meet regulatory requirements. Bradshaw, Tr. 12,976-77. Although the agreements do not themselves provide for compensation, bus providers will be paid out-of-pocket expenses in furnishing buses for an emergency response. Reimbursement could come from insurance, the

Applicant, settlements under the Price-Anderson Act or from PEMA under Commonwealth legislation, including Pub. L. No. 1332. Hippert, Tr. 19,602-03, 19,628; Appl. Exh. E-102.

141. Montgomery County views a provider agreement as an expression of an organization's willingness to assist the County in any emergency. Emergency planners are well aware that significant resources are required to respond to a disaster or emergency. The historical record indicates that the actual response by resource providers in a disaster or emergency is consistent with the agreement which states the organization's willingness to assist. Cunnington, Tr. 12,977.

142. An Energy Consultants witness stated that a review of the historical record would indicate that bus providers contacted by the counties were extremely conservative in the number of buses and drivers they estimated to be available in an actual emergency. Historically, greater resources are volunteered at the time of an actual emergency than were pledged. Cunnington, Tr. 12,971.

143. The record of past responses to emergencies and disasters has been documented in a number of reports such as the Hans and Sells study, which is an evaluation of evacuation risks. It is the opinion of emergency management professionals generally that the predicted response for a radiological emergency would not be any different than for any other hazard in the historical record. Bradshaw, Tr. 12,987-88.

144. The historical record also demonstrates that, in times of disaster or emergency, resources are volunteered without any particular incentives or inducements. Cunnington, Tr. 12,982. This experience includes incidents at the local level where emergency management agencies have requested buses and drivers and they were promptly furnished. For example, during the Three Mile Island incident, bus providers were fully prepared to provide buses and drivers to support a potential evacuation. Bradshaw and Cunnington, Tr. 12,983-84. Other circumstances in which bus providers have voluntarily responded to assist in evacuations involved fire, high water, situations involving the police and evidence, arrest and other criminal activities. Cunnington, Tr. 12,984.

145. Finally, the historical record of disaster responses indicates that typically 99% of the population utilizes private vehicles. Therefore, very few buses would actually be required or utilized. Bradshaw, Tr. 12,986.

146. On this basis, while each individual provider in Montgomery County has provided a conservative estimate of the number of buses and drivers it would reasonably anticipate to make available in an emergency, there is every expectation that some providers would be able to furnish buses and drivers well in excess of their conservative estimates. Cunnington, Tr. 12,980-81.

(4) LIMERICK ASSIGNMENTS

147. NUREG-0654 does not require that buses be preassigned to particular schools. Rather, jurisdictions are afforded flexibility to respond to the particular circumstances at the time of an emergency. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 3-4. The preassignment of buses and drivers could restrict flexibility in implementing the plans. Cunnington, Tr. 13,722-23. There is no planning standard which mandates the preidentification of bus drivers who would assist in an evacuation during a radiological emergency. Once a bus company has agreed to provide its bus resources for an evacuation, it has committed itself to ensuring that drivers are available, absent any contrary indication. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 25. Another reason bus drivers need not be preidentified is that they are not emergency workers and would only be asked to drive buses as they normally do. Bigelow, Tr. 14,293-94.

148. The "Limerick assignments" contained in the Montgomery County plan, Annex I, Appendix I-2, have been made only to utilize the plan as a worksheet. Bus providers have not asked and the Montgomery County OEP had not indicated specifically where buses and drivers would be assigned. Rather, bus providers have simply agreed to make buses and drivers available to the maximum extent possible for all emergencies, including an accident at Limerick. Bigelow, Tr. 14,177-79, 14,186, 14,196-97.

149. Assignment of buses from providers outside the EPZ to specific schools is a tactical decision best made at the time of an emergency. The speed of evacuation is not dependent upon preassignment of buses to schools but is a function of mobilization time, which will occur at the early stage of an emergency. Campbell (Admitted Contentions), ff. Tr. 19,852, at 2-3. As utilized in Annex I of the Montgomery County plan, the term "mobilization" refers to the time necessary to have buses and drivers ready to depart and does not include travel time to their assignments. Bigelow, Tr. 14,238.

150. The "Limerick assignments" in the Montgomery County plan reflect the greatest number of buses necessary for an evacuation. The information would be checked with bus providers at the time of an emergency, necessary adjustments would be made and final assignments would be given at that time. Cunnington, Tr. 16,920-21; Appl. Exh. E-3, Appendix I-3. Procedures for making or adjusting assignments at the time of an emergency are outlined in the school district plans. Bradshaw, ff. Tr. 12,764, at 24; Appl. Exhs. E-49 to E-61, § V.B and Attach. 3; Appl. Exh. E-53, at 6114.4(k) and Attach. 6.

151. Understandably, a number of school superintendents within the EPZ wished to know the source of buses that would be used to evacuate their schools in an actual emergency (e.g., Murray, Tr. 15,083-84). Ample credible testimony has been heard, nonetheless, that successful school evacuation does not depend upon preassignment of buses to particular schools. Bd. Fdgs. 147-150. Based upon the evident desire of each school district to adopt a workable plan (e.g., Feich, Tr. 14,927; Murray, Tr. 15,096-97, 15,166; Welliver, Tr. 15,548-49; Warner, Tr. 15,635-36), the Board is satisfied that the explanation of planning procedures for bus assignments by the Montgomery County OEP will sufficiently inform and assure school officials that an adequate number of buses will be available. Further, contrary to LEA's assertion that school bus providers were initially uninformed that buses and drivers would be assigned for an evacuation related to Limerick, the record shows that providers were specifically informed that their buses would be assigned to a transportation staging area at which a school or other assignment would be made at the time of an actual emergency. Bigelow, Tr. 14,186-90.

(5) SCHOOLS WITH EXISTING CONTRACTS

152. With regard to other fixed nuclear power plant sites within the Commonwealth, PEMA has never required a school district which has an existing contract with a bus provider to obtain an ancillary agreement for radiological emergencies. Bradshaw, Tr. 16,911. School district officials as well as the Montgomery County OEP and Chester County DES have not indicated the necessity to have such ancillary agreements. Cunningham, Tr. 16,912. It is unnecessary for a school district to enter into an ancillary agreement with a bus provider, or for the county to obtain a letter of understanding with a bus provider, to ensure that buses guaranteed under an existing contract would be provided in a radiological emergency. Cunningham, Tr. 16,912.

153. The agreements sought by Montgomery County with the Spring-Ford, Methacton and Pottstown School Districts or their providers relate only to situations beyond normal school hours. The Montgomery County plan recognizes that those school districts would utilize their transportation resources to evacuate their own schools. Cunningham, Tr. 16,921-22, 16,932-33, 16,937-38.

154. When a bus provider furnishes transportation for a school district on a routine basis under contract, or where the district operates its own buses, the Montgomery County plan assigns those particular buses only to their routine school district assignment. For example, the routine

bus transportation provided under contract by CMD Services for the Pottstown School District is reflected as the same assignment in the Montgomery County plan. Cunnington, Tr. 13,137-38, 16,922; Appl. Exh. E-3, at p. I-2-7. Likewise, the buses furnished by the Levy Bus Company on a routine basis under contract for transportation of Upper Perkiomen School District children, including those who attend the Western Montgomery Vocational Technical School, are assigned under the Montgomery County Plan for that purpose only. Cunnington, Tr. 16,907-09; Appl. Exh. E-3, at p. I-2-8.

(6) UNSIGNED AGREEMENTS

155. The only providers who declined Montgomery County's request for a letter of understanding for the provision of buses and drivers in an emergency were the Perkiomen Valley and Lower Merion School Districts. Bigelow, Tr. 14,201-02, 14,218.

156. The Board of School Directors for the Lower Merion Area School District has stated in a letter to Montgomery County that it would assist in an actual emergency, including one at Limerick, by providing buses and drivers to the extent possible. Appl. Exh. E-85. That commitment is supported by the same underlying bus and driver resource data supplied by school districts which have signed agreements. Bigelow, Tr. 14,128, 14,218; Pugh, Tr. 16,362, 16,364, 16,378; Appl. Exhs. E-83, E-84. The School Board did not decline to sign the proposed agreement because it was unwilling to cooperate, but rather because it was not satisfied with language in the agreement stating that it could be unilaterally rescinded by either party and because the district felt it could not "guarantee" a bus driver's response. Pugh, Tr. 16,364.

157. The Perkiomen Valley Area School District did not sign the proposed agreement because it intends to utilize its buses to evacuate its own students. Bigelow, Tr. 14,128, 14,201; Appl. Exh. E-56, at p. A3-20.

158. The Board finds that the absence of signed transportation agreements from the Perkiomen Valley and Lower Merion School Districts does not have adverse implications with regard to the availability of resources from those two districts in the event of a radiological emergency.

159. The North Penn School District Board of Education has not yet taken any action on the letter of agreement forwarded by Montgomery County because it has not received it from its transportation agent, who is newly appointed and has been on extended medical leave. Starkey, Tr. 16,421, 16,423, 16,433-34. The North Penn Board had, however, sched-

uled consideration of the proposed agreement for January 1985. Starkey, Tr. 16,434.

160. The North Penn School District had previously entered an agreement to use district property as a transportation staging area and a district building as a host school under the Montgomery County plan. Starkey, Tr. 16,434-37. The prior agreements reflect the spirit of cooperation and sense of responsibility which could similarly be expected in responding to a request for buses and drivers. Starkey, Tr. 16,454.

161. The Board of Education has indicated that even in the absence of an express written agreement, the North Penn School District would do whatever it could to assist another school district in an emergency by providing buses and drivers. Starkey, Tr. 16,451.

162. The North Penn School District employs eighty-six bus drivers. Starkey, Tr. 16,431. In order to fulfill the assignment for North Penn School District buses and drivers under the Montgomery County plan, as reflected in the bus survey form filled out by the district transportation agent, only forty-two of eighty-six available drivers would have to be available. Starkey, Tr. 16,457-58; Appl. Exh. E-86.

(7) TRANSPORTATION FOR PRIVATE SCHOOLS

163. State law requires public school districts to provide transportation to nonpublic schools within 10 miles of the district boundary. Bigelow, Tr. 14,348; Kowalski, Tr. 16,195.

164. A number of school districts within the EPZ have indicated that they will not assume primary responsibility for emergency notification and transportation services for private schools within their jurisdiction. For example, the Pottsgrove School District plan will be modified to reflect that Pottsgrove will coordinate notification and transportation services for private schools within its territory as a backup only. Cunningham, Tr. 12,877. The Pottstown School District has taken the same position. Cunningham, Tr. 12,884; Appl. Exh. E-57, at 6-7.

165. The Pottstown and Pottsgrove School Districts have discussed this matter with Montgomery County. They contended that the County, with its greater resources, would be better able to provide primary notification and coordination of transportation for private schools. Accordingly, the Montgomery County OEP has agreed to assume primary responsibility for emergency notification and coordination of transportation for private schools within those districts. Bigelow, Tr. 14,259-63; Cunningham, Tr. 12,877, 12,890-91. This is consistent with the requirements of NUREG-0654. Cunningham, Tr. 13,710-11. If the plans finally adopted

utilize this approach, Montgomery County has sufficient resources to fulfill this responsibility. Bigelow, Tr. 14,262-63.

166. In Chester County, the planning task force in operation in the Owen J. Roberts School District has requested that responsibility for private schools within its district be eliminated from its plan. Cunningham, Tr. 12,886, 12,892. Chester County has modified the county plan to state that the transportation requirements for private schools in that district will be satisfied as unmet needs passed on to the county. Cunningham, Tr. 12,886-87; Appl. Exh. E-2, Annex N, Appendix 1.

167. Similarly, the Phoenixville School District does not have sufficient resources under contract to provide emergency transportation for all public, private and parochial school students in the district and has transmitted an unmet need for transportation to the county, which is addressed in the Chester County plan. Cunningham, Tr. 12,889-90.

168. Ultimately, PEMA sees no obstacle to resolving any unmet need for buses and drivers to evacuate schoolchildren. Hippert, Tr. 19,577-78.

(8) RESERVE BUSES

169. As represented by Appendix Q-1 of the Montgomery County plan, overall bus and van requirements in that county amount to 478 vehicles. Bigelow, Tr. 14,127; Appl. Exh. E-3, at Q-1-1. This number is conservative in that the school population calculation of need was based upon total enrollment and did not account for absentees. Students who drive to school were also included in the total enrollment. Bigelow, Tr. 14,129, 14,235.

170. Based upon current survey information and known unmet needs, there are sufficient transportation resources within Montgomery County to meet all evacuation needs in a single lift. Bigelow, Tr. 14,127, 14,191; Hippert, ff. Tr. 19,498, at 11.

171. The forty-nine buses and vans designated as a reserve in the Montgomery County plan, which have been reported to PEMA as an unmet need, represent an extra reserve constituting 10% of overall needs. It does not represent any actual unmet need for transportation in Montgomery County. Bigelow, Tr. 14,127, 14,192, 14,338; Hippert, Tr. 19,546-47.

172. Montgomery County has a ready reserve of buses and drivers built into its plan inasmuch as it calls for the use of less than half of the available bus resources and between only 20 to 25% of the approximately 1225 available drivers outside the Limerick EPZ. That pool of drivers will be sufficient. Nonetheless, Montgomery County intends to obtain

an additional reserve which could provide further backup capability. Bigelow, Tr. 14,269-70, 14,297-99; Bradshaw, ff. Tr. 12,764, at 23; Cunnington, Tr. 12,991, 13,629.

173. The unmet need for nineteen coach buses reported to PEMA (Appl. Exh. E-3, at Q-1-1) does not relate to evacuation of school students. These buses would be used to evacuate persons from the geriatric center or other persons requiring special assistance. Bigelow, Tr. 14,331-32.

174. Thirty-seven buses from the Southeastern Pennsylvania Transportation Authority ("SEPTA") Frontier Division are designated in the Montgomery County plan only as a reserve. Bradshaw, Tr. 13,145; Appl. Exh. E-3, at I-2-12, I-3-14. Other existing reserves are listed in Annex I, Appendix I-2, e.g., Ashbourne Transportation, Inc. Bigelow, Tr. 14,338; Appl. Exh. E-3, at p. I-2-5. Buses and drivers which would be furnished by SEPTA upon request to Montgomery County in an emergency would logically be supplied from the buses stationed at the Frontier Division, in Norristown, Montgomery County, but SEPTA has depots all across five counties in Southeastern Pennsylvania and buses could be supplied from any of those locations. Wert, Tr. 16,574-75; Hippert, ff. Tr. 19,498, at 10-11.

(9) CHESTER COUNTY

175. Chester County also surveyed potential bus providers and is seeking to enter into letters of agreement for the provision of buses in the event of an emergency, including an emergency at Limerick. Campbell (Admitted Contentions), ff. Tr. 19,852, at 2.

176. Initially, Chester County reported an unmet need of 134 buses to PEMA, including a total of 80 buses necessary to evacuate schoolchildren. Campbell, Tr. 19,874, 19,980; Hippert, ff. Tr. 19,498, at 10-11; Appl. Exh. E-2, at N-3-1, N-3-2. A total of 545 buses within the county for use in an emergency has been identified. Campbell, Tr. 19,981.

177. Thus far, Chester County has obtained six written agreements with bus providers for approximately 100 buses. The bus agreements are based upon a transportation inventory form which states the type of vehicle, its passenger capacity, radio equipment and usual location. Campbell, Tr. 19,860. A driver would be provided with each bus. Campbell, Tr. 19,861. Verbal agreements exist for an additional eighteen buses. The number of buses for which written commitments have not yet been received has been submitted to PEMA as an unmet need. Campbell (Admitted Contentions), ff. Tr. 19,852, at 2 (as amended), Tr. 19,981,

20,085; Hippert, ff. Tr. 19,498, at 10-11; Bradshaw, Tr. 12,920; LEA Exhs. E-63 to E-66.

178. The Chester County DES is continuing efforts to obtain written agreements with the balance of bus providers located within or serving Chester County with the objective of having all potential providers under agreement. Campbell, Tr. 19,866, 20,027. There has been no indication that these commitments will not ultimately be reduced to writing. Bradshaw, Tr. 12,922.

179. At this time, Chester and Montgomery Counties are negotiating an agreement with SEPTA to provide buses in the event of an emergency. Wert, Tr. 16,608. A basic consensus between them exists as to the form of the agreement. Wert, Tr. 16,582-83. Mr. Wert further expressed his expectation that the remaining details for an agreement to provide buses will be settled. Wert, Tr. 16,612. SEPTA has a total of approximately 1500 buses and 4000 employees who are drivers or licensed to drive buses. Wert, Tr. 16,611.

180. A resolution passed by the SEPTA Board on January 23, 1985, authorizes the SEPTA General Manager to enter into an agreement with Chester County to provide buses to the extent available during any emergency or exercise related to emergency preparedness, including an emergency at Limerick. As such, it constitutes an agreement by the SEPTA Board subject to the approval of the SEPTA General Manager and General Counsel. Campbell, Tr. 20,071-72; Commonwealth Exh. E-12.

181. As Vice Chairman of SEPTA and Chairman of the Chester County Board of Commissioners, Mr. Robert J. Thompson intends to utilize his dual positions to assist Chester County and SEPTA in reaching an agreement as to the provision of buses in an emergency. Thompson, Tr. 18,843. The execution of such an agreement by SEPTA management to provide buses in an emergency would be sufficient assurance to Chester County that drivers would be available. Thompson, Tr. 18,814-15, 18,820-21, 18,824.

182. If called upon to provide buses to assist in an emergency that threatened the public safety, SEPTA has indicated that it would cooperate even in the absence of a formal written agreement. Wert, Tr. 16,608-09. Chester County and PEMA are confident that SEPTA would provide buses under those circumstances. Campbell, Tr. 19,982-83; Thompson, Tr. 18,818; Hippert, Tr. 19,590. SEPTA has stated its willingness to provide buses as they become available. Wert, Tr. 16,578.

183. The Deputy General Manager of SEPTA, Robert C. Wert, testified that SEPTA cannot commit in advance to furnish a specific number of buses that would be available at any given time, but that it is highly

improbable that SEPTA could not furnish some buses. Wert, Tr. 16,562, 16,624. At any given time, about 300 buses are out of service because of State inspection, accidents or routine maintenance. Wert, Tr. 16,625. Presumably, most of those buses could be furnished promptly upon request in an emergency. Additionally, during nonpeak daytime hours, about one-fourth to one-third of the operating buses would not be in service and would be provided as they became available. Wert, Tr. 16,577-78, 16,632-34. SEPTA expects that in an actual emergency, Chester County would request about 100 buses under the agreement. Wert, Tr. 16,584.

184. Mr. Wert also testified that although SEPTA, as a public utility under Pennsylvania law, is required to provide services along certain routes, it would defer to the judgment of elected officials at the time of an emergency that the need for buses for an evacuation was more pressing than service along their normal routes. Wert, Tr. 16,592.

185. If efforts to reach an agreement for the provision of SEPTA buses should fail, procedures are being developed by PEMA and PennDOT to implement the Governor's authority to commandeer buses, including SEPTA buses, in the event of an emergency. Hippert, ff. Tr. 19,498, at 11-12.

186. With regard to the availability of drivers, the counties intend to request SEPTA drivers only as volunteers and would not rely on any existing contractual obligations. Cunnington and Bradshaw, Tr. 17,024-25. In the opinion of the SEPTA Deputy General Manager, most SEPTA drivers would want to assist in an emergency. Wert, Tr. 16,610. While a union representative testified that only union employees could drive SEPTA buses under the collective bargaining agreement (Tauss, Tr. 16,752-53), he overlooked the authority of the Governor to commandeer those buses and man them with any available drivers. Bd. Fdgs. 185, 189. In such a situation, anyone who could drive a 2½-ton truck could drive a bus. Hippert, Tr. 19,589.

187. PEMA asserts, however, that notwithstanding the agreements Chester County has executed with transportation providers its reported unmet need for buses still stands. This constitutes an overly formalistic and unrealistic interpretation of the evidence. As clearly stated by Mr. Campbell, any unmet need reported by Chester County still exists only to the extent agreements have not been reached for that portion of the reported need. Otherwise, the reported unmet need now constitutes a request for a reserve. Campbell, ff. Tr. 19,852 (correction sheet), Tr. 19,874-75; Hippert, ff. Tr. 19,498, at 11.

188. If Chester County were to contact the providers who have not yet given written or verbal assurances, it would expect to receive buses

in response to an emergency request. Campbell, Tr. 19,982-83; Thompson, Tr. 18,818. Such companies have previously placed their buses on standby for service upon request without prior verbal or written agreements. Campbell, Tr. 19,983. In fact, in one other potential evacuation, Chester County requested buses, which were made available although they were not actually needed. Thompson, Tr. 18,832-33, 18,851.

189. Moreover, if for some unanticipated reason buses were unavailable by way of agreement, the Governor is empowered under § 7301(f)(4) of Pub. L. No. 1332 to commandeer or utilize buses or any other private property necessary to cope with an emergency. Thompson, Tr. 18,853; Hippert, ff. Tr. 19,498, at 9-11, Tr. 19,589.

190. In everyday circumstances, even absent activation of emergency networks, surrounding counties provide various forms of assistance upon request. Chester County is confident that adjacent counties would therefore provide buses in response to a request for help. Campbell, Tr. 19,983-84. Lancaster County, for example, is a risk county for both the Three Mile Island and Peach Bottom facilities. There would be no difficulty in obtaining buses from Lancaster County available under its plan. Campbell, Tr. 19,984. Buses could also be obtained from Delaware County and potentially from New Castle County, Delaware, and Cecil County, Maryland. Campbell, Tr. 19,984-85; Thompson, Tr. 18,852-53.

191. The Fetters Bus Company will not be utilized to evacuate schoolchildren. The Downingtown School District has only one school building within the EPZ, which will utilize sheltering even if an evacuation for the remainder of the EPZ is ordered. Moreover, the Fetters Bus Company is not among the assigned bus providers in the Chester County plan. Bradshaw, Tr. 12,768-69, 16,906-07; Fetters, Tr. 14,713-14.

(10) SPECIFIC SCHOOL DISTRICT NEEDS

192. A number of school district superintendents testified as to the transportation needs of their districts and the availability of resources to satisfy those needs. The evidence indicates that adequate transportation resources are available within the three risk counties to evacuate all students from the EPZ in one lift. Many school districts have sufficient resources of their own or under contract to evacuate their students. The testimony of Dr. Thomas Persing, Superintendent of the Upper Perkiomen School District, Dr. Royden Price, Superintendent of the Souderton Area School District, and Dr. Laird Warner, Superintendent of the Methacton School District indicates that their schools have no unmet transportation needs and can be evacuated in a single lift. Persing, Tr.

14,784, 14,850-51; Warner, Tr. 15,658; Price, Tr. 15,438-39, 15,441; Appl. Exh. E-55, at A3-14; Appl. Exh. E-59, at A3-1.

193. To evacuate its only school within the EPZ, the Upper Perkiomen School District would at most need only six or seven of the thirty-one buses it presently utilizes under contract with the Levy Bus Company. Mr. Levy has assured school district officials that his buses and drivers will be available if needed for an emergency evacuation. Persing, Tr. 14,784, 14,795-96, 14,799, 14,850-52; Appl. Exh. E-3, at p. I-3-13. Further, the contract between the Upper Perkiomen School District and the Levy Bus Company states without qualification or reservation that buses will be furnished upon request. Accordingly, if it were necessary to transport students in the event of an emergency at Limerick, there is no question that Levy Bus Company would supply the necessary transportation. Persing, Tr. 14,852-53.

194. Several school district superintendents indicated they have an unmet need for buses. Specifically, Dr. Ray Feich of the Pottstown School District testified that his district has an unmet transportation need of thirty-two buses and drivers as reflected in its draft plan. Feich, Tr. 14,940; Appl. Exh. E-57, at p. A-3-23. To ameliorate this problem, time permitting, it is the intention of the Pottstown School District to have an early dismissal of its students at the alert or site emergency stage of an emergency at Limerick. Feich, Tr. 14,933-34.

195. Early dismissal aside, Dr. Feich was advised by Montgomery County that almost double the number of buses and drivers needed to evacuate his district would be available in an actual emergency. Feich, Tr. 14,952-53. Dr. Feich acknowledged that there are sufficient buses and drivers available to Montgomery County to satisfy any unmet needs for buses passed on by the Pottstown School District. Feich, Tr. 14,993; Appl. Exh. E-3, at Q-1.

196. Dr. Robert D. Murray, Superintendent of the Phoenixville Area School District, testified that the unmet needs for the Phoenixville School District are accurately stated in Annex N of the Chester County plan as seventeen buses. Murray, Tr. 15,066; Appl. Exh. E-2, at N-3-1. The Phoenixville School District contracts with the Gross Bus Company for transportation for its schools. That company has sufficient resources to provide for the needs of the Phoenixville School District. Murray, Tr. 15,040-41.

197. Dr. Murray's concerns would be satisfied if he received a letter from the Gross Bus Company assuring full cooperation in the provision of buses and drivers in the event of a radiological emergency. Murray, Tr. 15,101-02, 15,155. Nonetheless, the contract between the Phoenixville School District and the Gross Bus Company already provides that

buses will be furnished upon request, including any kind of emergency. Murray, Tr. 15,102-03.

198. Dr. William A. Welliver, Superintendent of the Spring-Ford School District, indicated that the total unmet need for buses to evacuate schoolchildren from public and private schools within his district in a radiological emergency varies between thirty and thirty-three buses, depending upon enrollments. Welliver, Tr. 15,521. Discussions between Dr. Welliver and a representative of the Custer Bus Company, the only contractor of significance providing transportation for that district, indicate that the contractor would have no hesitancy in providing the necessary buses in a radiological emergency. Welliver, Tr. 15,522.

199. Dr. Roy C. Claypool, Superintendent of the Owen J. Roberts School District, stated that his district requires about fifty-five buses to evacuate its enrollment of approximately 3200 to 3400 students in a single lift. Claypool, Tr. 15,854, 15,863. Currently, forty-three buses are available to the Owen J. Roberts School District under contract with the Gross Bus Company. Claypool, Tr. 15,863. Nonetheless, the Owen J. Roberts School District has reported an unmet need of twenty-five vehicles. Claypool, Tr. 15,874; Appl. Exh. E-2, at N-3-1.

200. At least one witness testified that the reported unmet need for twenty-five vehicles by the Owen J. Roberts School District is overstated. Cunnington, Tr. 16,941. Because of plans to station buses at the main campus at the alert stage, more than forty buses would likely be available. Additionally, the first five or six drafts of that district's plan indicated an unmet need of only fifteen buses. Cunnington, Tr. 16,941-42. Because school buses within the district would be stationed at the main campus at the alert stage (Appl. Exh. E-53, at 6114.4(L)), buses would not have to travel through traffic from parents picking up children, as anticipated by Dr. Claypool. Additionally, the County Sheriff could deploy personnel to facilitate traffic control at schools within the district. Campbell, Tr. 20,036.

201. As to the transportation needs for private schools within the EPZ, LEA presented evidence only as to a single school, the Kimberton Farms School, which has approximately 260 students. The reported needs of this school, given available vehicles at the school, are correctly stated as three 72-passenger school buses in the Chester County plan. Dill, Tr. 16,324; Appl. Exh. E-2, at N-3-2. Those unmet needs will be met on the same basis as other reported needs in Chester County. Bd. Fdgs. 175-178.

(11) SCHOOL DISTRICT BUS PROVIDERS FROM OUTSIDE THE EPZ

202. The statement of unmet needs by the school superintendents discussed above is offset by the testimony of the school superintendents whose districts would be providing buses to satisfy the unmet needs of the risk school districts in the event of an emergency. For example, Dr. Bruce W. Kowalski, Superintendent of the Wissahickon School District, testified that his district had entered into an agreement with Montgomery County to provide buses and drivers to the maximum extent possible in an emergency. In doing so, the Wissahickon Board of Education acted upon an absolute commitment and unanimous consensus that the property of the school district would be made available to Montgomery County residents to transport them to safety in times of disaster. Kowalski, Tr. 16,155, 16,157-59.

203. Dr. Thomas Davis, Superintendent of Schools for the Springfield School District, and Dr. Clare G. Brown, Jr., Superintendent of Schools for the Upper Dublin School District, both testified that their districts have entered into written agreements with Montgomery County for the provision of buses and drivers to the maximum extent possible in the event of an emergency. Brown, Tr. 16,462, 16,465-66; LEA Ex. E-11; Davis, Tr. 16,644, 16,646-47; LEA Ex. E-14. Even in the absence of a formal written agreement, the Upper Dublin School District would provide transportation resources to another school district to assist in an evacuation. Brown, Tr. 16,487.

204. As with all other providers, information as to the source and number of buses and drivers which could be made available from bus providers upon request were compiled from bus provider survey forms filled out and verified by the private bus providers or transportation agent of a public school district who had direct knowledge of the number and kinds of buses available, their routes and schedules, and the number and availability of drivers (e.g., Kowalski, Tr. 16,171, 16,189-92; Appl. Ex. E-75; Pugh, Tr. 16,372; Appl. Ex. E-83; Starkey, Tr. 16,422; Appl. Ex. E-86; Brown, Tr. 16,467-68; Appl. Ex. E-87; Davis, Tr. 16,668-69, 16,676; Appl. Ex. E-90; Cunningham, Tr. 16,952-53). The Montgomery County plan accurately depicts this information (e.g., Kowalski, Tr. 16,171; Brown, Tr. 16,481; Appl. Ex. E-3, Annex I, Appendix I-2, Tab 3), except to the extent the plan understates available resources. Davis, Tr. 16,671-73; Appl. Ex. E-3, at p. I-2-13.

205. Subsequently, the Montgomery County OEP has requested the providers to review this information and make appropriate changes. Kowalski, Tr. 16,192-94; Appl. Ex. E-76; Pugh, Tr. 16,375, Appl. Ex. E-84; Starkey, Tr. 16,422, Appl. Ex. E-99. Updates will be conducted annually. Bigelow, Tr. 14,345.

206. Under the letters of understanding, the buses and drivers estimated by providers to be available in an emergency would not necessarily correspond to other information contained in the bus provider surveys. Differences between the survey information and the tentative Limerick assignments in the Montgomery County plan, Annex I, necessarily exist where there is already a contractual obligation on the part of a particular provider to transport students of a given school district, thereby committing all or part of the provider's fleet to that school district on a routine basis. Also, differences would exist given the availability of buses at different times of the day, during the week and on weekends, and other factors affecting bus and driver availability. Bigelow, Tr. 14,204-15.

207. The school districts which operate their own buses have developed a highly sophisticated system in order to coordinate their transportation needs, which include transportation of children from private and parochial schools within 10 miles of the school district boundary. Kowalski, Tr. 16,195-97. The Board believes it reasonable to expect that the transportation officers of the various school districts responsible for handling such complex and sophisticated operations would have sufficient working knowledge of their systems to determine a realistic but conservative number of buses which could be made available in the event of an emergency.

208. Even in the absence of letters of agreement, school districts would provide whatever resources they have available, including vehicles and drivers, upon request by a governmental agency. Pugh, Tr. 16,378; Appl. Exh. E-85; Brown, Tr. 16,487. School superintendents and board members are sworn to uphold the constitution of the Commonwealth and its laws, and to serve the public of the entire Commonwealth, both within and without their county. As State officers, superintendents and board members feel strongly that they should make publicly financed facilities and resources of the school district available in an emergency. Kowalski, Tr. 16,211; Pugh, Tr. 16,383-84; Starkey, Tr. 16,454; Brown, Tr. 16,486-87, 16,493; Davis, Tr. 16,680-81.

209. None of the superintendents of school districts outside the EPZ who testified expressed any doubt that his district would furnish buses and drivers upon request during an emergency at Limerick and thereby honor the commitment in its letter of understanding. Kowalski, Tr. 16,207; Davis, Tr. 16,659, 16,679.

210. In fact, a number of superintendents testified that they would consider delaying the opening or closing of schools in their district so that buses could be released to evacuate schools within the Limerick EPZ. This would be handled just like a snow delay. Kowalski, Tr.

16,200, 16,217-18; Davis, Tr. 16,663; *see also* Cunnington, Tr. 16,953-54. Inasmuch as school districts inside and outside the EPZ open and dismiss within a close range of times (Cunnington, Tr. 16,954-55), it is likely that school districts outside the EPZ would not be called upon to provide buses at times of peak need within their own districts. Schools within the EPZ would be transporting their own students at that time pursuant to normal arrangements. Cunnington, Tr. 16,956.

211. School district bus providers outside the Limerick EPZ which will be providing bus transportation for EPZ school districts routinely require bus drivers to be available as a matter of first priority to evacuate children in the case of snow or other emergency. There has never been a problem in obtaining drivers for such early dismissals, even if this involved obtaining substitute drivers. Kowalski, Tr. 16,178-79; Murray, Tr. 15,085-86, 15,103-04; Cunnington, Tr. 12,987.

212. Providers inside and outside the EPZ have far more drivers than buses/drivers committed by letter of agreement, e.g., sixty drivers in the Wissahickon School District to drive twenty buses. Kowalski, Tr. 16,208. Similar comparisons can be made from the numbers of drivers and the lesser number of buses/drivers with tentative Limerick assignments in the Montgomery County plan. Appl. Exh. E-3, Annex I, Appendix I-2, Tab 3. Additionally, the great majority of drivers employed by providers outside the EPZ themselves reside outside the EPZ. Kowalski, Tr. 16,208.

213. The estimates of buses and drivers which could be made available in an emergency to Montgomery County are additionally conservative because they are based upon a very short mobilization time, i.e., typically 1 hour or less. Appl. Exh. E-3, Annex I, Appendix I-2, Tab 3; Appl. Exhs. E-75, E-83, E-87. For example, the Wissahickon School District could make twenty buses available within half an hour, but probably could make its entire fleet of sixty buses available thereafter. Kowalski, Tr. 16,198-99. The total number of buses available to Montgomery County under optimal conditions could well exceed 1000. Bradshaw, Tr. 12,970.

214. It was on the basis that drivers would be volunteers that the school districts entered into letters of understanding with Montgomery County to provide buses to the maximum extent possible. Kowalski, Tr. 16,201-02.

215. In this regard, LEA cited correspondence from various school districts which were asked to execute letters of understanding for buses and drivers, noting the statements by various school officials that an "absolute guarantee" of drivers could not be made because drivers, as volunteers, could refuse to participate. LEA Proposed Findings 469-473.

Absolute certainty, however, is not required; only "reasonable assurance" is necessary. Based upon the historic record, the small percentage of total driver force needed to accomplish an evacuation, and the evidence of driver availability for early dismissals and other emergencies, the Board is satisfied that such reasonable assurance exists.

(12) CONCLUSION

216. The Board finds that there is sufficient information available to reasonably assure that there will be enough buses to evacuate both public and private schools in Montgomery and Chester Counties. Both counties have conservatively determined their needs and assessed the transportation resources available to meet those needs. Bd. Fdgs. 122-215. The total transportation reserve is more than adequate to handle all foreseeable needs and written agreements have been made for most of the needed reserves. Efforts are continuing in each county to obtain written agreements with all bus providers. Testimony strongly indicates that, in a Limerick emergency, bus providers will respond regardless of the status of agreements and in numbers significantly greater than required to accomplish one-lift evacuation. Bd. Fdgs. 134-146.

b. LEA-12

The draft Montgomery, Chester, and Berks County RERPs and the School District RERPs are not capable of being implemented because there is not reasonable assurance that there will be sufficient numbers of teachers and staff required to stay at school during a radiological emergency if sheltering is recommended as a protective measure, or that there will be sufficient numbers of school staff available to evacuate with children in the event of a radiological emergency. Therefore, children are not adequately protected by the draft RERPs.

217. This contention was admitted by the Licensing Board in its Special Prehearing Conference Order of April 20, 1984 (LBP-84-18, *supra*, 19 NRC at 1054) and further defined in its Memorandum and Order of September 24, 1984 (unpublished), slip op. at 7-10. The Board ruled that LEA-12 is solely about human response of school staff in a radiological emergency. Consequently, the Board rules out: parent/child behavior and family decisionmaking patterns, except as they have an influence on whether staff would suffer conflicts between their public and their private duties, and what sort of conflicts; and the issue of minimum staffing requirements to cope with the psychological trauma that children will undergo in a radiological emergency. *Id.* at 8.

(1) POSITION OF STATE AGENCIES AND FEMA

218. The position of the Pennsylvania Department of Education on LEA Contention 12 and the duties and responsibilities of public school districts and teachers was presented by Dr. Michael A. Worman, Deputy Secretary of Education of the Commonwealth. Worman, ff. Tr. 19,329, Tr. 19,330-77.

219. The principal witness for PEMA stated that the availability of teachers and school staff in the event of an accident at Limerick is a question that must be resolved at the school district level, and is one that must be confronted by school officials in planning to meet any major disaster, whether man-caused or natural. The PEMA witness criticized certain school districts which reported an alleged lack of teachers or staff as an unmet need and expect it to be filled by personnel from outside the EPZ. The time element and problems involved in relying on such an alternative would hinder or preclude a prompt and safe evacuation of the schoolchildren. Hippert, ff. Tr. 19,498, at 14.

220. School districts in the Commonwealth have authority to adopt rules and regulations setting forth teacher responsibility during the period students are in school, as well as time spent coming to and from schools. This would include therefore the authority to set rules and regulations establishing teacher responsibility during an evacuation. Worman, ff. Tr. 19,329, at 2. Such rules should be in written form and made known to the employee. *Id.* at 3.

221. FEMA expects teachers to fulfill their responsibilities in protecting their schoolchildren, regardless of the concerns expressed by the Pennsylvania State Education Association about the availability of teachers in the event of a radiological emergency. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 10. FEMA is not aware of any specific instance, either in Pennsylvania or nationwide, where significant numbers of teachers have refused to assist in the protection of their students in the event of an emergency. *Id.* at 8. Since the infrastructure currently exists for teachers to be on hand at a school if there were a radiological emergency at Limerick and there is no definitive indication that teachers within the EPZ would not remain with their students, FEMA sees no need to predesignate teacher volunteers. *Id.* at 10.

222. Any school district evacuation plan must be consistent with the plan developed by the encompassing political subdivision under Pub. L. No. 1332. Worman, ff. Tr. 19,329, at 2, 3.

(2) EFFECT OF COLLECTIVE BARGAINING AGREEMENTS

223. The provisions of a particular school district collective bargaining agreement may or may not address teacher responsibilities in an evacuation. A local district cannot, however, invoke its collective bargaining agreement to override or alter the provisions of the duly authorized RERP of the encompassing political subdivision. Worman, ff. Tr. 19,329, at 4.

224. In the event of an actual emergency, teachers would not abandon students or fail to provide proper supervision simply because they are not required to do so under their collective bargaining agreements. Murray, Tr. 15,119, 15,132. There are many situations in which teachers act as volunteers after school dismissal for particular activities which are not covered by collective bargaining agreements, including the provision of emergency transportation of students for personal or medical reasons. Murray, Tr. 15,110-11, 15,132; Greaser, Tr. 15,380-81.

225. The collective bargaining agreement for the Owen J. Roberts School District states that “[m]embers of the bargaining unit recognize that their professional responsibilities may extend beyond the delineated time period [of a 7-hour school work day].” Bollinger, Tr. 16,141.

226. There is no legal authority by which a collective bargaining agreement or local rules adopted pursuant to a collective bargaining agreement would override the provisions of an evacuation plan promulgated by a political subdivision pursuant to its obligations under Pub. L. No. 1332. Worman, Tr. 19,358.

227. A teacher’s collective bargaining agreement would not preclude him or her from volunteering to perform assigned responsibilities in the event of a radiological emergency. Worman, Tr. 19,351.

228. In Dr. Worman’s opinion, teachers could be expected to fulfill assigned responsibilities away from school buildings in a radiological emergency on the same basis as fire drills, real fire emergencies and other nonradiological emergencies. Worman, Tr. 19,361. Even though those situations might not be specifically covered by collective bargaining agreements, they would entail a response by a teacher as a professional employee. Worman, Tr. 19,363-64.

229. Dr. Worman knew of no other school district within the Commonwealth of Pennsylvania in which the terms of emergency plans for radiological accidents have been the subject of collective bargaining. Worman, Tr. 19,353. He was also unaware of any ruling by the Pennsylvania Labor Relations Board or any advisory opinion by the Pennsylvania Attorney General or any other Commonwealth officer which has determined that a failure to negotiate the terms of radiological

emergency response plans is a violation of the Pennsylvania Labor Relations Act. Worman, Tr. 19,356.

(3) TEACHER/STAFF RESPONSIBILITIES AND ACTIONS

230. During a radiological emergency, school teachers and staff in both public and nonpublic schools in Pennsylvania have a professional responsibility to provide for the safety of students being transported to or from school. This would include safe conduct to and from a host facility. Worman, Tr. 19,531. While a survey of staff would be helpful regarding their availability and willingness to perform this function, it is not necessary. Worman, Tr. 19,336-37. Teacher surveys have been undertaken at several school districts in the Limerick plume EPZ. *See, e.g.*, Claypool, Tr. 15,882-84; Welliver, Tr. 15,525. School districts have also been encouraged to identify teacher volunteers as part of the planning process. Campbell, ff. Tr. 19,852 (admitted), at 4.

231. The same professional responsibility to provide for the safety of students applies in the event sheltering is directed. Worman, Tr. 19,340, 19,374.

232. While a number of superintendents expressed the concerns of their teachers and staff regarding the welfare of their own families in the event of a radiological emergency (*see, e.g.*, Murray, Tr. 15,089; Claypool, Tr. 15,894, 15,950), the Board believes that those concerns are being addressed and will continue to be addressed in the planning process. A teacher's child who attends school outside the EPZ would not be sent back into the EPZ at the time of an emergency. Persing, Tr. 14,839-45; Appl. Exh. E-61, § V.B.3.c, at 18. The planning arrangements in operation under that particular school district plan would adequately protect the safety and welfare of children who attend other schools within the EPZ. Welliver, Tr. 15,569.

233. Under Annex E, any protective action would be implemented for the entire 10-mile EPZ. If sheltering were implemented, it would impact all areas within the EPZ, including schools. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 11; Bradshaw, Tr. 16,927. It would therefore be impractical and possibly hazardous for teachers at schools within the EPZ to leave their assigned responsibilities to pick up their own children because other schools within the EPZ will be implementing the same protective action recommendations. The Board believes that if sheltering were recommended, it is reasonable to expect that the teachers would remain in their school and would not endanger their own children by taking them out of school.

234. If evacuation were ordered, a teacher's own children might be evacuated to a host facility by the time the teacher arrived. Bradshaw, Tr. 16,927. Although some schools have reluctantly drafted pickup procedures (Bradshaw and Cunnington, Tr. 17,000-02), standard PEMA policy, as reflected in the school district and private school plans, discourages parents from attempting to pick up their children at school in the event of a radiological emergency. Bradshaw, Tr. 16,927-28.

235. Not all teachers would have family concerns. Many do not live within the EPZ, are unmarried, or have a spouse or other member of the extended family who could take custody of their children in an emergency. Cunnington, Tr. 13,728. Evidence as to the number of married teachers, teachers with families, and, in particular, single-parent teachers who reside within the EPZ, was extremely sketchy (e.g., Welliver, Tr. 15,569-70; Warner, Tr. 15,646-47). The legitimate concerns of single-parent teachers and staff for the welfare of their children can be met by providing in the school district plans that they be dismissed at an early stage of emergency. Feich, Tr. 14,967.

236. In many districts, the issue of teacher availability has never even been raised with the superintendent (e.g., Persing, Tr. 14,857). The expected conduct of school personnel as reasonable adults, certified by the Commonwealth for the instruction of children reasonably assures that such personnel will remain with the children during an emergency. Bradshaw, ff. Tr. 12,764, at 12-13. The education and certification process for teachers, which includes demonstration of maturity in dealing with students, would include a demonstration of the teacher's ability to deal with unusual or stressful situations. Greaser, Tr. 15,381.

237. At the time of the Three Mile Island accident and ensuing events, teachers reported to school and performed their assigned responsibilities. Worman, Tr. 19,354. Dr. Worman would expect other teaching professionals to act similarly in the event of an emergency. Worman, Tr. 19,356.

238. The history of emergency response shows a willingness by individuals to perform their duties. Individuals who have a clear understanding of their roles in an emergency plan do not abandon their roles in an emergency. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 7-8. Thus, teachers are expected to perform their assigned roles in a radiological emergency. Campbell, Tr. 19,986-87; *see generally* Worman, Tr. 19,327, *et seq.* Training and information are important to ensure this cooperation. Campbell, Tr. 19,986-87.

239. Referring to their experience in school emergency planning at other nuclear plant sites, the panel of witnesses from Applicant's consultant have not encountered a single school district whose representative

stated that the district could not implement its radiological emergency response plan because of staffing considerations. Bradshaw, Tr. 13,102-03.

240. During the evacuation of the junior and senior high schools in the Daniel Boone School District due to a hazardous material accident, there was every indication that administrative, faculty and staff personnel cooperated in effectuating the evacuation. Cunnington, Tr. 13,053-54. School supervisors agree that people with responsibilities in an emergency situation do whatever is necessary to fulfill those responsibilities, including remaining with children past normal working hours. Feich, Tr. 14,978-79; Welliver, Tr. 15,539.

241. The history of emergency response shows a willingness by individuals to perform their duties. In fact, in many instances, more people than just those predesignated as emergency workers volunteer their services. Individuals who have a clear understanding of their roles in an emergency plan do not abandon those roles in time of an emergency. The same historical record of individual and group behavior in a disaster demonstrates that community goals prevail over individual goals, and that community goals are balanced with family goals. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 7; Bradshaw, Tr. 13,070, 13,078.

242. There is no reason to believe that teachers, as reasonable adults certified by the Commonwealth for the instruction of schoolchildren, would act differently or that human response in a radiological emergency would be any different. Price, Tr. 15,443; Kinard, Tr. 20,295-96; Bradshaw, Tr. 13,070, 13,095. Other than concerns raised by the representative of a teacher's bargaining group, which FEMA did not regard as substantial, there is no evidence as to any specific instance, either in Pennsylvania or nationwide, where teachers have refused to assist in the protection of their students in the event of an emergency. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 8, 10.

243. Several witnesses testified that there is no need to conduct a survey of teachers regarding the performance of assigned roles in an emergency. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 12; Bradshaw, ff. Tr. 12,764, at 13, Tr. 13,071-72, 13,738; Campbell, Tr. 20,048. Neither the Commission's emergency planning regulations nor the emergency planning guidance require that such surveying be conducted. See 10 C.F.R. § 50.47; Appendix E, 10 C.F.R. Part 50; 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; Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 12. Any survey at one point in time as to the unwillingness or unavailability of a particular indi-

vidual to participate when an emergency plan is implemented in the future has obvious drawbacks because of the realities of disaster response. The historical record of human response in emergency is such that more than adequate numbers of individuals volunteer to perform the necessary duties. In many instances, a major problem is to deal with the excess of volunteers. Bradshaw, Tr. 13,738; Cunnington, Tr. 13,074-75, 13,102. As Dr. Welliver testified, such surveys are essentially uninterpretable. Welliver, Tr. 15,576-77.

244. Two school districts in Berks County have students who attend school in the plume EPZ. Dr. Mainello, Superintendent of the Daniel Boone School District made a personal survey of his teachers and staff and has assured Berks County that he will have more than adequate coverage of students at the Amity Elementary School, the only school in the district within the EPZ. Reber, ff. Tr. 19,729 (admitted), at 1-2; Reber, Tr. 19,730. Mr. Reber expressed confidence in Dr. Mainello's representation, based on the two men's close working relationship. Reber, Tr. 19,733.

(4) TEACHER/STUDENT RATIOS

245. In the event of a radiological emergency at Limerick, if either sheltering or evacuation of schoolchildren becomes necessary, classes could be combined and normal student/teacher ratios reduced. Hippert, ff. Tr. 19,498, at 2; Reber, ff. Tr. 19,729 (admitted), at 2.

246. Based on discussions with school administrators, who have reviewed the functions that would need to be performed for either sheltering or evacuation; it was found that the school district plans can be implemented with less than all school administrators, teachers and other adult staff (collectively "teachers"). For example, an appropriate ratio might be the equivalent of study hall or field trip supervision. There would be no difference in the appropriate teacher/student ratio for evacuation or sheltering scenarios. Therefore, school plans adequately account for human response and other factors which may unexpectedly reduce usual teacher/student ratios. Bradshaw, ff. Tr. 12,764, at 13-14; Bradshaw and Cunnington, Tr. 13,635-36.

247. Dr. Worman of the Pennsylvania Department of Education testified that a teacher/student ratio of 1:50 would be appropriate for supervision of schoolchildren in an emergency. Worman, Tr. 19,353.

248. School superintendents in the EPZ generally testified that teacher/student ratios in an emergency could be significantly higher than for classroom instruction. This opinion was based, for example, upon their personal observation of school dismissals in inclement weather, during

fire drills and evacuations during bomb scares, the procedures for which are similar to those that would be utilized in responding to a radiological emergency. Warner, Tr. 15,689-91.

249. Various school superintendents stated that schools would have an appropriate teacher/student ratio during an emergency. For example, the Pottstown School District would have a teacher/student ratio of 1:40 even if less than one-third of its staff responded to the emergency. Feich, Tr. 14,958-60, 15,000. Basing its calculations solely on the number of teachers who live outside the EPZ or do not have children, the Phoenixville School District determined it could achieve a teacher/student ratio of 1:45. Murray, Tr. 15,118-19.

250. Similarly, the Superintendent of the Methacton School District stated that any unmet needs regarding the supervision of students in his district were not critical inasmuch as, even based upon staff survey results, a 1:46 teacher/student ratio exists, which he stated was more than adequate to safely supervise students in a radiological emergency. Teachers assigned study halls or cafeteria duty often supervise even more students. Warner, Tr. 15,688-89.

251. Dr. Roy Claypool, superintendent of the Owen J. Roberts School District, contended that his district had an unmet need for teachers to supervise in an emergency. Dr. Claypool stated that 156 teachers would be needed to supervise the current enrollment of about 3300 students in the event of a radiological emergency, i.e., a 1:20 ratio. This would leave his district approximately ninety-one staff short based on a teacher survey which he interpreted to show that approximately sixty to sixty-five staff would be willing to perform their assigned duties in a radiological emergency. Claypool, Tr. 15,882-84, 15,935.

252. Dr. Claypool was unaware of any other school district superintendent which agreed that such a low ratio of teachers to students would be necessary in an emergency. Claypool, Tr. 15,935. Other than a Board of Education policy setting a 1:35 ratio for field trips under normal conditions and smaller ratios for dangerous situations like going to factories, he was unable to state any special consideration for the Owen J. Roberts School District which would require a lower ratio of teachers to students than that which would be satisfactory for other school districts. Claypool, Tr. 15,883, 15,936. More important, Dr. Claypool subsequently acknowledged that a teacher/student ratio of 1:35 would be adequate. Claypool, Tr. 15,937. Ninety-four teachers would be sufficient to achieve a 1:35 teacher/student ratio, based on the current enrollment of about 3300 students. Claypool, Tr. 15,935. Even given Dr. Claypool's minimum estimate of sixty to sixty-five available staff members, a teacher/student ratio in the range of 1:50 to 1:55 would exist.

(5) TRAINING

253. A comprehensive training program for school administrators, teachers and bus drivers has been offered to all public and private school personnel within the EPZ. Hippert, ff. Tr. 19,498, at 22; Bigelow, Tr. 14,132; Campbell, ff. Tr. 19,729, at 3. With one exception discussed below, no school district has indicated that its staff would be unwilling or unable to accompany students and remain with them in the event of an evacuation for personal or other reasons. Bradshaw, ff. Tr. 12,764, at 12.

254. At all training sessions, instructors have advised persons involved in emergency response activities that they should discuss family arrangements during an emergency. Members of families of school personnel remaining on duty during a radiological emergency are members of the general public and are evacuated on that basis. Arrangements for evacuation of the general public under the various plans provide reasonable assurance to school personnel that family members will be protected in the event of a radiological emergency. Welliver, Tr. 15,575; Bradshaw, ff. Tr. 12,764, at 12; Bradshaw, Tr. 13,059-62, 13,103-05, 13,727.

255. Because of their training, most persons participating in an emergency response develop procedures to assure the safety of their families during emergency conditions. This preplanning should allow individuals to fulfill their emergency duties with assurance that their families will be adequately protected. Accordingly, FEMA expects teachers to fulfill their responsibilities in protecting schoolchildren, irrespective of family concerns. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 9. That view is shared by Dr. Michael A. Worman, Deputy Secretary for Administration, Pennsylvania Department of Education, who testified as to his professional opinion as well as his personal experience during the Three Mile Island accident in 1979. Worman, Tr. 19,354. Dr. William A. Welliver, superintendent of the Spring-Ford Area School District (Welliver, Tr. 15,493), stated that teachers would be available and of service to students during any kind of emergency. Welliver, Tr. 15,576. Other superintendents agreed, based on a knowledge of their faculties and past experiences. Feich, Tr. 14,978; Price, Tr. 15,422-23, 15,443.

256. The overview at training sessions covers planning considerations for the public at large, including the existence and scope of municipal and county plans. Bradshaw, Tr. 13,104. In addition, the training sessions described the procedures for sheltering, evacuation and selective evacuation, and their impact on the general public and schools. Cunningham, Tr. 13,104. Furthermore, teachers were generally advised that they

should discuss family arrangements with their families to determine what would happen during a radiological emergency. Bradshaw, Tr. 13,058-60; Wenger, Tr. 13,103-04. Training sessions will be supplemented by a public information brochure that is being reviewed by county and Commonwealth planning officials. Bradshaw and Wenger, Tr. 13,104-05; Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 9. This brochure will include such information as: (1) how individuals will learn of a nuclear accident; (2) what to do if you are instructed either to take shelter or to evacuate; (3) what you should do if you need transportation; (4) school information; (5) where to go if you have to evacuate, including a map showing the major evacuation routes; (6) rumor control numbers; and (7) other general information, such as how accidents are classified and what is radiation. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 9-10. Moreover, as FEMA has stated, this information is important to all members of the public, including teachers, so that they may be clearly informed concerning the procedures to be utilized during a radiological emergency. *Id.* at 10. The Board considers the dissemination of this information to be an important ingredient in the proper implementation of emergency planning within the Limerick EPZ. It is our understanding that this information was expected to be disseminated to the public in December 1984. Bradshaw, Tr. 13,104-05. FEMA should ensure that this dissemination does take place. This information will provide teachers with assurance that they and their families, as part of the general public, will be cared for in an emergency. The historical record indicates that the knowledge of such plans and procedures provides personnel with a sense of security which will enable them to better perform their responsibilities in the event of an actual emergency. Bradshaw, Tr. 13,061-62; Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 7.

(6) OWEN J. ROBERTS SCHOOL DISTRICT

257. Contrary to LEA's assertion (LEA Proposed Finding 395), Applicant's consultant panel did not testify that the willingness of teachers to perform their duties in a radiological emergency is dependent upon the adequacy of the corresponding municipal plan. Rather, it was stated that those who participate in an emergency have greater confidence in the performance of their tasks when they are properly trained and informed as to the contents of the plan they are implementing. Bradshaw, ff. Tr. 12,764, at 11-12, Tr. 13,061-62.

258. An unmet need for supervisory adults has been passed to Chester County by the Owen J. Roberts School District. Chester County and

the Commonwealth are working to meet this need, with some reservations as explained below. Hippert, Tr. 19,605; Campbell, Tr. 20,034-36; Bradshaw, ff. Tr. 12,764, at 13.

259. The principal PEMA witness stated that it is not feasible to expect an unmet need for supervisory personnel to be filled by persons from outside the EPZ. The time element and problems involved in mobilizing persons at least 10-15 miles away would hinder, and in all likelihood preclude, a prompt and safe evacuation of the schoolchildren. Not even the National Guard could be mobilized that quickly. Hippert, ff. Tr. 19,498, at 14; Tr. 19,556-57; 19,605-07. *See also* Campbell, Tr. 19,986.

260. PEMA and Chester County representatives have discussed the Owen J. Roberts unmet staff need with Dr. Claypool, the district superintendent. They advised Dr. Claypool that he should seek additional resources in his district. Hippert, Tr. 19,605-07; Campbell, Tr. 19,986. Dr. Claypool recently notified Chester County, however, that his school district still has an unmet need for supervisory adults. Campbell, Tr. 19,886, 20,036.

261. The Owen J. Roberts (OJR) Citizen's Task Force for School Emergency Planning for the Owen J. Roberts School District surveyed the OJR teachers at least twice as to their willingness to participate as volunteers in the event of a Limerick emergency. Dr. Claypool did not take part in administering the survey but did provide a summary of the second survey in a May 1, 1984 letter to the Chester County Department of Emergency Services. LEA Ex. E-29, at 3.

262. In the second survey, an effort was made to obtain responses from the entire faculty of 208 teachers, but only 137 teachers (66%) responded. Dr. Claypool did not know if an effort had been made to obtain responses from the seventy-one teachers (34%) who did not respond. Claypool, Tr. 15,932, 15,944; LEA Ex. E-29, at 3. Moreover, the survey instructions indicated that signing the answer was optional, but Dr. Claypool inexplicably discounted unsigned answers, representing 40% of the 137 total responses, or about fifty-five teachers. Claypool, Tr. 15,932-33; LEA Ex. E-29, at 3; Appl. Exh. E-105. Accordingly, only about 82 of the 208 district faculty members were actually surveyed (137 responses minus 55 discounted). LEA Ex. E-29, at 3. Based upon his conservative interpretation of the second survey, Dr. Claypool estimated that sixty to sixty-five teachers would be available to accompany and attend to students at host centers. LEA Ex. E-29, at 3.

263. The survey results are also ambiguous because of the survey's format, which asked teachers to check off a "yes" or "no" box expressing a willingness to accept two emergency assignments related to a stu-

dent evacuation. Appl. Exh. E-105. The survey could therefore reasonably be interpreted, as did the president of the local Teachers Association, to provide a choice between possible assignments during an emergency. Claypool, Tr. 15,933-35; Bollinger, Tr. 16,123-24. Inasmuch as the total of ninety-four positive responses (thirty-eight willing to accompany students by bus in an evacuation and fifty-six willing to otherwise supervise students at a host facility) (LEA Exh. E-29, at 3) exceeds the number of survey forms considered (eighty-two), the Board assumes that some teachers did check more than one answer. Since Dr. Claypool provided no breakdown or further explanation, for all the Board knows, all of the eighty-two teachers whose responses were considered agreed to accept an assignment of responsibilities in a radiological emergency.

264. The teacher survey at the Owen J. Roberts School District was also flawed because a prior survey (Appl. Exh. E-106) had been actively opposed by the local teachers' union. This opposition might well have affected responses in the second survey upon which the school district relied in determining unmet staff needs. Claypool, Tr. 15,944-45. Finally, the teacher survey did not advise teachers that their performance of assigned responsibilities in the event of a radiological emergency was an important element to the successful implementation of the school district plan, nor did it reflect a school district policy encouraging participation. Appl. Exh. 105; Claypool, Tr. 15,931.

265. Despite the alleged teacher shortage, officials of the Owen J. Roberts School District would do everything humanly possible to get teachers and staff to volunteer and to work towards an agreement or understanding with the teachers' union toward that end. Claypool, Tr. 15,955. Even though a teacher/student ratio of about 1 to 50 or 55 would exist using only those teachers who stated they would be willing to remain, the number of staff identified in the Owen J. Roberts survey as unwilling to remain with students in the event of a radiological emergency has been passed on to Chester County as an unmet need. Bradshaw and Cunnington, ff. Tr. 12,764, at 13-14.

266. Chester County continues its efforts to identify resources which might meet the Owen J. Roberts unmet staff need. It may be possible on a limited scale to recruit county employees such as child or youth services workers who have appropriate background in dealing with children. Campbell, Tr. 20,034-35.

267. School district RERPs provide that risk school teachers accompany children to the host school and remain with them until they are picked up by parents or other authorized individuals. Hippert, ff. Tr. 19,498, at 14-15.

268. As a matter of policy PEMA believes risk school teachers should turn children over to host school staff upon arrival at the host facility. This permits the risk teachers to be released to care for or rejoin their own families, who may also be involved in an evacuation. Hippert, ff. Tr. 19,498, at 15; Tr. 19,558. An agreement between host and risk school districts to implement this procedure might assist a risk school district to ensure more of its teachers would be available, specifically during an evacuation, to supervise children. Hippert, ff. Tr. 19,498, at 15. PEMA has advised the Owen J. Roberts and Phoenixville superintendents that this alternative is available to them in their planning. Hippert, Tr. 19,560.

(7) EVACUATION OF STUDENTS TO HOST FACILITIES AND TRANSFER TO MASS CARE CENTERS

269. As a matter of policy, PEMA now states that host school teachers should assume supervision of evacuated students to permit the risk school teachers to leave. However, if risk school districts prefer to arrange for their own teachers to remain with evacuated students, that is their prerogative. Hippert, Tr. 19,558.

270. In the event of an actual emergency, students transported to a host facility would be transferred to a mass care center by 8:00 p.m. if not already picked up by their parents. Cunningham, Tr. 13,107. Assuming schools dismiss at about 3:00 p.m., the evacuation of schoolchildren to a host facility would occur at least 5 hours prior to the transfer of schoolchildren to a mass care center. Since that time is consistent with the time frame for an evacuation of the entire EPZ, only a very few students, if any, would have to be transferred to a mass care center and they could probably be supervised by a school administrator. Bradshaw, ff. Tr. 12,764, at 24, Tr. 13,109; Cunningham, Tr. 13,645-47. The information relevant to this procedure is contained in the School District Plans and in the Bus Driver Training Lesson Plan. Bradshaw, ff. Tr. 12,764, at 24; *see, e.g.*, Appl. Exh. 54, at 20; Appl. Exh. E-57, at 17; Appl. Exh. E-58, at 21; Appl. Exh. E-64, at 32.

271. In any event, a number of faculty and staff members have indicated their willingness to evacuate with students and remain with them at host schools beyond ordinary dismissal times. Feich, Tr. 14,979. There is no evidence that this particular responsibility creates any problem for risk school teachers.

272. Contrary to LEA's assertion that some uncertainty in host school arrangements exists (LEA Proposed Finding 381), the host school agreements between risk and host school districts clearly provide

that risk school staff will remain with students until they are picked up by their parents (e.g., Appl. Exh. E-58, at 3, and item 3d at 11). Only three host school agreements are yet to be obtained. Bradshaw, Tr. 17,243-44.

273. The school district RERPs provide for risk teachers to remain with children. While PEMA does not prefer this procedure, it is permissible if acceptable to and desired by the school districts. Hippert, ff. Tr. 19,498, at 15, Tr. 19,558.

274. Public school districts are generally obligated under Pennsylvania law to provide transportation to students who live within the district but attend private schools. Worman, Tr. 19,342. Several school districts in Montgomery and Chester Counties have asked the counties to assume primary responsibility for coordination of transportation for public schools in a Limerick emergency. See, e.g., Murray, Tr. 15,039, 15,073-74; Bigelow, Tr. 14,346, 14,347, 14,349-50. The counties are planning to meet these requests. See generally Bigelow, Tr. 14,346-50; Chester County/Commonwealth Exh. E-1, Annex N.

275. With respect to teacher participation at private schools, LEA presented the testimony of only one private school representative, Andrew Dill, faculty chairman of the Kimberton Farms School. Dill, ff. Tr. 16,356, at 3. While he expressed concern regarding the availability of teachers who drive the family's only car, there was no evidence that this is a pervasive problem. Dill, Tr. 16,327-28. Moreover, it does not appear to the Board that this is in any way a problem unique to this institution. Like other transportation-dependent persons, those teachers could request publicly available transportation from Chester County to evacuate their families or make prior arrangements for transportation by obtaining rides from friends, neighbors and relatives. Dill, Tr. 16,328-30; Bd. Fdgs. 254, 255.

276. Further, none of the twenty-eight teachers at the Kimberton Farms School has stated that he or she would not perform assigned functions at the school in the event of a radiological emergency. Dill, Tr. 16,331. In the Board's view, the dozen or so faculty members whose children attend that school are especially likely to be available in an actual emergency. Dill, Tr. 16,333. The Board believes that any other concerns expressed by Mr. Dill will be resolved as the school focuses more sharply upon the specific details of its plan. Appl. Exh. E-82.

277. The November 20, 1984 supplemental exercise was intended to demonstrate school district emergency response capability. The school participation in the exercise did not materialize to the amount anticipated, so FEMA did not observe the districts' response. FEMA has asked the Commonwealth to arrange an acceptable demonstration of school

district evacuation capability. The Commonwealth is working toward that end. Asher and Kinard, ff. Tr. 20,150 (Update), at 1; FEMA Exh. E-8; Taylor, Tr. 20,164.

(8) SHELTERING

278. Margaret A. Reilly, Chief, Division of Environmental Radiation, Bureau of Radiation Protection, Pennsylvania Department of Environmental Resources, testified that under Annex E, an appropriate structure for sheltering may be a residential, commercial or public building, i.e., any building which is reasonably winter-worthy with windows and doors closed. Reilly, ff. Tr. 19,381, at 3; Hippert, ff. Tr. 19,498, at 15; Bradshaw, ff. Tr. 12,764, at 14-15; Commonwealth Exh. E-1, Appendix 12, § 10.2.2.2, at p. E-12-49. The absence of a basement does not necessarily render a building inadequate for sheltering. Reilly, Tr. 19,386. Representatives of Energy Consultants have visited a number of school buildings within the Limerick EPZ and have found them all to be winter-worthy. Cunningham, Tr. 16,913.

279. There is no provision in 10 C.F.R. § 50.47, 10 C.F.R. Part 50, Appendix E, NUREG-0654 or Annex E which requires an individualized evaluation of buildings to determine their adequacy for sheltering, nor has the Commonwealth undertaken any such evaluation for any other nuclear plant sites in Pennsylvania. Reilly, Tr. 19,397-98; Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 11; Bradshaw, ff. Tr. 12,764, at 14; Cunningham, Tr. 16,913. If the Bureau of Radiation Protection were to undertake such evaluations, its ability to make protective action recommendations would not be enhanced because the individual protective value of a building has no bearing on the decision to shelter or evacuate. Protective action recommendations are based upon the dose projection for the entire populace rather than the occupants of any particular building. Evaluation of the protection afforded by structures within the EPZ will not make those buildings more suitable for sheltering or affect the choice of a sheltering option. Reilly, Tr. 19,398-99; Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 11; Bradshaw, ff. Tr. 12,764, at 15, Tr. 13,254. Protective action recommendations are based on the prognosis for the accident, time constraints and existing conditions. Reilly, Tr. 19,382; Bradshaw, ff. Tr. 12,764, at 15; Commonwealth Exh. E-1, Appendix 12, § 10.2.2.2, at p. E-12-49.

280. Sheltering as a protective action has the primary purpose of protecting an individual against the inhalation pathway rather than radiation shine. Inhalation pathway protection is measured in terms of the air exchange rate between the area outside and the area inside a building.

Therefore, the air exchange rate is a factor of the airtightness of a building, not its construction material. Bradshaw, Tr. 13,261; Reilly, ff. Tr. 19,381, at 2; Commonwealth Exh. E-1, Appendix 12, at p. E-12-49. This understanding is consistent with Commonwealth guidance as well as protective action guidelines published by the Environmental Protection Agency for sheltering, neither of which refers to the protection factor of buildings as a consideration in recommending sheltering. Bradshaw, Tr. 13,264.

281. Contrary to LEA's assertion, the radioactive plume would not be "inside" any building used for sheltering within a 2-hour period. LEA Proposed Finding 643. Rather, based upon air exchange rates, the representative of the Division of Environmental Radiation, Bureau of Radiation, Pennsylvania Department of Environmental Resources, stated that the inhalation pathway inside and outside the building would be essentially equivalent after 2 hours. Reilly, Tr. 19,396.

282. In training school staff, instructors explain the circumstances under which sheltering would be the preferred protective action and provide instruction as to the procedures for implementing this option. Accordingly, school staff have the necessary information to be assured that sheltering, if implemented, provides the greatest level of protection for staff and students under the circumstances. Bradshaw, ff. Tr. 12,764, at 15-16; Bd. Fdgs. 324, 328.

283. School district plans provide that students should be moved away from windows as part of the general direction to provide sheltering in those areas of the building which afford the greatest degree of comfort for students. Cunnington, Tr. 16,913; *see, e.g.*, Appl. Exh. E-57, at 21, and Appl. Exh. E-58, at 21. In very warm weather, a classroom without shades could become quite hot if windows were closed and ventilation/air conditioning were turned off. This might prompt officials to shelter students on the shady side of the building, using a hallway, gymnasium or auditorium to increase comfort. Cunnington, Tr. 16,913-14. Sheltering in hallways or away from windows is absolutely unrelated to any radiological concern; students could be sheltered in any area of the building which is winter-worthy. Cunnington, Tr. 16,914-15.

284. Contrary to an apparent assumption by some school officials, there is no reason why students would have to be sheltered together; they could be broken up into any number of groups, including their normal classroom assignments. Bradshaw and Cunnington, Tr. 16,915.

285. Some school district superintendents have apparently confused emergency planning concepts related to civil defense with those for fixed nuclear power plants. They wrongly believe that radiological considerations require sheltering in a basement away from areas with win-

dows and exits and entrances. Persing, Tr. 14,809, 14,864; Feich, Tr. 14,934-35, 14,995-96, 15,003-06; Murray, Tr. 15,122. At least one instance of such misapprehension arose from misinformation provided by LEA's counsel. Persing, Tr. 14,864-65. The Board believes that further coordination between school administrators and county or PEMA officials will clear up such a misunderstanding.

(9) EXERCISES

286. The Commission's emergency planning requirements (10 C.F.R. § 50.47(b)(14) and guidance (NUREG-0654 at 71) call for periodic exercises to evaluate emergency response capabilities and for drills to develop and maintain emergency response skills. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 12. NUREG-0654, which implements the Commission's emergency planning requirements, provides that some exercises should be unannounced. NUREG-0654 (November 1980) at 71. However, it is not essential that all exercises be unannounced. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 12. FEMA believes that drills and exercises are always a good mechanism for testing the viability of plans. *Id.* Because of its concern over the lack of complete planning for schoolchildren and the fact that the July 25, 1984 exercise took place during the summer, FEMA highlighted the need for some type of demonstration of school district evacuation plans. *Id.* at 12; FEMA Exh. E-4, at 136. Toward that end FEMA arranged to have a drill conducted on November 20, 1984. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 12. Several days before the supplemental exercise was held on November 20, 1984, FEMA was informed that the participation of school districts would not be on a scale that was originally anticipated. *Id.* at 1. FEMA was informed that certain school officials would be available to discuss their plans. Thus FEMA decided not to send observers to the various participating school districts. *Id.* As a result, FEMA continues to list the lack of a meaningful demonstration of the various school districts' capabilities to evacuate their students as a Category A deficiency. FEMA Exh. E-8; Asher, Tr. 20,259-60. A Category A deficiency is of the type that would cause a finding that offsite emergency preparedness was not adequate to provide reasonable assurance that appropriate protective measures can be taken to protect the health and safety of the public. FEMA Exh. E-4, at 134. The FEMA witness, Mr. Asher, testified that it would be desirable in his professional opinion that the meaningful demonstration of school districts capabilities to evacuate their students involve the actual

involvement of students in the exercise. Asher, Tr. 20,291. This involvement could be limited to either a class or a few students. *Id.* Based on conversations with PEMA, FEMA has been informed that, while no date has been established, PEMA is working on the feasibility of conducting a drill to demonstrate the capabilities of the school districts within the EPZ to evacuate their students. Taylor, Tr. 19,614; Asher, Tr. 20,260-61. The Commission's emergency planning requirements expressly exclude mandatory public participation in conducting emergency planning exercises (10 C.F.R. Part 50, Appendix E, § IV.F). While the Board declines to require a demonstration involving actual evacuation of students, the Board believes that, given the importance that FEMA attaches to the matter, some form of capability demonstration should be conducted. Recent correspondence received by the Board indicates that testing of the evacuation plans for the school districts was scheduled for April 10, 1985. (Letter to Board from D.F. Hassel, dated 4-16-85 and transmitting memoranda between FEMA and NRC concerning FEMA interim findings on offsite radiological emergency preparedness.)

(10) CONCLUSION

287. Based on the evidence developed for this contention, the Board finds that the human response assumptions underlying these plans, i.e., that in an emergency individuals show a willingness to perform their duties and do not abandon their roles when they have a clear understanding of those roles, as demonstrated by the history of response to an emergency, are reasonable absent substantial evidence to the contrary. Bd. Fdgs. 237-242; also cf. *Consolidated Edison Co. of New York* (Indian Point, Unit No. 2), LBP-83-68, 18 NRC 811, 958 (1983) and *Cincinnati Gas & Electric Co.* (Wm. H. Zimmer Nuclear Power Station, Unit No. 1), ALAB-727, 17 NRC 760, 772-73 (1983). LEA contended that teachers torn between the needs of their families and their emergency duties would leave the school and tend to their personal problems. No evidence was presented that teachers would abandon their students to take care of their own families. Bd. Fdg. 221. Experience with teachers at TMI bears this out. Bd. Fdgs. 237, 255. Training programs available to teachers and staff should provide the necessary knowledge and confidence in the overall emergency plan that teachers will know their children are being cared for by the system of which they are a part. These training programs also stressed the identification and resolution of personal family needs by preplanned arrangements. Bd. Fdgs. 253-256. Conflicts not capable of easy resolution by such preplanned arrangements can easily be accom-

modated by schools. Even with significant numbers of teachers and staff not available to participate in an emergency, it is the Board's view that adequate supervisory staff will be available. A case on point is the Owen J. Roberts School District, where an admittedly conservative (Murphy's Law invoked) estimate showed that about 60 to 65 of the 208 teachers could be counted on to participate in a Limerick emergency. Bd. Fdgs. 251, 261-262. Even with this low estimate (based upon the Board's review of the survey upon which the estimate was based, it would not be unreasonable to more than double that estimate) the student/teacher ratio was in the range of 50-55 to 1. Bd. Fdgs. 263-265. The Board believes that such a ratio of students to teacher is workable in an emergency and would be satisfactory for both the sheltering option and evacuation providing at least one faculty member per bus. Bd. Fdgs. 244, 246-250, 252. The Board does not believe collective bargaining agreements are or will be a factor in teacher/staff participation in emergency response. Bd. Fdgs. 223-229. Considering all the evidence presented on this contention, the Board finds there is reasonable assurance that there will be sufficient numbers of teachers and staff to implement the protective action of either sheltering or evacuating schoolchildren within the EPZ. While the Board declines to require a demonstration involving actual evacuation of students, the Board believes that some form of capability demonstration should be conducted. Bd. Fdg. 286.

c. *LEA-14(a)*

The School District RERPs and the Chester, Berks, and Montgomery County RERPs are deficient because there are inadequate provisions of units of dosimetry-KI for school bus drivers, teachers, or school staff who may be required to remain in the EPZ for prolonged periods of time or who may be required to make multiple trips into the EPZ in the event of a radiological emergency due to shortages of equipment and personnel.

288. LEA-14 was one of the contentions originally admitted for litigation in our April 20, 1984 Special Prehearing Conference Order (LBP-84-18, *supra*). The Board therein construed LEA-14 as asking that the RERPs treat school bus drivers and school personnel as members of the general public who may, in certain circumstances, be designated as emergency workers and provided for, in terms of training programs and dosimetry (19 NRC at 1061). By our September 24, 1984 Memorandum and Order, slip op. at 14, this Board accepted for litigation all the bases proffered by LEA for the respecified Contention LEA-14(a) which included allegations of: (1) inadequate provision in the school district and county RERPs of units of dosimetry for bus drivers when they are

not scheduled to pass through a transportation staging area; (2) inadequate provision of a sufficient number of units of dosimetry at the County transportation staging areas; (3) inadequate provision of units of dosimetry to each school district for use by school staff; and (4) inadequate training of school staff in the use of dosimetry in the event that sheltering is recommended.

(1) ONE-LIFT EVACUATION PRINCIPLE

289. Having identified the necessary transportation resources, the basic concept of the risk county and school district plans is that school evacuation and evacuation of transportation-dependent individuals will be accomplished in a single lift. Accordingly, it is not anticipated that any school bus driver, teacher or school staff member would remain within or reenter the EPZ in the event of an emergency. Hippert/Taylor, ff. Tr. 19,498, at 13; Bigelow, Tr. 14,137-38, 14,360; Reber (Admitted Contentions), ff. Tr. 19,729, at 3; Campbell, Tr. 19,995-96; Bradshaw, ff. Tr. 12,764, at 18; Appl. Exhs. E-49 to E-52 and E-54 to E-60, § II.G.3.c; Appl. Exh. E-53, at 6114.4(f).

290. The Bureau of Radiation Protection will make any sheltering recommendation based on data from its sources, federal agencies and the Limerick plant itself. School teachers and staff, as well as the students, are considered part of the general public in a sheltering scenario, and dosimetry is not issued to the public as a precondition to determining the initiation or termination of sheltering as a protective action. Hippert/Taylor, ff. Tr. 19,498, at 14-15. Therefore, if there is a sheltering recommendation, there is no corresponding need for dosimetry. Bradshaw, Tr. 13,336.

291. Dosimetry/KI are issued only to emergency workers, which would not include bus drivers or school staff accompanying evacuating schoolchildren. Hippert/Taylor, ff. Tr. 19,498, at 13-14; Campbell (Admitted Contentions), ff. Tr. 19,852, at 9; Reber (Admitted Contentions), ff. Tr. 19,729, at 3; Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 19.

292. It is the Commonwealth's policy for all fixed nuclear power plant facilities that the general population within the EPZ not be given dosimetry and that school bus drivers, teachers and school staff be considered part of the general public. Hippert, Tr. 19,619-20.

293. Bus drivers and teachers are not deemed to be emergency workers because, under the one-lift plan to evacuate the EPZ, they would not be requested to perform any task which would subject them to an exposure or dose commitment exceeding that for the general public, as distin-

guished from designated emergency workers. Bradshaw, Tr. 13,167, 13,281-82, 13,333.

294. FEMA chose to defer delivering an opinion on whether the RERPs should provide for distribution of dosimetry and KI to bus drivers, school teachers and staff until LEA-11 involving the ability of the school districts to evacuate in one lift is resolved. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 18-19. This Board has previously stated that it has reasonable assurance that evacuation of the school districts can be conducted in one lift. *See* Findings on LEA 11, Bd. Fdgs. 121-216. FEMA did state that if it were determined that enough bus resources were available to evacuate students in one lift, then bus drivers, school teachers and staff would be considered as the general public, i.e., not in need of KI and dosimetry. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 10-20.

295. All vehicles entering the EPZ for the purpose of evacuating schoolchildren or transportation-dependent persons will first pass through a county transportation staging area. Bigelow, Tr. 14,343-44; Reber, Tr. 19,822; Bradshaw, ff. Tr. 12,764, at 18-19; Appl. Exhs. E-1 at I-1, E-2 at I-1, E-3 at I-1. If it were necessary for a driver to reenter the EPZ for some unforeseen reason after the time frame for evacuating the general public, he would reenter through a transportation staging area and be provided with dosimetry/KI. Chester and Montgomery Counties will retain a supply of dosimetry and KI at each transportation staging area. Berks County has a reserve of units of dosimetry available in its EOC that could be transported to the transportation staging area for distribution if it became necessary. Appropriate instruction in the use of dosimetry/KI could be given quickly at the staging area. Bigelow, Tr. 14,138-39; Reber, Tr. 19,822, 19,835; Bradshaw, ff. Tr. 12,764, at 18-19, Tr. 13,277-78, 13,309, 13,608; Appl. Exhs. E-2 at M-3-3, E-3 at M-3-9. The decision to administer KI would be made by the Commonwealth. Bigelow, Tr. 14,139, 14,284.

296. By agreement dated September 6, 1984, Applicant agreed to fund the procurement of dosimetry necessary to protect offsite emergency workers responding to a radiological emergency at Limerick. Appl. Exh. E-104. If this agreement were formally transmitted to FEMA for review, and those pieces of equipment were purchased and disseminated according to the distribution scheme in the RERPs, then FEMA would have no more concerns regarding the Category "A" deficiency cited in the FEMA Exercise Evaluation Report on the July 25, 1984 exercise (FEMA Exh. E-4) regarding inadequate provisions of dosimetry. Asher, Tr. 20,262-63; *see also* Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 28-29. The Commonwealth provided testimony that the

Pennsylvania Department of Health had purchased the KI needed for Limerick in amounts sufficient to satisfy the need identified by FEMA. Hippert, Tr. 19,580, 20,422. FEMA agreed that if this information were formally transmitted to FEMA the Commonwealth's actions would satisfy the Category "A" deficiency cited in the FEMA Exercise Evaluation Report (FEMA Exh. E-4, at 136) where there had been a failure to demonstrate the availability of KI in a quantity sufficient for emergency workers. Asher, Tr. 20,261-62. On that basis, the Commonwealth withdrew its previously admitted contention (Commonwealth-1) regarding availability of dosimetry.

297. Individuals who staff transportation staging areas are emergency workers qualified to instruct others in the use of dosimetry/KI. In addition, they would have radio communication with the county EOC to contact the radiological officer. Cunnington, Tr. 13,704.

298. Under the county plans, a "unit" of dosimetry/KI includes two self-reading dosimeters, a thermoluminescent dosimeter, one dosimetry-KI Report Form and a 14-day supply of KI. Bradshaw, Tr. 13,398; Campbell (Admitted Contentions), ff. Tr. 19,852, at 12; Appl. Exhs. E-1 at M-5-1, E-2 at M-3-3, E-3 at M-3-9. The number of dosimetry/KI units available at each of the transportation staging areas represents a conservative estimate of potential needs. Bradshaw, ff. Tr. 12,764, at 20; Cunnington, Tr. 13,307-08, 13,329. Accordingly, if it became necessary for buses to reenter the EPZ, adequate supplies of dosimetry and KI would be available. Campbell, Tr. 20,001; Bigelow, Tr. 14,360-61; Reber, Tr. 19,821-22.

299. Berks County does not distribute dosimetry/KI to transportation staging areas under its plan because, given the large number of available buses, a multiple lift would not be required. Berks County has 252 buses and drivers available to meet a total need of 97 buses for county schools and all other unmet transportation needs. Nonetheless, the Berks County EOC has an unassigned reserve of 100 units which could supply the transportation staging areas if necessary. Reber (Admitted Contentions), ff. Tr. 19,729, at 3, Tr. 19,821; Bradshaw, ff. Tr. 12,764, at 19-20, Tr. 13,320; Appl. Exh. E-1, at M-4-1.

300. Dosimetry/KI units at transportation staging areas are reserved for bus drivers and are not needed for emergency workers because supplies for emergency workers have been predistributed to the municipalities and emergency service organizations. Bigelow, Tr. 14,361; Appl. Exhs. E-1 and E-2, Appendix 3, Annex M; Appl. Exh. E-3, Appendix M-2, and M.

301. If a bus driver were required to reenter the EPZ, the dosimetry issued the driver would also provide exposure indication for any other

individuals on the bus. A thermoluminescent dosimeter measures the accumulated radiation dose of the individual wearing it. The self-reading dosimeters can be used to estimate the dose received by any other individual in close proximity to the wearer. It is a common planning practice throughout the United States to assign dosimetry to a vehicle rather than to an individual. Bradshaw, ff. Tr. 12,764, at 19, Tr. 13,285. Any schoolchildren or staff on the bus would be treated as members of the general public with regard to dosimetry/KI supplies since they would not be subjected to the same dose commitment as a driver making multiple runs. Bradshaw, Tr. 13,287.

302. Adequate provisions exist in the plans for radio communication with the county EOC in the event a bus should break down enroute. Cunnington, Tr. 13,378.

(2) CONCLUSIONS

303. This Board has reasonable assurance, based on the record before it, that the school staff who may be required to remain in the EPZ for a prolonged period in the event of a sheltering advisory are not in need of provisions of dosimetry because the school staff would be considered part of the general public. Dosimetry is not issued to the general public as precondition to initiating or terminating sheltering as a protective action. Bd. Fdgs. 289-294.

304. This Board has reasonable assurance, based on the evidentiary record before it, that the risk country RERPs contain adequate provisions for dosimetry in the form of reserves maintained by the risk counties for emergency workers if bus drivers volunteer to reenter the plume exposure EPZ. Bd. Fdgs. 295-302. Further, this Board finds that there are also provisions in the plans for providing training in the use of dosimetry at the transportation staging areas to any bus driver who chooses to reenter the EPZ as an emergency worker. Bd. Fdgs. 298, 301.

305. The Board has reasonable assurance, based upon the testimony by the Commonwealth and the agreement between the Applicant and the Commonwealth (Appl. Exh. E-104), that supplies of dosimetry and KI have been purchased in quantities sufficient to satisfy FEMA's concerns as expressed in the FEMA Exercise Evaluation Report. FEMA Exh. E-4, at 136, #3; Bd. Fdg. 296. The Board expects the Applicant and the Commonwealth to formally transmit this information to FEMA.

d. LEA-14(b)

The Chester, Berks, and Montgomery County School District RERPs fail to provide reasonable assurance that school bus drivers, teachers or other school staff are properly trained for radiological emergencies.

306. This Board, by the terms of a September 24, 1984 Memorandum and Order (unpublished), admitted for litigation LEA-14(b) as reworded and stated above with the bases LEA proffered in support of its contention. Those bases included alleged inadequacies in the provisions in the school district RERPs for training the school staff and bus drivers in (1) procedures for handling contaminated individuals and equipment; (2) risks of radiation exposure and proper use of any necessary equipment, which LEA explained included: instruction in the use of dosimetry and in the adequacy of school district buildings for sheltering and instruction in dealing with children under stress conditions, and ensuring that school staff clearly understood their roles and responsibilities in the implementation of school district RERPs, as evidenced by a post-training survey to identify willing volunteers. The last proffered basis included inadequacies in ensuring the bus drivers' familiarity with their assigned routes.

307. Because school staff, teachers and school bus drivers will not be issued dosimetry and KI, there is no need for them to be trained in the use of this equipment. The intent is for these groups to be evacuated prior to a radioactive release. Taylor, ff. Tr. 19,498, at 22.

(1) TRAINING AVAILABILITY

308. Although they are not considered emergency workers, training for school teachers, staff and bus drivers for response to a radiological accident has been and continues to be offered by Energy Consultants through the three risk county emergency management agencies. Hipert/Taylor, ff. Tr. 19,498, at 16; Bigelow, Tr. 14,132; Reber (Admitted Contentions), ff. Tr. 19,729, at 3; Campbell (Admitted Contentions), ff. Tr. 19,852, at 5; Bradshaw, ff. Tr. 12,764, at 20-21; Appl. Exhs. E-64, E-65, E-66, E-76, E-99.

309. In the two school districts in Berks County, 15 school administrators, 495 faculty and staff and 48 bus drivers have received training. Reber, ff. Tr. 19,729 (admitted), at 4; Tr. 19,744-45. Mr. Reber recently recontacted the districts reiterating the offer of training. Reber, Tr. 19,845.

310. Based on his attendance at Energy Consultants' training sessions for school staff and faculty, Mr. Reber is of the opinion that the in-

formation provided is sufficient for staff to understand their role in evacuation and sheltering of schoolchildren in a radiological emergency. Reber, Tr. 19,745-47, 19,796, 19,797, 19,833.

311. In Chester County, training has been received by the Owen J. Roberts, Downingtown and Phoenixville school districts. Campbell, Tr. 19,890.

312. In Montgomery County, training has been received by the Perkiomen Valley, Pottstown and Upper Perkiomen school districts. Wenger, Tr. 13,086.

313. Training in the form of general orientation for administrators, teachers and school staff offered by Energy Consultants includes a general description of nuclear power plant operations, background information on radiation and its biological effects, an overview of the emergency planning process, planning concepts for schools, and a description of assigned responsibilities outlined in the school district plans. More extensive training for school staff and bus drivers regarding risk of exposure to radiation and proper use of any necessary equipment is unnecessary. Bradshaw, Tr. 13,015; Wenger, Tr. 13,087-88; Appl. Exhs. E-64, E-65, E-66. The general orientation for teachers also includes a description of their responsibilities during sheltering and instructions on sheltering procedures. This information has been provided in all training sessions. Wenger, Tr. 13,015-16, 13,098; Appl. Exh. E-65, at 14, 23-25.

314. Although some witnesses differed in their characterization of whether teachers had actually received "training" as opposed to an "orientation," the Board is satisfied upon reviewing the training materials and testimony that the information provided teachers constitutes appropriate preparation for assignments in an emergency. Bradshaw, ff. Tr. 12,764, at 11; Persing, Tr. 14,806-07; Bigelow, Tr. 14,278. Whatever its label, teachers who participated in these programs were provided background information and were informed of the content of their plans and general operating procedures. Wenger, Tr. 13,088-89.

315. Annual retraining of school staff will be provided. Bradshaw, Tr. 13,631; Bigelow, Tr. 14,364; Campbell, Tr. 19,996; Appl. Exh. E-1, at R-3; Appl. Exh. E-2, at R-2; Appl. Exh. E-3, at R-3. The Philadelphia Electric Company has taken under advisement a request for it to make a long-term commitment to provide radiological emergency response training. Campbell, Tr. 19,996; Bradshaw, Tr. 13,631. It is expected that there should be no problem in obtaining a long-term commitment to train personnel. Bigelow, Tr. 14,279; Campbell, Tr. 19,962-63.

316. The training sessions offered by Energy Consultants are based upon lesson plans whose content has been determined, reviewed and approved by Commonwealth and county emergency planning authorities.

The lesson plans are consistent with the policies and procedures of those bodies. Bradshaw and Wenger, Tr. 13,356, 13,359-60; Appl. Exhs. E-64, E-65, E-66.

317. PEMA asserts that State officials did not “approve” the content of the lesson plans. The Commonwealth acknowledges, however, that PEMA reviewed and commented on those plans. Commonwealth Proposed Finding 99. There is no evidence that PEMA found any lesson plan inadequate. Its representatives stated no dissatisfaction with the approach or content of the lesson plans during the extensive examination concerning those plans during the hearing.

318. County planning officials and their staffs have been evaluating the adequacy of the Energy Consultants’ training program by either reviewing the lesson plans and/or attending the training programs. Bigelow, Tr. 14,275; Reber, Tr. 19,745, 19,796-97; Campbell, Tr. 19,893-94. While county planning officials are generally satisfied that the training provided by Energy Consultants for school administrators, school teachers and staff, and bus drivers provides an adequate understanding of their respective rules and responsibilities (*see* Bigelow, Tr. 14,275; Reber, Tr. 19,745-47, 19,797, 19,833), there were instances where pre- and post-class testing signaled a problem with the participants’ retention of the information presented to them and thereby indicated a possible need for reevaluation and improvement of the lesson plans and content of the training program. Campbell, Tr. 19,891-92. In those instances, the pre- and post-testing reflected a measurable educational gain in all groups that were tested; however, the participants in those programs did not meet the standard established by a county training and public education coordinator. Campbell, Tr. 19,891-92. While this Board is concerned with the progress of the training program participants, it does not believe that the limited testimony on the post-training results provides any basis for concluding that the training program does not adequately inform the participants about their respective roles in a radiological emergency. The Board expects and believes that changes to the training program signaled by such pre- and post-training testing, or other surveys requesting critiques of the standardized training program, would be a normal occurrence, and such input would be used in improving the training program. Indeed, Energy Consultants has been responsive to requests for changes to its program. Campbell, Tr. 19,890, 19,893; Bradshaw, Tr. 13,632, 16,916-17.

319. FEMA found that the lesson plans utilized by Energy Consultants for school administrators, school teachers and staff, and bus drivers are comprehensive in nature and adequately cover the various aspects of

a nuclear power plant emergency response. Asher and Kinard (Update), ff. Tr. 20,150, at 1.

320. Neither NUREG-0654 nor the provisions of 10 C.F.R. § 50.47 require post-training survey of teachers and school staff. There are no special circumstances requiring a post-training survey of teachers to determine their willingness to volunteer, given the limited responsibilities of teachers in accompanying students during an evacuation. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 12; Bradshaw, ff. Tr. 12,764, at 14.

321. There appears to be no need to conduct special drills for an actual evacuation of the schools since this merely involves escorting students out of school buildings, which occurs normally during fire drills, and transporting them by bus to other locations. Staff supervision of students during an evacuation would therefore be similar to supervision of large student groups during any number of other outside activities and would not be enhanced by drills. Bradshaw, ff. Tr. 12,764, at 14. Nonetheless, Energy Consultants has been and continues to be willing to provide assistance to school districts in conducting sheltering/evacuation drills. Bradshaw and Cunnington, Tr. 16,917-18. This would meet the desire expressed by some superintendents for "guided practice," or a demonstration, which would involve a drill in addition to the training provided by Energy Consultants. Persing, Tr. 14,857-60.

(2) ASSIGNED RESPONSIBILITIES FOR WHICH TEACHERS HAVE
BEEN TRAINED

322. The basic responsibilities of assigned school teachers and staff to accompany evacuated students and remain with them at host schools until relieved are described in each school district plan. No special training for these basic responsibilities is necessary because teachers routinely supervise students in similar situations. Bradshaw, ff. Tr. 12,764, at 11; Appl. Exhs. E-49 to E-50, E-54 to E-60, § V.D.2.d; Appl. Exh. E-53, at 6114.4(f), 6114.4(g). School districts periodically implement early dismissal procedures comparable to the evacuation procedures for a radiological emergency. Those situations include boiler breakdowns, gas leaks, bomb threats, or severe weather. Persing, Tr. 14,831; Feich, Tr. 14,973. Because emergency and routine responsibilities are comparable, pre-identification of teacher volunteers is not required to make the plans workable, nor is it a requirement of NUREG-0654. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 10; Kinard, Tr. 20,298.

323. Nonetheless, training for teachers and staff has been provided to familiarize them with nuclear plant operations, radiation hazards and

related emergency planning concepts. Training is available on an ongoing basis for school staff assigned to perform this function, as explained in the county and school district plans. Bradshaw, ff. Tr. 12,764, at 11; Appl. Exhs. E-1 at R-3, E-2 at R-2, E-3 at R-3, E-49 to E-61, § III. As a result of this training, school staff will be informed about the likely risks involved in an actual emergency and prepared to perform their limited escort function without unrealistic fears or apprehension. Wenger, ff. Tr. 12,764, at 11-12.

324. In accordance with emergency planning principles of assigning individuals roles with which they are already familiar, teacher responsibilities outlined in the school district plans are essentially extensions of similar activities teachers perform on a day-to-day basis. Escorting students to different locations, taking attendance and keeping a count of students, monitoring and supervising students in groups of various size, and closing windows and doors are responsibilities teachers are already trained to perform or for which no training is required. In an emergency, they can be reasonably expected to continue to perform those same basic functions for the same or larger class sizes if necessary. The training provided teachers demonstrates how those routine functions would be performed in the context of a postulated radiological emergency at Limerick. Cunningham, Tr. 13,020-24; Bradshaw, Tr. 13,730.

325. Similarly, the procedure for evacuating students from schools is simply to escort them to buses as is done for daily dismissal, attendance at extracurricular events, monthly fire drills and annual or semi-annual bus drills. This requires no special training. Persing, Tr. 14,823, 14,831; Bradshaw, Tr. 13,011-12; Cunningham, Tr. 13,023, 13,638.

326. There was testimony by certain witnesses that children are subject to higher stress levels during natural or man-made emergencies and that training in handling these situations would be helpful. Greaser, Tr. 15,356-57, 15,390-91; Price, Tr. 15,430, 15,444. Stressful conditions exist in nonradiological emergencies, such as evacuation for a fire or bomb threat. Campbell (Admitted Contentions), ff. Tr. 19,852, at 6. However, there was also testimony that in the past teachers have not had any problems maintaining discipline and order during fire drills, evacuations due to bomb scares and field trips. Price, Tr. 15,452-53; Welliver, Tr. 15,575. The Board believes that if a school district believes such training is necessary, it should be arranged by the district involved. Campbell (Admitted Contentions), ff. Tr. 19,852, at 6.

327. As of the time of the hearing, training had been received in six school districts inside the EPZ: Boyertown School District, Owen J. Roberts School District, Phoenixville School District, Perkiomen Valley School District, Pottstown School District, and Upper Perkiomen School

District. Wenger, Tr. 13,086. No school district has rejected training. Those districts which have postponed training have not stated any unwillingness to schedule training in the future. Bradshaw, Tr. 13,686. The training offered through the cooperative program between Energy Consultants and the counties is proceeding at a reasonable pace to train sufficient people to fulfill emergency assignments. Campbell, Tr. 20,043-44.

328. There is no need to instruct school staff in the adequacy of school buildings for sheltering because individualized decisions on sheltering for particular schools will not be made. Bd. Fdgs. 279-280. Nonetheless, information regarding sheltering is contained in training lesson plans for administrators, teachers and bus drivers (Appl. Exh. E-64, at 31; Appl. Exh. E-65, at 23-25; Appl. Exh. E-66, at 35-39).

329. School maintenance and security personnel routinely adjust the operation of a school building's heating and ventilating systems under normal circumstances and could easily do so in the event of a radiological emergency requiring sheltering. Cunningham, Tr. 13,028-30.

330. No teacher who received training has informed his school superintendent that it was inadequate or that he did not understand his assigned responsibilities in the event of a radiological emergency. Persing, Tr. 14,857; Murray, Tr. 15,078; Claypool, Tr. 15,893. Similarly, school officials have not expressed any concerns to county planners as to the adequacy of the training sessions. Bigelow, Tr. 14,277-78.

(3) BUS DRIVER TRAINING

331. When county representatives discussed with bus providers the number of buses and drivers which could be made available in an actual emergency, including Limerick, they advised providers that a training program would be offered to address any driver's concerns. This information was also contained in the letter seeking updated survey information. Bigelow, Tr. 14,141, 14,189-90; Appl. Exhs. E-76, E-99.

332. Accordingly, training has been offered to school bus drivers regarding their assigned responsibilities in the event of a radiological emergency and will continue to be offered on an ongoing basis. Bradshaw, Tr. 13,289-90; Bigelow, Tr. 14,139-40; Reber, ff. Tr. 17,729, at 3; Campbell, ff. Tr. 19,852, at 11.

333. The training program for bus drivers offers a general orientation and overview of radiation principles, emergency management principles, susceptibility of children to radiation and additional background information. No other special training is required. Bradshaw, Tr. 13,289, 13,369-70.

334. Training does not include route assignments. Bus drivers would be given their assignment to evacuate a particular facility or segment of the population at the time of an actual emergency. Campbell, ff. Tr. 19,852, at 10-11; Bigelow, Tr. 14,128-29. If drivers are unfamiliar with the assigned routes, they will be provided with strip maps. Hippert/Taylor, ff. Tr. 19,498, at 17; Cunningham, Tr. 13,745-46. It is standard practice throughout the Commonwealth for all five nuclear power plants to issue strip maps to bus drivers unfamiliar with assigned routes. Hippert, Tr. 19,621. The use of such maps will be sufficient to provide drivers with directions to their assigned locations. Kinard, Tr. 20,300.

335. In a typical training session for bus drivers, one or two drivers would indicate concern about their family arrangements. Bradshaw and Cunningham, Tr. 16,939-40. Accordingly, their training included a discussion of family arrangements which should be considered in advance of an emergency. The instructor discussed the overall planning process by which the municipal and county plans make arrangements for the public at large, including the family of any driver residing in the EPZ. Bradshaw, Tr. 13,153.

(4) CONCLUSIONS

336. The Licensing Board has reasonable assurance, based on the evidentiary record before it, that the training that has been provided to bus drivers, teachers and other school staff has adequately prepared them for their respective roles in a radiological emergency. This Board has not heard any evidence that would lead us to believe there is any need for teachers to be trained in handling contaminated individuals or equipment. This Board has already stated that it has reasonable assurance that evacuation of the affected school districts can take place in one lift. Thus, school staff and teachers are in the same position as that of the general public. Therefore, this Board will not reach the question of whether teachers and school staff should be trained in the use of dosimetry and in the adequacy of school district buildings for sheltering. As stated in Board Finding 326, the Board finds that if a school district has particular concerns about the discipline of children during a radiological emergency, these are matters that can be resolved by the school districts with the cooperation of Energy Consultants, which is providing the training.

337. The Licensing Board also has reasonable assurance based on the evidentiary record, that the Applicant will make a long-term commitment to provide radiological emergency response training on an annual basis.

e. *LEA-15*

The Chester and Montgomery County RERPs and the School District RERPs are not capable of being implemented because the provisions made to provide bus drivers who are committed to being available during a radiological emergency, or even during preliminary stages of alert are inadequate.

338. In its April 20, 1984 Special Prehearing Conference Order Ruling on Admissibility of Offsite Emergency Planning Contentions (LBP-84-18, *supra*), this Board ruled that LEA-15 belonged to a group of contentions raised by Intervenor dealing with human response during a radiological emergency. 19 NRC at 1054. The Board ruled that LEA-15 is about whether there is reasonable assurance that in an emergency there would be enough school personnel to implement the school plans and involves letters of agreement only to the extent that such letters are one way to establish such reasonable assurance. *Id.* at 1055. The Board considered LEA-15 "to be solely about human response in a radiological emergency." *Id.* In its September 24, 1984 Memorandum and Order Ruling on Reworded and Respecified Offsite Emergency Planning Contentions, the Board ruled out Intervenor's specifications dealing with communications with bus drivers, mobilization time, concerns about whether some drivers are being assigned to evacuate both the school population and the general public and transportation for private school students.

(1) BUS DRIVER AVAILABILITY

339. FEMA witnesses testified that NUREG-0654, Planning Standard C.4, indicates that there is a need for letters of agreement with bus companies with regard to providing adequate numbers of bus drivers, but could not comment on the adequacy of any letters of agreement because they (FEMA) had not had an opportunity to review them. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 24. Chester County presently has six signed agreements with bus companies covering school evacuation. Campbell, Tr. 19,854. Montgomery County has completed twenty of thirty-three agreements with transportation providers. Bradshaw, ff. Tr. 17,191, at 13; Bigelow, Tr. 14,127, 14,345, 14,366.

340. The basic responsibilities and procedures regarding bus driver assignments in a radiological emergency are described in the bus driver training program. Appl. Exh. E-64. The training program offered to bus drivers provides general information on nuclear technology and terminology, radiation measurement and effects, emergency planning and response operations. This encourages drivers to plan ahead for emergency

contingencies in order to eliminate conflicts between volunteer and family responsibilities. Bradshaw, ff. Tr. 12,764, at 24-25; Appl. Exh. E-64. Also, training should address any misconceptions held by drivers as to the nature of their emergency responsibilities or the risks they are likely to face in carrying out their assignments. Bd. Fdgs. 308-310, 331-335.

341. Because the basic principle governing evacuation within the EPZ is that all transportation-dependent individuals will be evacuated in a single lift (Hippert, ff. Tr. 19,498, at 9), bus drivers will not be subjected to greater radiological hazards than those facing the general public. *Id.* at 19-20; Bradshaw, Tr. 13,333. Accordingly, bus drivers are instructed in training sessions that they would not be expected to do more than drive a bus as they do in carrying out routine school assignments. Bigelow, Tr. 14,294; Bradshaw, Tr. 13,730; Appl. Exh. E-64, at 30-32.

342. The evidence in the record of this proceeding supports the historic record that drivers will perform assigned functions. FEMA witnesses testified that the history of response to emergencies shows a willingness by individuals to perform their duties and that individuals who have a clear understanding of their roles in an emergency plan do not abandon these roles in time of emergency. A comprehensive training program for bus drivers is needed to provide a clear understanding of what is required. FEMA was unable to make any determinations as to the adequacy of the ongoing bus driver training because it was not familiar with the specifics of such training. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 26-27. The lesson plans that have been reviewed by FEMA are, however, for the most part, comprehensive in nature. Kinard, Tr. 20,208. As of December 3, 1984, in Montgomery County, thirty-nine bus drivers had received training. Bigelow, Tr. 14,140. In Chester County, as of January 23, 1985, forty-three bus drivers have been trained. Campbell, Tr. 19,890. Verbal and written notice by the Montgomery County Office of Emergency Preparedness has been made to all bus providers; however, at the time of the hearing no bus provider in Montgomery County had taken advantage of bus driver training offered by Energy Consultants. Bigelow, Tr. 14,140-41, 14,188-90. Training will continue to be offered. Bigelow, Tr. 14,140.

343. In discussing arrangements for obtaining additional buses with non-EPZ school districts and private bus companies, Montgomery and Chester County planning officials had a clear understanding, except when expressly stated to the contrary, that a commitment by the provider of its transportation resources included a driver for each bus. The counties explained to each provider why buses and drivers were being requested and, obviously, the providers understood that it would be

meaningless to provide a bus without a driver. Bd. Fdgs. 126-133, 175-186. Thompson, Tr. 18,813, 18,863; Campbell, Tr. 19,861, 20,033. LEA Exhibits E-4 and E-63 show the providers' agreement to provide buses and drivers "to the maximum extent possible" (for E-4) and as determined "to be available" (for E-63). These agreements are subject to the willingness of the bus drivers to participate. The record is clear that such drivers will be volunteers. Kowalski, Tr. 16,201; Wert, Tr. 16,581. Providers agreed generally to use best efforts with respect to drivers, but none stated that drivers would be ordered to participate. Applicant's witnesses testified that there is a large body of social/scientific knowledge that addresses individual and group behavior in a disaster; that volunteers respond in an emergency; that community goals prevail over individual goals and that community goals are balanced with family goals. Bradshaw, Tr. 13,070. FEMA witnesses expressed the belief that once a bus company has agreed to provide its bus resources for the evacuation of schoolchildren from the 10-mile EPZ, such company has committed itself to ensuring that bus drivers are available to drive the buses in the absence of indications to the contrary. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 25.

344. The reference to available "units" in the bus provider survey forms underlying the Montgomery County letters of understanding demonstrates the intent to provide a driver for each vehicle. Cunningham, Tr. 12,959-60. In one instance in which an agreement provides that the bus provider does not employ drivers, the provider specifically requested that the agreement be modified to state that drivers will not be furnished. Cunningham, Tr. 12,973.

345. Both Montgomery and Chester Counties have conservatively estimated the number of buses and drivers available under commitments from bus providers and will ultimately have commitments which far exceed any possible unmet need. Bd. Fdgs. 136-150, 170-172. Transportation assistance is also expected from adjoining counties. Campbell, Tr. 19,983-85. Nonetheless, pools of backup drivers are also being formed. Bigelow, Tr. 14,269-70, 14,297-99; Bradshaw, ff. Tr. 12,764, at 23. Typically, bus providers have far more drivers than buses, and certainly more than the number conservatively estimated by providers under their letters of agreement with the counties. Kowalski, Tr. 16,208-09. Also, many drivers will not have family concerns. Cunningham, Tr. 13,728. The Montgomery County plan will utilize only 20 to 25% of all available drivers employed by providers outside the EPZ. That pool will suffice. Within the EPZ, Montgomery County expects to utilize about two-thirds of the available drivers. Bigelow, Tr. 14,270, 14,298-99.

346. The agreements between the three county emergency planning agencies and bus companies are general and do not specify buses or drivers for a particular use or assignment. Advance assignments may or may not be made in practice. Bradshaw, ff. Tr. 12,764, at 23; Appl. Exh. E-1, Annex T, Appendices T-23 to T-27. The same procedure of assigning buses and drivers at the time of an actual emergency has been used by the counties previously. Bus companies have provided buses and drivers promptly upon request on those occasions. Accordingly, drivers willing to perform their assignments have been obtained under those *ad hoc* procedures in the past. Bradshaw, ff. Tr. 12,764, at 24.

347. In Pennsylvania, the Governor has authority to declare a state of disaster emergency and to alter any Commonwealth code or regulation necessary to respond to the emergency. The Pennsylvania Vehicle Code would be covered by this authority. Accordingly, the Governor could modify the Code to permit other than certified bus drivers to drive buses. Bradshaw, Tr. 13,147-48. The Limerick emergency plans do not, however, rely upon that authority with regard to transportation arrangements. Bradshaw, Tr. 13,150-51.

348. Several school district superintendents testified that they have required buses for early school dismissal without prior notification a number of times each year and that they had experienced no difficulty in obtaining a full complement of buses and drivers. Persing, Tr. 14,854; Feich, Tr. 14,997; Murray, Tr. 15,085-86, 15,103-04; Price, Tr. 15,439-40; Welliver, Tr. 15,554-55, 15,585-86; Warner, Tr. 15,659-61.

349. Not a single bus driver has refused to drive a bus during emergency circumstances, notwithstanding that drivers often face very hazardous conditions while driving in inclement weather. Kowalski, Tr. 16,206-07. Bus drivers are particularly capable and caring individuals. They especially care about children and would therefore want to serve in an emergency if the safety of schoolchildren were threatened. Kowalski, Tr. 16,210, 16,216.

350. Experience during other disaster emergencies, such as the Three Mile Island accident in 1979, an accidental chemical release in a Union Carbide Plant in 1982, and an incident at the Ginna Nuclear Power Plant, demonstrate that bus drivers will respond when called upon in an actual emergency. Bradshaw and Cunningham, Tr. 13,647-49, 13,716, 13,723-24; Bigelow, Tr. 14,293.

351. A number of the school superintendents had surveyed their drivers to determine their willingness to transport students in the event of a radiological emergency. Because of the paucity of information provided to drivers at that time and the informality or inadequacy of

those surveys, the Board has some doubts as to the reliability of the results. For example, in a driver survey of the Gross Bus Company by the Superintendent of the Owen J. Roberts School District, approximately twenty-five of forty-three bus drivers indicated they would perform assigned responsibilities in an emergency. However, while there is some question as to how many drivers will respond, many of the drivers expressed the concern that in an emergency their families would come first, and they must be assured that their children had been taken care of. LEA Exh. 29, at 2. Others were unsure or stated that they would attend to personal needs first, although no clear breakdown was given. Claypool, Tr. 15,870; LEA Exh. E-29, at 2. This survey, however, was limited to the forty-three drivers who routinely drive buses to and from schools in the Owen J. Roberts School District, and did not include other drivers employed by that provider. The Superintendent did not know the total number of drivers at either of the two locations utilized by the Gross Bus Company who could also be called upon in an emergency. Claypool, Tr. 15,912-13.

352. In the same survey, there was no evidence to demonstrate that any of the remaining eighteen drivers who were surveyed specifically stated they would not perform assignments if requested to do so in a radiological emergency. Claypool, Tr. 15,913. Likewise, there was no information to show that drivers were encouraged to respond positively to the survey or that the importance of performing assigned responsibilities in a radiological emergency was impressed upon them. Claypool, Tr. 15,914. No attempt has been made to discuss or resolve any concerns that might have affected the responses of the surveyed bus drivers. Claypool, Tr. 15,918; Appl. Exh. 107.

353. The business agent for the North Penn School District expressed concerns regarding the availability of all thirty-nine buses and drivers designated in the Montgomery County plan for his district, depending upon the time at which such a request might be made. He stated that about half of the approximately twenty drivers with whom he had spoken indicated that they would be willing to drive buses in response to an emergency at Limerick. Starkey, Tr. 16,425-26. The survey discussion was so nebulous and lacking in particulars, however, that responsibilities of drivers in the event of a radiological emergency could easily have been misunderstood, i.e., that drivers would be reentering the EPZ after a "nuclear mishap" so as to subject them to substantial radioactive releases. Starkey, Tr. 16,426-29, 16,455. The drivers were not informed that, in the event of an accident at Limerick, plans call for schoolchildren to be evacuated prior to the release of radiation from the facility. Starkey, Tr. 16,455.

354. A survey of the bus drivers employed by the Custer Bus Company conducted by the Spring-Ford Area School District indicated that six of forty drivers stated they would decline to drive buses to transport schoolchildren in the event of a radiological emergency. Welliver, Tr. 15,523. The superintendent was uncertain, however, whether the survey included all drivers employed by the Custer Bus Service or only those who routinely drive buses for the school district's own students. He had asked the bus provider only for a list of drivers who drive for the district. Welliver, Tr. 15,565-66. Accordingly, the survey did not necessarily include all drivers who would be available from the district's bus provider in the event of an actual radiological emergency. Welliver, Tr. 15,566.

355. A survey of bus drivers by a committee working on the development of an emergency plan for the Methacton School District determined a need for fifteen additional drivers in the event of a radiological emergency. Warner, Tr. 15,623. There was, however, no probative evidence to validate the survey results as reliable and verifiable. Warner, Tr. 15,625-30. Moreover, not all drivers were surveyed. Warner, Tr. 15,687-88.

356. Roger Tauss is president of Local 234, Transport Workers Union of America, AFL-CIO, which represents SEPTA bus drivers of the City Transit and Frontier Divisions. Tauss, Tr. 16,736-38, 16,766. The vast majority of the Local 234 union members live outside the EPZ. Tauss, Tr. 16,787. Nonetheless, Mr. Tauss stated that his drivers would not go into an area of a "nuclear emergency," and that he would instruct them not to do so. Tauss, Tr. 16,741-42. His position was that "there is no way that [Local 234 bus drivers] are going to drive into a nuclear meltdown situation" because he wished to avoid their being subjected to any "devastating potential of injury." Tauss, Tr. 16,743-44, 16,784-85.

357. Mr. Tauss' concern regarding a "meltdown situation" is based upon his distrust of government officials and scientists. Specifically, he would distrust any information from the Pennsylvania Bureau of Radiological Protection or PEMA that it was safe for drivers to enter the EPZ to evacuate residents. Tauss, Tr. 16,773-75. His basic position was that "[e]verybody is for sale these days" and "will say what they are paid to say." Tauss, Tr. 16,813. He has little knowledge of emergency planning concepts pertaining to radiological accidents or how those concepts would be employed in the event of a real emergency to protect the public health and safety. Tauss, Tr. 16,775, 16,808-10.

358. Mr. Tauss testified that he and his staff had surveyed a number of SEPTA drivers and found them unwilling to assist in the event of an

emergency at Limerick. Tauss, Tr. 16,743, 16,782. Despite his disclaimers (Tr. 16,784), the Board believes that Mr. Tauss' informal survey of thirty SEPTA bus drivers was necessarily infected with his own distrust of planning for radiological emergencies and that the responses he received simply reflect his personal opinion.

359. Mr. Tauss stated his reasons for his belief that SEPTA would attempt to coerce bus drivers to accept assignments in a radiological emergency. Tauss, Tr. 16,803-04. Mr. Tauss testified, however, that a SEPTA request for volunteer bus drivers would not violate its collective bargaining agreement and that if Local 234 bus drivers did volunteer, no union sanctions could be taken against them. Tauss, Tr. 16,778-79, 16,797, 16,800, 16,811. Also, if training were offered to SEPTA bus drivers, the union would not oppose it. Tauss, Tr. 16,759, 16,793-94.

360. Mr. Tauss' unwillingness to participate in any kind of emergency situation, including nonradiological emergencies, where it might be necessary to evacuate residents from a potential threat to the public health and safety (Tauss, Tr. 16,798-99), is against the weight of the historic record as well as the record in this proceeding regarding the actions of bus drivers in other emergencies. See discussions of behavior of volunteers in an emergency. Bd. Fdgs. 237-241, 243.

361. The record here, as discussed above and in the context of LEA Contention 12, clearly shows the willingness of volunteers to fulfill their responsibilities in an emergency. (See *Consolidated Edison Co. of New York* (Indian Point, Unit No. 2), LBP-83-68, 18 NRC 811, 958 (1983).) This is in contrast to the situation where the only evidence in the record raised serious questions as to whether volunteers would be willing to respond in an emergency. See *Cincinnati Gas & Electric Co.* (Wm. H. Zimmer Nuclear Power Station, Unit No. 1), ALAB-727, 17 NRC 760, 772-73 (1983).

362. FEMA witnesses assumed that bus driver training would include instructions regarding transport of students from host schools to mass care centers, and was aware that bus driver training is being conducted by Energy Consultants. FEMA was not familiar with the specifics of such training and therefore could not comment on the adequacy of such training. FEMA, ff. Tr. 20,150, at 26. Transporting students from host schools to mass care centers is a very simple procedure occurring at least 5 hours after an evacuation notice and requiring transport of only a small number, if any, of the total number of students evacuated. There is no reason to assume that bus drivers would be unwilling to do this. Information relevant to this procedure is contained in the school district plans and the bus driver training lesson plan. Bradshaw, ff. Tr. 12,761, at 24; e.g., Appl. Exh. E-49, at 25; Appl. Exh. E-64, at 32.

(2) CONCLUSION

363. Based on the evidence developed for this contention, the Board believes as it stated in the conclusion finding of LEA Contention 12, the human response assumptions underlying these plans are reasonable, i.e., that in an emergency individuals show a willingness to perform their duties and do not abandon their roles when they have a clear understanding of these roles. FEMA testified that procedures had not yet been developed to provide reasonable assurance that adequate numbers of bus drivers will be available during a radiological emergency. FEMA's conclusion was based on plans submitted in December 1983. Bd. Fdgs. 337, 531. However, we note that the record addresses facts that took place subsequent to FEMA's review. The Board's findings and conclusion in LEA 11 and 12 lend support to our findings in LEA 15. With sufficient buses (Bd. Fdg. 216) and the demonstrated history of human response in an emergency (Bd. Fdgs. 139, 141, 143-145, 240-244), the Board is satisfied that there is no merit to Contention LEA 15. Based upon this record, we find that there is reasonable assurance that adequate provisions are being made to assure availability of bus drivers and there will be a sufficient number of bus drivers willing to participate in response to an emergency at Limerick.

2. Day Care Facilities

a. LEA-13

There must be specific and adequate plans for children in day care, nursery and pre-school programs in order to provide reasonable assurance that this particularly sensitive segment of the population is adequately protected.

(1) DEVELOPMENT AND CONTENT OF MODEL DAY CARE FACILITY PLAN

364. In its September 24, 1984 Memorandum and Order Ruling on Reworded and Respecified Offsite Emergency Planning Contentions, this Board reiterated its April 20, 1984 Order (LBP-84-18, *supra*) concerning the meaning of the word "specific" in LEA-13. It does not call for institution-specific plans. It only asserts that, to be adequate, whatever planning is done of these institutions must be specific. Slip op. at 11. This Board also ruled out Specification 1, dealing with procedures used to contact parents and guardians. *Id.* at 12.

365. Nothing in NUREG-0654, 10 C.F.R. § 50.47, Annex E or Pub. L. No. 1332 requires any special planning for day care facilities, nursery or pre-school facilities (hereinafter referred to collectively as "day care

facilities”). In particular, there is no requirement for detailed, site-specific plans for each and every school or institution within a nuclear power plant’s EPZ. Adequate arrangements for children enrolled in such facilities should be contained in the appropriate municipal or county plans. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 14, Kinard, Tr. 20,181; Campbell, Tr. 19,990.

366. There are no specific plans for day care facilities at any other fixed nuclear power plant site in Pennsylvania. Such facilities at those sites fall under the general criteria applicable to the public at large. Bradshaw, Tr. 13,271.

367. Prototype county, municipal and school district plans approved by PEMA for governmental units within the Limerick EPZ did not contain any specific provisions for day care facilities inasmuch as concerns for such institutions would generally come under the consideration of “special facilities” in the municipal plans. Bradshaw, Tr. 12,859. Arrangements for day care facilities under the Limerick offsite emergency plans are properly characterized as provisions made for the general public. Bradshaw, Tr. 13,177.

368. No federal planning standard requires that transportation resources be pre-assigned to day care facilities, or that protective action decisionmaking be any different for such facilities than for the general public. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 16.

369. Nonetheless, to assist day care facilities in their own planning, a model radiological emergency response plan for use by day care facilities (“model day care plan”) was developed by PEMA in coordination with the Pennsylvania Department of Education and Department of Public Welfare for use in emergency planning at Limerick. Hippert, ff. Tr. 19,498, at 15-17; Bradshaw, Tr. 13,177-79; Appl. Exh. E-63. The model day care plan provides policy guidelines, recommended procedures for notifying parents at the alert stage in the event of a radiological emergency, and a specification of actions to be taken under each emergency classification. FEMA found the model day care plan adequate for responding to an incident at Limerick. FEMA, ff. Tr. 20,150, at 2. A sample letter to parents, including an explanation of actions that would be taken by the day care facility, is included as Appendix 3 of the model plan. Hippert, ff. Tr. 19,498, at 16; Appl. Exh. E-63, at 3-1.

370. The day care facility director bears responsibility to review his or her facility’s own plan for adequacy. The director may request assistance in that review from emergency planning authorities. Campbell, Tr. 19,914. Day care facilities are not required to file their plans with a municipal coordinator or county emergency management agency, although accompanying instructions and the model plan suggest that they

do so. Campbell, Tr. 19,990; Appl. Exh. E-63, at 7. Municipalities will not conduct a detailed formal review of completed model day care plans but will simply check the plan to see that the appropriate blanks have been completed and that model letter has been sent to parents. This does not include a formalized approval of the plan, merely a check to determine that there is no conflict with any municipal planning provisions. Hippert, Tr. 19,630-31; Reber, Tr. 19,826; Campbell, Tr. 19,990.

371. The Berks County coordinator testified that municipal coordinators should provide assistance as part of their overall responsibility to protect citizens within a municipality by a review or discussions with day care facility directors to determine that radiological emergency plans have been completed. Reber, Tr. 19,743.

372. PEMA finds that it is the "responsibility" of municipal emergency management coordinators to ensure that day care plans are completed. Commonwealth Proposed Findings 77, 78, 85.

373. FEMA has not previously reviewed day care plans with regard to other fixed nuclear power plants in Pennsylvania and has indicated that it will not review any completed day care facility plans for Limerick. Kinard, Tr. 20,277-78, 20,290.

374. Inasmuch as the model day care plan was prepared by agencies of the Commonwealth under the direction of PEMA, it is consistent with the planning principles and assumptions of Annex E. Reber, Tr. 19,817-18; Appl. Exh. E-63. Before the model day care plan was distributed, it was reviewed and discussed at a meeting attended by representatives of PEMA, Montgomery County, Berks County, Chester County, Energy Consultants and Applicant. A few minor changes were recommended at that time, but it was agreed that the model plan was a good one. Bigelow, Tr. 14,304-05. The FEMA witnesses testified that the model day care facility plan is adequate for the purposes of responding to an incident at Limerick. Asher and Kinard (Update), ff. Tr. 20,150, at 2; Asher, Tr. 20,277.

375. Essentially, making the model day care plan available was no different than offering a model fire emergency plan. Its purpose is to make people better prepared to handle an emergency. Campbell, Tr. 20,077.

376. Energy Consultants has not received any requests to train day care facility staff. Bradshaw, Tr. 13,207. There is nonetheless sufficient publicly available information, including the model day care plan, to prepare and implement plans to protect children at day care facilities. Bradshaw, Tr. 13,215.

377. LEA has not specified what detailed information should be included in the public information brochure under development for day

care facilities. It is undisputed that the described brochure is being developed and will be sent to all EPZ residents as previously noted. Any other information specific to the needs of day care facilities can be obtained from Commonwealth agencies and municipal and county emergency coordinators.

378. The Board finds that "formal review training or communication command or accountability at the municipal, county, state or federal level" (LEA Proposed Finding 505) lacks any foundation in fact or requirement under controlling regulations. Review of individual day care facility plans will be conducted upon request. Notification procedures are in place. Municipal and county emergency planners are jointly accountable for the implementation of plans necessary to protect the health and safety of day care facility children in the event of an actual emergency.

(2) IDENTIFICATION OF DAY CARE FACILITIES

379. The Commonwealth's Department of Education and Department of Public Welfare identified all licensed day care facilities within the EPZ and forwarded them a copy of the model plan to assist them in developing their own plans. Bigelow, Tr. 14,133-34; Campbell, Tr. 19,992; Hippert, ff. Tr. 19,498, at 17. The Montgomery County OEP, Chester County DES and Berks County EMA identified unlicensed day care facilities by checking telephone directories, surveying area churches and youth services and through other informal contacts. Bigelow, Tr. 14,134; Reber, Tr. 19,735-36, 19,837-38; Campbell (Admitted Contentions), ff. Tr. 19,852, at 7-8. Energy Consultants assisted the counties in identifying unlicensed facilities throughout the EPZ by soliciting information from county and municipal staff and various organizations and by conducting telephone book surveys. Bradshaw, Tr. 13,184, 13,226, 13,734-35. Energy Consultants also utilized a list of day care facilities provided by LEA. Bradshaw, Tr. 13,185.

380. Based upon the overall effort of governmental planners and private consultants, the model day care plan has been distributed to all day care facilities within the EPZ. County officials and municipal coordinators have been informed of that distribution such that all identified day care facilities are known to the appropriate county and municipal planners. Hippert, ff. Tr. 19,498, at 17-18; Campbell, Tr. 19,992; Reber (Admitted Contentions), ff. Tr. 19,729, at 2, Tr. 19,735, 19,738-39; Appl. Exh. E-1, at N-9-1; Commonwealth/Chester County Exh. E-1, at N-5-1; Appl. Exh. E-3, at N-1-3. Ongoing identification of day care facilities within the EPZ will be a part of the continuing planning process.

Bradshaw, Tr. 13,229. The emergency plans will be updated, if necessary, to identify any newly identified day care facilities. Campbell, Tr. 19,999.

381. The Board finds that the general population public needs survey conducted in 1983 prompted a response from operators, directors or staff of day care facilities, and from the parents of children attending those facilities. The day care facilities within the EPZ have been notified from a copy of the model day care plan distributed by the Commonwealth. All day care facility owners or directors were aware of the model day care plan. Accordingly, the Board finds that each identifiable facility within the EPZ has been provided planning information and assistance to the extent deemed necessary by that facility.

382. Once identified, each unlicensed day care facility was mailed the model day care plan by the county and the identity of the facility was provided to the appropriate municipal coordinator for further contact. Those facilities were asked to contact their municipal coordinators if they had any problems or needed assistance. Required resources will be identified and furnished by the municipalities. Any unmet need will be reported to the counties and passed on to PEMA as with any other unmet need. This is part of an ongoing process. Campbell (Admitted Contentions), ff. Tr. 19,852, at 7, Tr. 19,900; Bigelow, Tr. 14,137, 14,356-57; Bradshaw, Tr. 13,242.

383. Under the model day care plan, facility operators are responsible for arranging transportation and identifying a host facility. Hippert, ff. Tr. 19,498, at 17-18; Bigelow, Tr. 14,137, 14,305-06; Bradshaw, Tr. 13,242; Appl. Exh. E-63, at 3; Appl. Exh. E-91. If there is any problem in doing so, municipal or county officials will, as stated in the cover letter accompanying the model plan, assist in arranging the necessary resources. Bradshaw, Tr. 13,242-43, 13,245; Bigelow, Tr. 14,134, 14,308; Appl. Exh. E-91. The counties will assume responsibility for ensuring that municipal plans reflect identified needs of day care facilities for notification and transportation. Campbell, Tr. 19,914-15.

384. None of the participants in PEMA's routine coordinating meetings has expressed any problem regarding the efforts of day care facility directors to identify host facilities. Hippert, Tr. 19,618. Nor is there any other evidence that day care facilities are having problems identifying and making arrangements with host facilities. Instructions provided facility directors clearly state that assistance from local and county coordinators can be obtained. Even if a specified host facility could not be arranged, it would not affect the children's safety. Day care facilities would simply use the mass care centers designated for use by the general public. Bradshaw, Tr. 13,246.

385. If a facility operator cannot provide or arrange transportation, he or she has been advised to contact the municipal emergency management coordinator to fulfill that need. Thus, to the extent day care facilities report any unmet transportation needs to their municipal coordinators, those needs will be incorporated and addressed in Attachment G of the respective municipal plans like any other portion of the general population with an unmet transportation need. If the need cannot be fulfilled locally, it would be passed on to the county. Hippert, ff. Tr. 19,498, at 18; Bigelow, Tr. 14,137, 14,308, 14,314, 14,358; Reber, Tr. 19,816-17; Bradshaw, Tr. 13,193-94, 13,200; Appl. Exh. E-6 to E-48, Attachment O, Note; Appl. Exh. E-91.

386. The record is clear that each day care facility has been included in municipal implementing procedures for notification and transportation planning purposes and these Board findings have reflected the Board's basis. LEA has incorrectly asserted that there is no way to determine whether day care facility transportation needs are reflected in the municipal plans. LEA Proposed Finding 497.

387. Although the Pottstown Borough transportation officer testified that the borough would not have any responsibility for unmet transportation needs reported by day care facilities (Mattingly, Tr. 17,822-23), those needs would be reported to and discussed with the borough's emergency coordinator, not its transportation officer. Hence, the Board finds the transportation officer's lack of knowledge does not indicate any shortcoming by Pottstown in planning for day care facilities.

388. There is no planning standard requiring a general public needs survey by emergency planners. FEMA has never reviewed such surveys nor even seen them before. Kinard, Tr. 20,184. Nonetheless, the transportation needs for children in day care facilities were also determined by a general public needs survey within the EPZ conducted in the Fall of 1983. Bigelow, Tr. 14,135; Reber, Tr. 19,813-14; Bradshaw, ff. Tr. 12,764, at 16, Tr. 13,179; Appl. Exhs. E-70, E-71, E-100; LEA Exh. E-44. The survey, which was prepared in consultation with the risk counties, was designed to cover the general populace, including day care centers. Each respondent was asked to identify transportation, medical or other special needs for the persons at that address. Each day care center therefore had an opportunity to report any need for inclusion within its municipal plan. Bigelow, Tr. 14,135; Reber, Tr. 19,813-14; Bradshaw, ff. Tr. 12,764, at 16, Tr. 13,188-89; Appl. Exhs. E-70, E-71, E-100; LEA Exh. E-44.

389. The replies to the survey forms were compiled by Energy Consultants and the results furnished to the appropriate county emergency management agency and to the municipal coordinators for inclusion in.

their plans. Bigelow, Tr. 14,135; Bradshaw, ff. Tr. 12,764, at 16; Appl. Exhs. E-6 to E-48, Attachs. F and G.

390. The lack of response from particular day care facilities does not indicate the survey was less than effective, since addressees were instructed to respond only to report a special need. Bradshaw, Tr. 13,191; LEA Exh. E-44. If a particular day care facility has not requested emergency planning assistance from the municipality or county, the Board finds it would be logical to infer that the facility, like any other institution treated as a member of the general public, did not have any unmet needs or unresolved planning problems requiring assistance. Reber, Tr. 19,826. Mr. Bradshaw of Energy Consultants was not aware of any requests for assistance from day care centers to Chester County for transportation or other special needs of infants and very young children. Bradshaw, Tr. 13,239-40.

391. Under municipal plans and implementing procedures, each municipal EOC will notify day care facilities within its jurisdiction at the alert stage. Appl. Exhs. E-6 to E-48, i.e., Exh. E-6, at 20; Bradshaw, Tr. 13,731. Notification at this early stage will give facilities adequate time to notify parents to pick up their children. Reber, Tr. 19,820; Bigelow, Tr. 14,410. The model day care plan gives the facility director the discretion to close the school at the alert stage and inform parents to pick up their children. Hippert, ff. Tr. 19,498, at 17; Bigelow, Tr. 14,309, 14,311; Bradshaw, Tr. 13,237, 13,731; Appl. Exh. E-63, at 4.

392. In the event, any children who have not yet been picked up at the time an evacuation is recommended would be evacuated to a designated host school. The name and location of the designated host facility is specified in the sample letter to parents, which advises parents that their children will be at that location if an evacuation occurs before they are able to pick them up. Thus, except in the most extreme emergencies involving rapidly developing scenarios, parents themselves would transport their children from the day care facility. Hippert, ff. Tr. 19,498, at 17-18; Bradshaw, ff. Tr. 12,764, at 17.

393. Under the model day care plan, children remain the responsibility of the day care facility until they are released to their parents. Campbell (Admitted Contentions), ff. Tr. 19,852, at 8, Tr. 20,001; Bradshaw, ff. Tr. 12,764, at 17, Tr. 13,273, 13,744; Appl. Exh. E-63, at 3. The Board finds nothing unusual in this because day care directors and staff otherwise act *in loco parentis* until children are picked up by their parents. This arrangement is appropriate. Reber, Tr. 19,819.

394. The historical record of human response in emergencies leads to the conclusion that, as with teachers and bus drivers, the family concerns of day care facility directors and staff would be balanced against

larger community concerns. In actual emergencies, such individuals have been found to balance those concerns so as to perform their obligations with regard to other individuals entrusted to their care. Bradshaw, Tr. 13,070, 13,222, 13,273. The documented record demonstrates that reasonable adults will perform such duties in a disaster situation in the absence of training or predefined responsibilities. One can only assume that persons who care for young children have a sense of commitment and that this is acknowledged by the parents in placing their children in the custody of day care facility staff. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 17; Campbell (Admitted Contentions), ff. Tr. 19,852, at 8, Tr. 20,000-01, 20,081; Bradshaw, ff. Tr. 12,764, at 17-18, Tr. 13,215.

395. Contrary to LEA's allegations of staffing deficiencies for day care facilities in the event of a radiological emergency (LEA Proposed Findings 512-514), representatives of only two day care facilities testified as to alleged staffing needs. The testimony of those representatives as to the reasons or likelihood that other staff would be unavailable are entirely speculative and lack credibility. Moreover, even those representatives acknowledged that a number of staff would be available. The Board finds no basis to assume that staffing needs exist elsewhere.

(3) DAY CARE FACILITY WITNESSES

396. LEA presented the testimony of three day care facility directors. These three individuals knew little of the overall planning process for their particular facilities. They testified only as to their generalized concerns, which in each case turned out to be unsubstantiated.

(a) *Little People's Pre-School of the Pughtown Baptist Church*

397. Elaine T. Troisi is the Director of the Little People's Pre-school of the Pughtown Baptist Church, an unlicensed facility located in South Coventry Township, Chester County. Troisi, Tr. 15,779, 15,822. There are twenty-four children enrolled in the Little People's Pre-school and three staff members. Troisi, Tr. 15,800.

398. Mrs. Troisi testified that she had not received the model day care facility plan (Appl. Exh. E-63) furnished by PEMA and the counties (Troisi, ff. Tr. 15,780, at 5), and stated that she had not been contacted by the county, township, municipality or State until December 14, 1984. Troisi, Tr. 15,791. Mrs. Troisi admitted that she had read in the paper that a model day care plan existed, but had not attempted to contact either county or municipal emergency planning officials. Troisi, ff. Tr.

15,780, at 5, Tr. 15,796-97. Mrs. Troisi further admitted that she had not contacted emergency planning officials because it was her belief that they should contact her. Troisi, Tr. 15,799, 15,819, 15,833. She will comply with whatever information is disseminated to her. Troisi, Tr. 15,809.

399. Mrs. Troisi testified that she had received a public needs survey form regarding her own family from the Chester County DES requesting information for those who would need assistance in the event of an emergency. Troisi, Tr. 15,818-19. The Board finds that the survey, along with the other information known to Mrs. Troisi at the time, was sufficient to prompt her to seek further guidance as to the special needs for their facilities. Troisi, Tr. 15,816; LEA Exh. E-44.

400. Mrs. Troisi stated that both members of her staff have a number of unresolved concerns and feel a need to get home to their own children. Tr. 15,804-08. These teachers have told Mrs. Troisi they would not stay in a radiological emergency, but would return to their families as soon as possible. Tr. 15,820-21. Mrs. Troisi stated that she would need assurances regarding notification of her facility and transportation for children to a host facility in order to say that "perhaps" her staff would be available. Troisi, Tr. 15,808. Arrangements already exist at the Little People's Pre-School for staff to transport students offsite in the event of a medical emergency. Troisi, Tr. 15,802-03. Although expressing some reservations regarding staff availability, Mrs. Troisi ultimately agreed that if her facility had an approved plan, she felt sure that she would be able to work out any staff arrangements necessary to provide for the safety of the children. Troisi, Tr. 15,822. Mrs. Troisi has not requested any additional transportation resources for her facility. She stated her intention to review carefully the model day care plan and any other information provided by the Chester County DES to take whatever steps are necessary to secure the safety of her pre-school's children. Troisi, Tr. 15,812.

401. Mrs. Troisi's concern regarding early notification is expressly covered by the South Coventry plan. Troisi, Tr. 15,810-12; Appl. Exh. E-35, at 19.

402. Mrs. Troisi was not aware of the existence of a Chester County plan, a South Coventry plan or any other plans, nor had she examined any of those documents. Troisi, Tr. 15,832-33. She did not know that the South Coventry plan, like all municipal plans, contains provisions to provide transportation for transportation-dependent individuals in the event of an emergency. Troisi, Tr. 15,813; Appl. Exh. E-35, at G-1.

403. The South Coventry plan indicates that a bus will be available in the event of an emergency to evacuate transportation-dependent indi-

viduals. Accordingly, in conjunction with the other vehicles with a capacity for eighteen persons already available to Mrs. Troisi and her staff, there are sufficient transportation resources to evacuate her charges in the event of an emergency, even assuming no parental pickup prior to their evacuation. Troisi, Tr. 15,800, 15,817, 15,825; Appl. Exh. E-35, at G-1.

(b) Day Care Association of Montgomery County, Inc. — Pottstown Center

404. Ilona Seidel is director of the Day Care Association of Montgomery County, Inc. — Pottstown Center. The Pottstown Center is one branch of the parent organization. It serves 141 children and has 22 adult staff members. Seidel, ff. Tr. 16,836, at 1; Tr. 16,837.

405. The Board found Mrs. Seidel unknowledgeable as to emergency planning concepts applicable to her school. Arrangements with the Montgomery County OEP for the Pottstown Center are being handled out of the parent organization's central office. Seidel, Tr. 16,842-43.

406. The model day care plan was furnished to the Pottstown Center by the Pennsylvania Department of Public Welfare in August 1984. A cover letter and attachment provided the name of the municipal coordinator. Seidel, Tr. 16,840; Appl. Exh. E-91.

407. Mrs. Seidel expressed concerns regarding the application of the model day care plan to the Pottstown Center involving the mechanics of notice to the parents and picking up the children at school. Seidel, Tr. 16,857.

408. Mrs. Seidel admitted that notification to the Pottstown Center at the alert stage of an emergency would adequately address her concern that parents should have an opportunity to pick up their children before the commencement of an evacuation. Seidel, Tr. 16,846.

409. Mrs. Seidel testified that approximately ten of seventeen teachers stated they are not willing to stay. Seidel, Tr. 16,846. Mrs. Seidel is not willing to stay (Seidel, Tr. 16,850-52) but would find her own 5-year-old child (outside the EPZ) regardless of what she is told, and "might" fabricate an excuse to pick up her child in the event of a problem at Limerick. Seidel, Tr. 16,851-53. Those staff, however, have not been adequately informed as to the provisions which would be taken by the respective school districts within the EPZ for the protection of their children, including evacuation to a host facility, in the event of a radiological emergency. Seidel, Tr. 16,849-50.

410. Only one of the staff at the Pottstown Center is a single parent. The evidence indicated no reason why arrangements could not be made for the families of other staff members to have the nonstaff parent or

some other person pick up children at school, assuming they attend school within the EPZ and that school officials would permit parental pickup prior to evacuation. Seidel, Tr. 16,855-56. There is no known circumstance in which Pottstown Center staff have abandoned children during times of stress or personal emergency and Mrs. Seidel believes that they would not do so in the event of an emergency at Limerick if the children at the Pottstown Center were threatened. Seidel, Tr. 16,859.

411. The Pottstown Center has a contract with CMD Bus Service of Pottstown for routine transportation. There is no reason to believe that CMD Bus Service would not cooperate in providing transportation for the Pottstown Center. Seidel, Tr. 16,839. If not, the Pottstown Center intends to report unmet transportation needs to the Montgomery County OEP. Seidel, Tr. 16,848.

(c) Upattinas School Open Community Corporation

412. Sandra M. Hurst is the director of the Upattinas School Open Community Corporation. Hurst, Tr. 16,540-41. The Upattinas School is a small, parent-cooperative, private academic school licensed by the Commonwealth. Tr. 16,544. The school is located in the northwest corner of Upper Uwchlan Township, Chester County, just north of the Pennsylvania Turnpike and on the edge of the EPZ. Hurst, Tr. 16,545-46. Though not a day care facility as represented by LEA, the Board nonetheless readily disposes of the minor planning concerns expressed by its director.

413. As a private school within the EPZ, the Upattinas School has its own plan. Appl. Exh. E-89. Although Mrs. Hurst had received the first draft of a plan for the Upattinas School in approximately March 1983, met with planning officials in May 1983, received a second draft plan in July 1983, and had additional communication with planning officials thereafter, she was unable to specify any specific concern or objection regarding her plan which had been raised at that time. Hurst, Tr. 16,546-47.

414. There are eight staff members at the Upattinas School, two of whom have indicated that, depending on the situation, they might be unable to assume responsibilities with regard to the sheltering or evacuation of schoolchildren in the event of a radiological emergency. Hurst, Tr. 16,551. The two staff members in question are husband and wife and have a child. Hurst, Tr. 16,553. Therefore, the Board considers it unlikely that at least one of those two staff members would not be able to assist the school in the event of a radiological emergency. Accordingly, given the enrollment of fifty children in the Upattinas School (Hurst,

Tr. 16,555), the Board believes that adequate staff will be available in the event of an emergency to supervise the children.

415. As reflected in its plan, the Upattinas School has requested a bus from Chester County to supplement the vehicles already available to the school for the transportation of children in the event of an evacuation. Sufficient transportation will therefore be available to evacuate the school in the event of an emergency. Hurst, Tr. 16,550-51; Appl. Exh. E-89, at A3-1.

(d) Conclusion

416. Plans for children in day care, nursery and pre-school programs are sufficiently specific to provide reasonable assurance that this particular sensitive segment of the population will be adequately protected.

3. Residential Facilities for the Mentally Retarded

a. LEA-27

There must be specific and adequate plans to protect Camphill Village Special School, Inc. in East Nantmeal Twp., Chester County and for Camphill Village School in West Vincent Twp., Chester County.

(1) CAMPHILL VILLAGE KIMBERTON HILLS, INC.

417. This contention was admitted for purposes of litigation in the Licensing Board's Special Prehearing Conference Order of April 20, 1984 (LBP-84-18, *supra*, 19 NRC at 1025) and its Memorandum and Order of September 24, 1984, slip op. at 11. In admitting this contention for litigation, the Licensing Board ruled that the use of the word "specific" in this contention was not meant to call for institution-specific plans, but only to assert that for planning to be adequate for these institutions the planning must be specific. LBP-84-18, 19 NRC at 1058; Memorandum and Order of September 24, 1984, slip op. at 11. Furthermore, the Board ruled that concerns about human response, telecommunications and adoptability of the plans are not within the scope of this admitted contention. Memorandum and Order of September 24, 1984, slip op. at 13. Accordingly, we approach the resolution of this contention within the confines of these prior rulings.

418. The Camphill Village Kimberton Hills, Inc. facility, located in West Vincent Township, Chester County, is a residential community for

the mentally retarded comprised of twelve houses on 400 acres of farmland. Five to ten individuals, including mentally retarded persons, reside together in each house. Zipperlen, Tr. 16,016, 16,022, 16,028. Camphill Village Kimberton Hills, Inc., is neither a school nor a licensed facility, but a residential community for mentally retarded individuals from age 18 to near 60. Zipperlen Testimony, ff. Tr. 16,070, at 1, Tr. 16,016-18. The mentally retarded residents are ambulatory and are not profoundly retarded. They are not individuals who cannot do for themselves. Zipperlen, Tr. 16,024. They are able to join their resident families for shopping, entertainment and vacations. They also visit their natural families outside the community, generally accompanied by someone. Zipperlen, Tr. 16,025-027.

419. There are forty-two adults available at the Camphill Village Kimberton Hills, Inc. facility to supervise twenty-eight children and fifty mentally retarded individuals in the event of an emergency. Zipperlen, Tr. 16,046. To varying degrees, the staff is experienced and trained in the care of mentally retarded individuals, with whom they attempt to develop a close and personal relationship. Zipperlen, Tr. 16,046-47.

420. Neither the Commission's emergency planning requirements nor FEMA require that specific emergency plans be developed for this facility. 10 C.F.R. § 50.47 and Appendix E to 10 C.F.R. Part 50; Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 37. Further, under the basic policy of the Commonwealth as set forth in Annex E, particularized written plans need not be prepared for a private facility such as Camphill Village Kimberton Hills, Inc. Rather, the special needs of any such facility, if any, should be incorporated in the appropriate municipal and county plan. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 37; Campbell (Admitted Contentions), ff. Tr. 19,852, at 14-15; Bradshaw, ff. Tr. 12,764, at 28-29.

421. The Camphill Village Kimberton Hills, Inc. facility lies within the jurisdiction of West Vincent Township, Chester County. The West Vincent Township plan and implementing procedures provide for special notification of that facility beginning at the alert stage of an emergency. Campbell (Admitted Contentions), ff. Tr. 19,852, at 14-15; Bradshaw, ff. Tr. 12,764, at 29; Appl. Exh. E-41, at 20; Zipperlen, Tr. 16,062-63.

422. The Camphill Village Kimberton Hills, Inc. facility responded to the public needs survey conducted by Chester County. The Chester County Department of Emergency Services was advised by the administrator of the facility that the transportation available to it could not transport more than one-third to one-half of their residents in one trip. Zipperlen, Tr. 16,058-60. That information was provided to the West Vincent coordinator, who contacted a representative of the facility to

confirm its transportation needs and incorporated those needs into the West Vincent plan. Bradshaw, ff. Tr. 12,764, at 29, Tr. 13,459-60; Zipperlen, Tr. 16,058-61; Appl. Exh. E-41, Attachs. G and O. Ultimately, any transportation need would also be reflected in the Chester County plan. Campbell, Tr. 20,005; Chester County/Commonwealth Exh. E-1, at N-3-2, I-2-1.

423. The Commonwealth asserts that any unmet transportation needs for the Camphill Village Kimberton Hills, Inc., and Camphill Special Schools, Inc., "have not been passed through" to the county. Commonwealth Proposed Finding 119. However, Mr. Campbell inferred from recent plan changes that the transportation needs of those facilities are reflected in the current Chester County plan. Chester County/Commonwealth Exh. E-1, at N-3-2, I-2-1; Campbell, Tr. 20,005.

424. The Chester County DES has entered into an agreement with the Devereaux School for the mentally retarded to act as a host facility for Camphill Village Kimberton Hills, Inc. Campbell, Tr. 20,005-06. The administrator of the Camphill Village Kimberton Hills facility is aware that Chester County has entered into an agreement with the Devereaux School to utilize it as a host facility for the Camphill Village Kimberton Hills facility. Zipperlen Testimony, ff. Tr. 16,070, at 2, Tr. 16,053. Moreover, West Vincent Township representatives have informed the administrator of the facility that the facility would be notified of a radiological emergency at Limerick and that the Emergency Coordinator will have three buses sent to the facility to evacuate its residents to the host facility at the Devereaux School. Zipperlen, Tr. 16,055, 16,061, 16,062. The provision of three buses each having a capacity of forty persons, which is the capacity used in the West Vincent Township plan, would be adequate to transport the residents of the facility if there were a radiological emergency at Limerick. Appl. Exh. E-41; Zipperlen, Tr. 16,069. Accordingly, the special notification, transportation and host facility needs of this facility have been met, thereby providing adequate planning consideration. Bradshaw, ff. Tr. 12,764, at 29, Tr. 13,471-72; Campbell, Tr. 20,005-06.

425. No special expertise or training is required by staff in order to perform the basic tasks of remaining with facility residents and escorting them on buses to the host facility, not an insurmountable task since the facility staff has had some training or experience in care and training of mentally retarded adults. Zipperlen, Tr. 16,064. For Camphill Special Schools, all of the staff members enroll in the facility's 4-year seminar that provides theoretical and practical training in supervising mentally retarded children. Wolf, Tr. 16,266-67. Training as provided to public and private schools has been nonetheless offered to the administrative

personnel and operating staff of both Camphill Village Kimberton Hills, Inc., and Camphill Special Schools, Inc. Zipperlen, Tr. 16,063, 16,067; Wolf, Tr. 16,238; Appl. Exhs. E-77 and E-78; Bradshaw, ff. Tr. 12,764, at 30. Training will alleviate any unjustified fear or apprehension which might otherwise interfere with the fulfillment of assigned responsibilities. Information as to radiation and its biological effects puts certain questions and myths to rest. In that way, trained personnel have a better understanding of what situations they might encounter and makes them more likely to efficiently implement their responsibilities. Bradshaw, ff. Tr. 12,764, at 30, Tr. 13,491. As a practical matter, however, the fact that the staffs of these facilities have not yet received training has little impact because the administrator has attended a number of training sessions including one at the facility. Zipperlen, Tr. 16,063, 16,066-67. Some staff already know how to perform the basic tasks that would be required of them in an emergency.

426. As with school teachers charged with the responsibility for their assigned students, the administrators and staff of the Camphill facilities can be expected to conduct themselves as responsible adults charged with the care and custody of intellectually and physically impaired individuals in the event of any emergency. Bradshaw, ff. Tr. 12,764, at 30. Helen Zipperlen, the administrator of the Camphill Village Kimberton Hills, Inc. facility, described her own staff as volunteers acting out of conscience. Zipperlen, ff. Tr. 16,070, at 3.

427. There is no cogent reason why presumably conscientious staff might decline to assume responsibility for transporting mentally retarded individuals with whom they reside to a host facility in the event of a radiological emergency. Zipperlen, Tr. 16,053-54. The facility's administrator does not know whether the staff would, if necessary, either remain with the mentally retarded residents or provide escort for those individuals during a radiological emergency at Limerick. Moreover, no staff member has ever stated to the administrator that he or she would not remain to assist in providing an escort for mentally retarded individuals to a host facility. Zipperlen, Tr. 16,058.

428. There is no reason why the families of the Camphill Village Kimberton Hills, Inc. facility could not be evacuated with the mentally retarded residents to the same host facility. Zipperlen, Tr. 16,050. Because resident staff of the Camphill communities would themselves need to relocate in the event of an evacuation, the Board finds it reasonable to expect that they would relocate with the client residents at the designated host facility. Bradshaw, Tr. 13,486. The children at the facility attend the Kimberton Farms School. Zipperlen, ff. Tr. 16,070, at 1; Zipperlen, Tr. 16,071. If children of the resident staff were in school

at the time of an emergency, they would be protected under the provisions of the Kimberton Farms School plan. Appl. Exh. E-82.

(2) CAMPHILL SPECIAL SCHOOLS, INC.

429. Bernard Wolf is co-director of the Camphill Special Schools, Inc., located in East Nantmeal Township. Wolf, ff. Tr. 16,310, at cover page, Tr. 16,234-35. Camphill Special Schools, Inc., is a residential community for mentally retarded children licensed by the Commonwealth of Pennsylvania. The population of the facility varies, but averages sixty-two to seventy-two mentally retarded children, fifty-five to sixty-five staff members, plus twenty to thirty staff children. Wolf, ff. Tr. 16,310, at 1. The facility is comprised of ten residences, which average six to eight clientele each (Wolf, Tr. 16,276) and from zero to five staff children and four to six adult staff members. Wolf, Tr. 16,276-77.

430. The Board has accorded minimum weight to Mr. Wolf's testimony because of his uncooperative demeanor during his testimony. The Board also notes that there is a higher level of directorate above Mr. Wolf that oversees operations of the facility, which would be responsible for approval of emergency planning provisions. Wolf, Tr. 16,236-37. The Board does not regard Mr. Wolf's statement of concerns as necessarily the views of his superiors regarding measures to adequately assure the safety and welfare of individuals at the Camphill Special Schools, Inc. facility in the event of a radiological emergency.

431. Mr. Wolf has been uncooperative in responding to several attempts by representatives of Energy Consultants as well as local emergency planning authorities who were attempting to assist Camphill Special Schools, Inc., to identify and meet any emergency planning needs. Wolf, Tr. 16,237-41, 16,260-62, 16,266. The apparent impediment to progress in planning for the facility was Mr. Wolf's unwillingness to engage in further planning efforts until Applicant provided remuneration for facility staff for time spent in emergency planning. Wolf, Tr. 16,262-63, 16,270-71, 16,308-09. Despite repeated attempts by Energy Consultants to meet and discuss specific concerns (Appl. Exhs. E-77, E-79), Mr. Wolf has not contacted Energy Consultants for assistance since his letter of August 14, 1984, stating his demand for compensation from Applicant. Bradshaw, Tr. 16,950, 16,963-64; Appl. Exh. E-78; Wolf, Tr. 16,238-39.

432. The public needs survey conducted by Chester County compiled information provided by Camphill Special Schools, Inc., which was provided to the East Nantmeal Township coordinator, who contacted a representative of the facility to confirm transportation needs, which

have likewise been incorporated in the East Nantmeal plan. Bradshaw, ff. Tr. 12,764, at 29; Bradshaw, Tr. 13,459-60; Appl. Exh. E-29, Attachs. G and O. The Director of the facility has indicated to the Emergency Management Coordinator of East Nantmeal Township that he wanted to arrange for the availability of adequate buses to move the entire population of the facility in one trip. Wolf, Tr. 16,243-44; Appl. Exh. G-81. In addition, Chester County has entered into an agreement with the Deveaux School to act as a host facility for the Camphill Special School. Campbell, Tr. 20,005-06. Mr. Wolf has been informed that the Deveaux School is the host facility for the Camphill Special School. Wolf, Tr. 16,268.

433. The Board found Mr. Wolf's testimony inconsistent with regard to existing plans for evacuation of the facility in an emergency. Under 55 Pa. Code § 6400.194 (Appl. Exh. 80), all resident facilities for the mentally retarded are required to have in place a plan, *inter alia*, for the evacuation of residents in the event of an emergency. Camphill Special Schools, Inc., has formulated such an emergency plan, which it forwarded on March 8, 1982, to the emergency coordinator for East Nantmeal Township, where the facility is located. Wolf, Tr. 16,242-43; Bradshaw, ff. Tr. 12,764, at 31; Appl. Exh. E-81. There is no reason why the State-required emergency plan, which makes no such distinction between man-made accidents or natural catastrophes, could not be applied to a radiological emergency at Limerick. Wolf, Tr. 16,249; Bradshaw, ff. Tr. 12,764, at 31; Appl. Exh. E-81.

434. Camphill Special Schools, Inc., has a sizable fleet of trucks, station wagons, cars and vans with a total capacity of up to eighty passengers which could be used in an evacuation. The emergency capacity of these vehicles would be even higher. Wolf, Tr. 16,246-47; Appl. Exh. E-81, at 2. Referring to the facility's State-required plan, Mr. Wolf stated that this fleet would suffice to evacuate all of the facility's clientele and nineteen supervisory staff (Appl. Exh. E-81, at 2). Transportation for about twenty-one remaining staff and twenty-five staff children would be provided by East Nantmeal Township, based upon the facility's response to the Chester County public needs survey.

435. Similarly, the existing facility plan requires that parents be notified to pick up their child within 36 hours. There is no reason why the same provision could not be utilized in the event of a radiological emergency, whereby parents could pick up children at the designated host facility for the school. Wolf, Tr. 16,256. Any special problems associated with evacuating the facility would be associated with the clientele rather than staff and staff children, whose needs are addressed in the existing plan. Wolf, Tr. 16,303-04. The existing facility plan requires, among

other things, that supervisory staff at the residence will assure that all students dependent on medications, specialized equipment, etc., are evacuated with adequate provisions. Appl. Exh. E-81, at 5. The children of facility staff who attend the Kimberton Farms School would be protected under the plan for that school. Wolf, Tr. 16,289; Appl. Exh. E-82.

436. While the existing plan for Camphill Special Schools, Inc., refers to relocation sites within the EPZ (Appl. Exh. E-81, § III), arrangements have been made to utilize the Devereaux School as a host facility in a radiological emergency. Campbell, Tr. 20,005-06; Bradshaw, Tr. 13,470-71.

437. No survey of facility staff concerning their willingness to respond in emergencies was conducted when the existing emergency plan was filed with the East Nantmeal coordinator. The plan simply assumed that whatever staff might be necessary to evacuate the facility would be available. Wolf, Tr. 16,255-56; Appl. Exh. E-81. Mr. Wolf stated he would do what is needed to evacuate the residents of the facility if that were necessary, including contacting governmental agencies that are available. Wolf, Tr. 16,275-75.

438. Facility staff live with the facility's mentally retarded residents on a full-time basis and have developed a surrogate parent relationship with the children. Wolf, Tr. 16,267. The State-required facility plan states that a 1:4 ratio would provide adequate supervision to effectuate an evacuation (Appl. Exh. E-81, at 1), which could be easily met with current staff/client enrollment. The Board finds that there will be adequate staff available to supervise the implementation of any protective action necessary for the facility's clientele in the event of a radiological emergency. Mr. Wolf's explanation that he had since changed his mind about the ratios (Wolf, ff. Tr. 16,310, at 3) is unpersuasive inasmuch as he has not amended the ratio of 1:4 contained in the existing plan on file since 1982. Wolf, Tr. 16,291. Further, the Pennsylvania Department of Public Welfare, which ordered the facility to develop the evacuation plan, has conducted inspections of the facility's plan on a yearly basis. Wolf, Tr. 16,252, 16,282. The facility, whose license is contingent on the outcome of those inspections, has passed every inspection. *Id.* More importantly, however, for those children with convulsive disorder and behavioral problems that may be exacerbated during an evacuation who are the reason for Mr. Wolf's concern about the adequacy of the 1:4 ratio, the Board notes that the staff of the facility deals with this situation on a daily basis and have medication available through the facility's full-time resident physician if needed. Wolf, Tr. 16,264-66, 16,285. Thus, this behavior is not unfamiliar to the facility's staff. Furthermore, Mr.

Wolf did not indicate how many of the facility's mentally retarded children exhibit this particular behavior. As we stated earlier, all of the facility staff engage in training for the supervision of mentally retarded children. Bd. Fdg. 319. Moreover, the facility's staff is familiar with the State-required evacuation plan since they have reviewed that plan and provided input into its development. Wolf, Tr. 16,282. Under these circumstances, the Board believes that there will be adequate staff available to supervise the implementation of any protective action necessary for the facility's mentally retarded residents during a radiological emergency.

439. Mr. Wolf was concerned about the absence of any evaluation of the facility's buildings to determine their feasibility for sheltering. Wolf Testimony, ff. Tr. 16,310, at 2. The Commission's emergency planning standards (10 C.F.R. § 50.47) do not require that such determinations for sheltering be made. Asher and Kinard Testimony, ff. Tr. 20,150, at 11, 38. However, any decision to shelter the residents of Camphill Special Schools would be made on the same basis as for the general public within the EPZ. Bradshaw, ff. Tr. 12,764, at 31-32. The Commonwealth of Pennsylvania has adopted the policy that if a protective action, such as sheltering, is necessary then it will be implemented for the entire 10-mile EPZ. *Id.* at 11. With respect to the adequacy of a building for sheltering, the Commonwealth of Pennsylvania's Department of Environmental Resources, Bureau of Radiation Protection for Nuclear Generating Station Incidents, provides that this protective action involves persons sheltering themselves in a building that can be made temporarily somewhat airtight. Commonwealth Exh. E-1, Appendix 12, at p. E-12-49. It also provides that a structure for sheltering may be a home, commercial or public building. *Id.*; Reilly Testimony, ff. Tr. 19,381, at 3. Furthermore, it provides that for the general climate of the Commonwealth, any building that is reasonably winterworthy will suffice with windows and doors closed, and such a building is adequate for 2 hours protection from inhalation hazards. Reilly Testimony, ff. Tr. 19,381, at 3. All of the Camphill Special Schools' facility residences have a large room in either the basement or living areas as part of the design. Wolf, Tr. 16,277-78. These residences are insulated and, with heating, can keep residents warm during the winter. *Id.* Further, all of the residents of the facility have windows that can be closed, although some windows cannot be closed tightly in that they are subject to a little draft. Wolf, Tr. 16,278-79. Thus, all facility residents in a particular residence can gather in one room and windows can be closed. *Id.* Accordingly, the Board finds that the Camphill Special Schools facility residences are sufficient to implement sheltering as a protective action in the event that were necessary.

(3) CONCLUSION

440. LEA has contended that for this contention there should be some assurance that municipal and county planners have identified the special needs of these two facilities and that their needs will be addressed. Zitzer, Tr. 16,012, 16,040-41. Based on this record, the Board finds that local planners have identified and addressed the special needs of these two facilities. While further planning may be beneficial, the Board finds the planning to date has been sufficient to address LEA's concerns. Although FEMA concluded that it believed the arrangements for these facilities were not adequate to protect their residents, FEMA's conclusion was based on a review of draft plans submitted to it in December 1983. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, Introduction, at-37. However, we note that *this record* consists of updated drafts of the relevant plans and planning that took place subsequent to FEMA's review. Based on this record, we find there is reasonable assurance that adequate and specific planning has been done for these two institutions. Therefore, the Board finds that FEMA's concern has been resolved by the evidence of further planning that has been developed on this record.

4. *Farmers*

a. *LEA-22*

The State, County, and Municipal RERPs are inadequate because farmers who may be designated as emergency workers in order to tend to livestock in the event of a radiological emergency have not been provided adequate training and dosimetry.

441. The Board in its April 20, 1984 Special Prehearing Conference Order accepted for litigation LEA-22. LBP-84-18, *supra*, 19 NRC at 1060. The concern that LEA sought resolution of was that the RERPs make specific provisions for training farmers in the use of potassium iodide (KI) and dosimetry and for allowing farmers reentry to the EPZ to care for livestock. At the time the Board thought this contention was capable of settlement. However, this contention was voluntarily narrowed and respecified pursuant to the Board's August 15, 1984 Order (unpublished). The Board, by our September 24, 1984 Memorandum and Order, slip op. at 13-14, accepted the respecified LEA-22 and all of the proffered bases. LEA alleged in its bases that the State and county RERPs were inadequate because they did not contain (1) provisions for dosimetry sufficient for multiple reentries into the EPZ by the actual

number of farmers in the EPZ; (2) definitions of “livestock” and “farmer”; (3) provisions for the disbursement of an informational brochure directed to the farming community; and (4) provisions for training to farmers.

(1) FARMER DESIGNATION FOR REENTRY INTO THE EPZ

442. The procedure for designating farmers as emergency workers in the three risk county plans reflects Commonwealth policy. The plans do not constrain reentry by those claiming to be farmers. In an actual emergency, county agents of the Extension Service of the United States Department of Agriculture and county planners would determine who is a “farmer” and what constitutes “livestock” consistent with Annex E. Furrer, Tr. 19,428. Neither Annex E nor the county plans restrict the type of livestock farmer who would be permitted to reenter the EPZ in the event of an emergency. Hippert/Taylor, ff. Tr. 19,498, at 19-20; Reber, Tr. 19,752-54; Bradshaw, ff. Tr. 12,764, at 26, Bradshaw, Tr. 13,383-84; Cunnington, Tr. 13,389-90; Appl. Exh. E-1, at O-2, O-3; Appl. Exh. E-2, at O-2, O-3; Appl. Exh. E-3, at O-2, O-3; Commonwealth Exh. E-1, Appendix 16, at E-16-2, E-16-8, E-16-9.

443. Registration for reentry would take place at the time of an actual emergency; there is no need to pre-register. Furrer, Tr. 19,419; Bradshaw, Tr. 13,386; Appl. Exh. E-1, at O-2; Appl. Exh. E-2, at O-2; Appl. Exh. E-3, at O-2. Essentially, county officials will accept the representation of anyone who states that he has sufficient reason to reenter the EPZ for that purpose. Reber, Tr. 19,753; Bradshaw, Tr. 13,388. The state of emergency would be sufficient to prevent unauthorized individuals who purport to be farmers from attempting to reenter the EPZ. Bradshaw, Tr. 13,389.

444. Conversely, reentry into the EPZ would not be restricted to those farmers identified in the process of developing a conservative estimate of the number of farmers who might seek reentry in an emergency. Cunnington, Tr. 13,393, 13,397. Nothing precludes a farmer from reentering the EPZ with hired hands or family to tend to livestock. Furrer, Tr. 19,420-21.

445. In LEA Proposed Finding 570, this Intervenor has alleged that for Limerick the Pennsylvania Department of Agriculture has not compiled and maintained a site-specific, current list and/or map of the location of dairy herds within the ingestion exposure pathway EPZ in accordance with the requirements of the Commonwealth of Pennsylvania Disaster Operation Plan, Annex E, Fixed Nuclear Facility Incidents, at E-15 3c. Commonwealth Exh. E-1. This is clearly beyond even the most

liberally construed scope of this contention framed by the same Intervenor, and the Board has not considered it necessary for its decision.

(2) DOSIMETRY/KI FOR FARMERS

446. Farmers would be designated as emergency workers because they could be exposed to radiation in the course of attending livestock within the plume exposure pathway (EPZ) and would be given dosimetry and potassium iodide ("KI") upon reentering the EPZ. Commonwealth Exh. E-1, Appendix 16, § II.M, at E-16-2. As a practical matter, however, farmers would not be performing assigned responsibilities similar to those of a fireman or policeman acting as an emergency worker. Bigelow, Tr. 14,143; Appl. Exhs. E-1, E-2, E-3, Appendix O; Appl. Exh. E-101. Nonetheless, farmers designated as "emergency workers" receive the same training on dosimetry as other designated emergency workers. Bradshaw, Tr. 13,384; Hippert/Taylor, ff. Tr. 19,498, at 21; Reber, ff. Tr. 19,729, at 4.

447. In general, county planners obtained a conservatively high estimate of the number of farmers who might seek designation as emergency workers from the local Extension Service Agent, the County Agricultural and Stabilization and Conservation Committee, and the Bureau of Soil Conservation, based on documents on file as to the farmers in the EPZ who receive materials from those agencies and operate farms. The counties supplemented this estimate with their own review of a mailing list provided to them to confirm that the number was a conservative estimate of those farmers who might wish to tend to livestock in an emergency. Hippert/Taylor, ff. Tr. 19,498, at 19-20; Campbell, Tr. 20,003; Bradshaw, ff. Tr. 12,764, at 26; Cunnington, Tr. 13,392.

448. The Berks County Emergency Management Coordinator testified that Berks County relied on the list developed by the USDA Director in identifying the farmers in that county. A total of 100 persons was identified, and all of those persons were contacted. If, in the event of a radiological emergency, a person properly identifying himself as a farmer sought access to the EPZ, he would be eligible for a permit allowing entry into the EPZ. Reber, Tr. 19,752-53.

449. County planners have no reason to question the reliability of the list of farmers obtained from those sources. Campbell, Tr. 20,003; Bigelow, Tr. 14,318-19; Reber, Tr. 19,822.

450. The dosimetry/KI unit supplied for farmers designated as emergency workers in each county (Appl. Exhs. E-1, E-2, E-3, Annex M, Appendix 3) is the same as for all other emergency workers. Bradshaw, Tr. 13,398-99. Each farmer will be issued two self-reading dosime-

ters and a permanent-record dosimeter, as well as a 14-day supply of KI and a Dosimetry-KI Report Form when authorized access to the EPZ. The self-reading dosimeters can be used repeatedly, if necessary by rezeroing on dosimetry chargers located at the issuing points. The permanent-record dosimeters are to be used only by the individuals to whom originally issued, and are to be retained by that person until no further reentries are to be made into the EPZ. Hippert/Taylor, ff. Tr. 19,498, at 20; Bradshaw, Tr. 13,398; *see also* Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 29. Accordingly, there is ample time for sufficient replenishment of supplies if needed. Campbell (Admitted Contentions), ff. Tr. 19,852, at 12. The estimated numbers contained in the county plans are conservative enough to cover the situation where more than one individual per farm might require reentry. Cunnington, Tr. 13,397-98. In addition to existing supplies specifically designated for farmers, there is a reserve supply of dosimetry/KI at each county EOC and transportation staging area. Bigelow, Tr. 14,321; Bradshaw, ff. Tr. 12,764, at 26, Tr. 13,399; Appl. Exh. E-1, at M-4-1; Appl. Exh. E-2, at M-3-1, M-3-3; Appl. Exh. E-3, at M-3-1, M-3-9.

451. The Chester County plan assigns 200 units of dosimetry/KI to farmers. Campbell (Admitted Contentions), ff. Tr. 19,852, at 12; Appl. Exh. E-2, at M-3-1. The Berks County plan assigns 100 units of dosimetry/KI to farmers. Reber (Admitted Contentions), ff. Tr. 19,729, at 4; Reber, Tr. 19,752; Appl. Exh. E-1, at M-4-1. The Montgomery County plan assigns 180 units of dosimetry/KI for farmers who reenter the EPZ to care for livestock, 45 units for animal husbandry workers, and an additional reserve, totaling 236 units. Bigelow, Tr. 14,318; Appl. Exh. E-3, at M-3-1.

452. By agreement dated September 6, 1984, Applicant agreed to fund the procurement of dosimetry necessary to protect offsite emergency workers responding to a radiological emergency at Limerick. Appl. Exh. E-104. If this agreement were formally transmitted to FEMA for review, and those pieces of equipment were purchased and disseminated according to the distribution scheme in the RERPs, then FEMA would have no more concerns regarding the Category "A" deficiency cited in the FEMA Exercise Evaluation Report on the July 25, 1984 exercise (FEMA Exh. E-4) regarding inadequate provisions of dosimetry. Asher, Tr. 20,262-63; *see also* Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 28-29.

453. The Commonwealth provided testimony that the Pennsylvania Department of Health had purchased the KI needed for Limerick in amounts sufficient to satisfy the need identified by FEMA. Hippert, Tr. 19,580, 20,422. FEMA agreed that if this information were formally

transmitted to FEMA the Commonwealth's actions would satisfy the Category "A" deficiency cited in the FEMA Exercise Evaluation Report (FEMA Exh. E-4, at 136) where there had been a failure to demonstrate the availability of KI in a quantity adequate for emergency workers. Asher, Tr. 20,261-62.

(3) FARMER TRAINING AND INFORMATION

454. Under Annex E, an Emergency Workers Instructor Course is available for those who will provide information to farmers. Training for farmers themselves on emergency planning and procedures in a radiological emergency is currently available and has been offered by Energy Consultants. Such training will continue to be made available to all farmers in the EPZ. Hippert/Taylor, ff. Tr. 19,498, at 20-21; Bigelow, Tr. 14,142, 14,315-16; Bradshaw, ff. Tr. 12,764, at 26; Appl. Exh. E-101. That training and the corresponding lesson plans have been reviewed and found to adequately cover the various aspects of a radiological emergency response. Asher and Kinard (Update), ff. Tr. 20,150, at 1; Reber, Tr. 19,796-97. As with other personnel, training will be provided periodically in the future for farmers wishing to be designated as emergency workers in the event of a radiological emergency. Bigelow, Tr. 14,143; Campbell, ff. Tr. 19,852, at 12-13. In an actual emergency, a brief refresher course on dosimetry use and recordkeeping would be sufficient for farmers wishing to reenter the EPZ. Furrer, Tr. 19,422-23; Reber, ff. Tr. 19,927, at 4.

455. Farmers have not been trained to respond to radiological emergencies at other fixed nuclear power plant sites in the Commonwealth. The absence of such training would not adversely impact the ability of farmers to protect their livestock. Furrer, Tr. 19,432.

456. While there is no planning standard in NUREG-0654 or regulatory requirement for distribution of informational brochures to emergency workers or farmers, a brochure to provide farmers with information about remaining with their livestock or reentering the EPZ in an emergency was developed by the Pennsylvania Department of Agriculture for the Three Mile Island facility. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 30. It will assist farmers in protecting livestock and taking other beneficial actions in the event of a radiological emergency. Furrer, Tr. 19,416; Bradshaw, ff. Tr. 12,764, at 26; Bradshaw, Tr. 13,405. The brochure could easily be adapted for use within the Limerick EPZ. Hippert/Taylor, ff. Tr. 19,498, at 21. A request has been made by Applicant to the Secretary of Agriculture to utilize the

Three Mile Island brochure on that basis and the Department has concurred in that request. Furrer, Tr. 19,416-17, 19,429-30. The responsible Commonwealth official has stated that he would make every effort to expedite any further action necessary for the prompt printing and distribution of the brochure. Furrer, Tr. 19,430-31.

(4) CONCLUSIONS

457. The Board has reasonable assurance, based on the evidence before it, that the State, county and municipal RERPs make adequate provision for and do not unduly restrict the designation of farmers with livestock to tend in the EPZ as emergency workers capable of reentering the plume exposure EPZ. Further, measures have been taken to identify farmers within the risk counties and to provide those farmers with training in emergency planning procedures for a radiological emergency, including the use of dosimetry and KI. This training has been and shall continue to be provided on an annual basis to the farming community. In addition, a basic refresher course in the use of dosimetry will be conducted at the time of issuance of dosimetry in an actual emergency.

458. The RERPs reflect that provisions have been made for dosimetry in sufficient quantity for the farmers who have been identified in the risk counties, and that reserves exist for any other farmers properly identifying themselves as such at the time of an actual emergency. The Board has reasonable assurance, based upon the testimony by the Commonwealth and the agreement between the Applicant and the Commonwealth (Appl. Exh. E-104), that supplies of dosimetry and KI have been purchased in quantities sufficient to satisfy FEMA's concerns as expressed in the FEMA Exercise Evaluation Report. FEMA Exh. E-4, at 136, #3. The Board expects such formal transmittal of this information to FEMA.

459. The Board has reviewed the informational brochure that the Applicant seeks to have reproduced in a form adapted to the Limerick plant. There has been testimony from the Commonwealth that provisions are being made for expediting the Applicant's request to reproduce the brochure. The Board urges the appropriate officials to complete this action. Even though the distribution of such a brochure is not required by any emergency planning regulation, NUREG-0654, Planning Standard G.1 suggests the use of informational brochures as a means of disseminating information to the public regarding how they will be notified and what their actions should be in an emergency. However, this Board has received substantial and probative evidence that the Applicant is making provisions for distribution of such an informational brochure

directed to the Limerick area farming community, and we find reasonable assurance that such a brochure will be printed and distributed.

C. Emergency Response Staff and Support Organizations

1. Notification and Route Alerting

a. LEA-26

The Draft County and Municipal RERPs are deficient in that they do not comply with 10 C.F.R. § 50.47(b)(5) because there is no assurance of prompt notification of emergency workers who must be in place before an evacuation alert can be implemented, and there is no assurance of adequate capability to conduct route alerting.

(1) PROVISIONS TO NOTIFY EMERGENCY WORKERS

460. In our April 20, 1984 Special Prehearing Conference Order, we admitted portions of LEA-26 that related to “the issues of resources for route-alerting, the order of the telephone calls by which emergency response organizations would be notified, and the arrangements for securing 24-hour-a-day broadcast capability for the EBS” (LBP-84-18, *supra*, 19 NRC at 1070-73). We found it necessary to reiterate previously stated rulings in our September 24, 1984 Memorandum and Order, slip op. at 15 and 16. Thus, we again excluded from litigation the first of LEA’s reworded bases for LEA-26 which raised questions about the effectiveness of the siren system and all the specifying material, i.e., allegations of ineffectiveness of the siren system related to loss of offsite power. We also rejected for litigation any issue about the effectiveness and timeliness of route alerting. Inasmuch as LEA also sought to raise concerns about human response to a radiological emergency that were not in the originally admitted version of LEA-26, we rejected any attempt to litigate them now. The issue of human response is covered adequately in Contentions LEA-8, LEA-12 and LEA-15. Although LEA has not explicitly stated that it is dropping the originally admitted portion of LEA-26 concerning 24-hour EBS broadcast capability, its failure to include this issue in its most recent rewording of LEA-26 constitutes a withdrawal of this concern.

461. This Board did accept two of LEA’s proffered bases for LEA-26. The first is basically that the notification system of emergency response organizations, prior to public notification, by the county EOCs must not delay siren activation. The second accepted basis is that the municipal RERPs fail to indicate sufficient resources available for route alerting.

462. Specific provisions exist within the county plans and implementing procedures, municipal plans and implementing procedures and procedures for special facilities to notify all emergency workers. Each county Emergency Operations Center ("EOC") is manned at all times and has a 24-hour operations capability. The public alert and notification system in each county could be activated upon notification from PEMA on the authority of the county coordinator or his alternate. Bradshaw, ff. Tr. 12,764, at 27, Tr. 13,413.

463. It is not necessary that county and municipal EOCs be fully manned and mobilized before activation of the public alert and notification (siren) system. Sirens can be activated from the county communications centers, each of which is manned 24 hours a day. Thus, even in the worst-case situation of a rapidly escalating scenario, the sirens could be activated almost instantaneously by on-duty personnel upon authorization of county coordinators. Hippert/Taylor, ff. Tr. 19,498, at 21-22; Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 36; Bradshaw, Tr. 13,412-14, 13,746-47.

464. The sole purpose of activating the sirens is to alert the public to tune their radios or televisions to the Emergency Broadcast System ("EBS"). The siren signal is not a notification to evacuate. Annex E, Appendix 8, ¶ V.B, at E-8-2 (Commonwealth Exh. E-1) provides that the sirens may be sounded when: (1) there is significant information that will reassure the public of their safety; (2) the public is to be informed of a plant status that may lead them to implement specific action on their own; or (3) specific actions (including protective actions) are to be taken by the public. Broadcast of a sheltering/evacuation message over the EBS could also be performed without mobilizing the county and municipal EOCs. Hippert/Taylor, ff. Tr. 19,498, at 23-24; Bradshaw, Tr. 13,413.

465. There is no requirement under NUREG-0654 or 10 C.F.R. § 50.47 that all emergency workers be in place before protective actions are implemented. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 34.

466. Predesignated county and municipal EOC staff personnel can be notified on a 24-hour basis by a pre-recorded message from a computer-assisted automatic dialing system known as the RECALL system once it is operational. As established at the three county EOCs, it has four telephone lines and the capability to dial pre-programmed individuals at home and business, according to the time of day activated. The system is capable of storing telephone numbers for use during different periods of the day or days of the week. It calls numbers in a listed

sequence and will record a coded response which shows receipt and acknowledgment of the message. Different lists have been programmed into the system based upon the priority for reaching particular individuals. An average call takes about 30 seconds. Four calls can be made simultaneously and would proceed through the notification list until completed. Unanswered numbers will be redialed until answered. Bigelow, Tr. 14,145-46, 14,402-05, Reber (Admitted Contentions), ff. Tr. 19,729, at 4-5, Tr. 19,759-61; Bradshaw, ff. Tr. 12,764, at 27, Tr. 13,409-10, 13,415-16; Commonwealth/Chester County Exh. E-1, at C-2-1; Appl. Exh. E-3, at C-6-1.

467. The notification list could also be completed manually in sufficient time to adequately protect the public health and safety. Reber, Tr. 19,765; Bigelow, Tr. 14,406-07; Bradshaw, Tr. 13,417. In addition to the telephone system, a 24-hour communications capability exists to notify fire, police and ambulance services by pager. This system could be used to notify all emergency response personnel even if the RECALL system were not working. Bigelow, Tr. 14,405-06.

468. While the RECALL computer-based dialing systems have been delivered to the county EOCs, they are not yet operational. Bigelow, Tr. 14,403; Reber, Tr. 19,759; Campbell, Tr. 20,055-56. During the July 25, 1984 exercise, the county planning officials saw a demonstration of the RECALL system. Bigelow, Tr. 14,403; Bradshaw, Tr. 13,417. The notification lists for activation and staffing of the county EOCs during the exercise were completed manually. Reber, Tr. 19,763; Campbell, Tr. 20,055.

469. FEMA, in its Exercise Evaluation Report of the July 25, 1984 exercise, found that Montgomery County prematurely staffed the EOC and cited this as a Category "B" deficiency. FEMA Exh. E-4, at 16 and 140. Chester County's EOC staff were activated promptly and in accordance with the plans. FEMA Exh. E-4, at 62. The Berks County EOC staff were in transit during the activation stages which required subsequent calls by those manning the EOC (Reber, Tr. 19,767; FEMA Exh. E-4, at 110); this was cited as a Category "B" deficiency. FEMA Exh. E-4, at 155. FEMA believes the RECALL system will alleviate this type of problem. FEMA Exh. F-4, at 110. Category "B" deficiencies include deficiencies where demonstrated performance during the exercise was considered faulty and corrective actions are considered necessary but other factors indicate that reasonable assurance could be given that, in the event of an actual radiological emergency, appropriate measures can be taken to protect the health and safety of the public. Category "B" deficiencies also include areas where performance was considered adequate, but a correctable weakness was noted. FEMA Exh. E-4, at 134.

(2) CONCLUSION

470. This Board, based on the entire evidentiary record before us, finds reasonable assurance that the notification system of emergency response organizations as provided in the County RERPs complies with 10 C.F.R. § 50.47(b)(5), and the additional guidance provided by NUREG-0654; Planning Standard E.

(3) ROUTE ALERTING

471. Route alerting would be necessary only as a backup if the siren system failed to function. Bigelow, Tr. 14,146-47; Bradshaw, ff. Tr. 12,764, at 27; Appl. Exh. E-3, at C-5-1. There is no planning standard which requires the installation of a redundant or supplemental public alert and notification system, such as route alerting. Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 35.

472. In implementing route alerting procedures, firemen will travel throughout predesignated sectors and, by using loudspeakers or going door-to-door if necessary, will ensure that all persons receive notification of the protective action to be taken. Bradshaw, ff. Tr. 12,764, at 27; Appl. Exh. E-1, at C-6-1; Appl. Exh. E-2, at C-6-1; Appl. Exh. E-3, at C-5-1.

473. Under the Limerick offsite emergency plans, there are approximately fifty fire companies involved in route alerting assignments throughout the forty-three municipalities. In all but two municipalities, Lower Providence Township and Skippack Township, the resources for conducting route alerting have been identified. All but one or two fire companies of the remaining forty-eight have finalized their route alerting sectors. Bradshaw, Tr. 13,449, 13,451. Lower Providence Township has indicated that it has the capability to conduct route alerting, but has not yet made formal route assignments. Bradshaw, Tr. 13,450. The Township is in the process of deciding whether it needs additional vehicles and better defining who will be utilized to perform the route alerting function. In this vein, the Fire Chief of the Lower Providence Township testified that there are not enough people to conduct route alerting. Miller, Tr. 18,142. He further testified that, during the November 20, 1984 exercise, route alerting for the hearing-impaired was performed by volunteers but this did not resolve his concerns. Miller, Tr. 18,147. County planning officials have stated that the county EOCs could provide personnel to take over notification functions, such as route alerting, if necessary. Reber, Tr. 19,807; Campbell, Tr. 19,975-76. Indeed, nothing under Annex E (Commonwealth Exh. E-1) restricts route alerting to fire departments; it can be done by police, auxiliary police or even

contracted to private individuals. Hippert, Tr. 19,588. Adequate arrangements for route alerting are being developed for Skippack Township.

474. The Applicant has an equipment purchasing program whereby the route alerting equipment requested by individual fire companies has been passed on to the Applicant. Bigelow, Tr. 14,401-02; Bradshaw, Tr. 12,861-62. Applicant has agreed to purchase all equipment requested by the fire companies which is necessary for route alerting, i.e., additional public address systems. Bradshaw, Tr. 12,862, 13,452.

475. No fire company with responsibility for route alerting has indicated any problems of manpower availability based upon daytime or evening shift considerations. Route alerting will utilize only a small percentage of the total personnel available to volunteer fire companies. Where a single fire company has responsibility for more than one township, that consideration has been taken into account in developing the sectors and assignments. Assignments have been reviewed with the fire companies and they have indicated that they can fulfill their assigned responsibilities. Bradshaw, ff. Tr. 12,764, at 27-28; Cunnington and Bradshaw, Tr. 13,454-55. Moreover, route alerting need not be performed solely by fire departments. It can be done by fire police, auxiliary police or private individuals. Hippert, Tr. 19,588.

476. Contrary to LEA's assertion (ff. LEA Proposed Finding 593), the evidence of record establishes that fire companies do maintain a roster of personnel for all assignments, including route alerting in a radiological emergency. Periodic updating of personnel rosters is a standard operating procedure for fire companies. This ensures the availability of route alerting personnel from fire companies in the event of an actual emergency. Bradshaw, Tr. 13,655.

(4) CONCLUSION

477. Based on the foregoing, this Board has reasonable assurance that the county and municipal RERPs demonstrate adequate resources capable of conducting route alerting.

2. *Roadway Clearance*

a. *LEA-28(a)*

There is no assurance in the County or Municipal RERPs that the National Guard will have time to mobilize to carry out its responsibilities with regard to towing and providing emergency fuel supplies along state roads.

478. The thrust of this contention as stated by the Board in its April 20, 1984 Order is length of time for mobilization of the National Guard. LBP-84-18, *supra*, 19 NRC at 1073. Under Annex E as well as the county plans, the National Guard has the capability to assist, *inter alia*, with towing and providing emergency fuel supplies. As stated in the plans, this assistance would be furnished as needed in coordination with and supplementary to the capabilities of municipal and county governments and other State agencies. Commonwealth Exh. E-1, Basic Plan, §§ VII.A.17.h, VII.A.22.c and VII.A.22.d; Appl. Exhs. E-1, E-2 and E-3, Annex H, § III; Bradshaw, ff. Tr. 12,764, at 32.

479. As further stated in Annex E and the county plans, the Pennsylvania Department of Transportation ("PennDOT") has shared responsibility for clearance of obstacles to traffic flow, including disabled vehicles on main evacuation routes, and for establishing emergency fuel distribution points on such routes. Road clearance equipment from the PennDOT District Office will be dispatched, if needed, to keep roads clear of stalled or abandoned vehicles. Essentially, this provides a backup support service for the counties if they lack adequate resources. Fuel and towing resources will be provided by the National Guard and PennDOT for all main evacuation routes, regardless of whether they are State or non-State roads. Under Annex E, major arteries are used as main evacuation routes to assure, to the maximum extent possible, that those routes will remain usable and unrestricted in the event of an actual evacuation. Commonwealth Exh. E-1, Basic Plan, §§ VII.A.22.c and VII.A.22.d; Appl. Exhs. E-1, E-2, and E-3, Annex K, § III; Bradshaw, ff. Tr. 12,764, at 32-33; Starasinic, ff. Tr. 20,099, at 4-5.

480. Annex E also states that the Pennsylvania State Police are responsible for coordinating with PEMA, PennDOT and the National Guard to control the orderly evacuation of the EPZ and, particularly, to conduct traffic surveillance to ensure that roads and highways designated as major evacuation routes are open and capable of handling the projected and actual traffic loads. Commonwealth Exh. E-1, Basic Plan, §§ VII.A.19.b and VII.A.19.e; Bradshaw, ff. Tr. 12,764, at 33.

481. PennDOT maintains several facilities in each of the three risk counties, each of which may be promptly activated during nonbusiness hours by means of a 24-hour emergency telephone number available to PEMA and the county emergency management agencies. Accordingly, the PennDOT facilities could be activated and deployed rapidly, if needed, independent of and prior to National Guard mobilization. Bradshaw, ff. Tr. 12,764, at 33-34.

482. Col. Eugene P. Klynoot is the Chief of Staff for the Pennsylvania Army National Guard. Klynoot, Tr. 19,638. As the organized and

equipped State militia of Pennsylvania, the Pennsylvania National Guard is ready to respond to the orders of the Governor placing it on active duty in the event of emergencies or potential emergencies within the Commonwealth. Klynoot, ff. Tr. 19,642, at 2. The Pennsylvania National Guard has previously responded effectively to a wide variety of emergencies, including the Johnstown flood, the Agnes flood, other floods, major snow emergencies, trucker strikes. *Id.* at 2-3. The Guard has previously had very good success in mobilizing under severe weather conditions. Klynoot, Tr. 19,657. The designated response units are equipped with all-terrain vehicles designed for off-road travel. Klynoot, Tr. 19,665.

483. Overall responsibilities for the National Guard in a radiological emergency are detailed in Annex E as well as the Guard's own plans. Such a response would involve supporting county and municipal governments within the EPZ by the deployment of designated Guard units to provide security, traffic control, evacuation and logistical assistance. To coordinate such a response, the Guard would commence operations of a National Guard EOC as well as send representatives to the Commonwealth and risk county EOCs. The Guard is prepared to provide air and ground troop transportation resources to supplement county and municipal resources to assist in an evacuation, including establishment of emergency fuel distribution points and provision of equipment and manpower for road clearance on main evacuation routes. Klynoot, ff. Tr. 19,642, at 4-5; Klynoot, Tr. 19,648.

484. Three specific Guard units with a total of 1300-1400 troops have been designated as the primary response unit for each risk county in the EPZ. Backup units have also been assigned and are available for primary duty or to augment the primary unit as necessary. Klynoot, ff. Tr. 19,642, at 5-6, Tr. 19,673.

485. The main body of each designated unit will be prepared to deploy when about 75% of the unit has assembled. For a worst-case scenario, it would take 6 hours to deploy the unit assigned to Chester County, 8 hours for Berks County and 6 hours for Montgomery County. Advance segments of each unit, however, would be dispatched to the deployment area as soon as mobilized if there were a need. For example, each unit could dispatch its gasoline tanker truck to a point designated by planning officials within an hour to an hour and a half after notification. A wrecker truck could be similarly deployed very shortly after notification. Klynoot, ff. Tr. 19,642, at 7-10, Tr. 19,666-67; Bradshaw, ff. Tr. 12,764, at 34. If given advance notification by PEMA of a possible need to deploy troops, the Guard could begin the early steps of a mobilization to reduce the overall mobilization time. The Guard's plans pro-

vide for it to act upon such notice. Klynoot, Tr. 19,668-69; Bradshaw, ff. Tr. 12,764, at 34.

486. The Guard has fixed wing and helicopter aircraft available at Indianatown Gap, only 60-70 miles from Limerick, to fly equipment, supplies or personnel to emergencies. Klynoot, Tr. 19,647, 19,664-65.

487. In addition to wrecker trucks, the Guard has vehicles equipped with winches to assist in roadway clearance. Klynoot, Tr. 19,654. Almost every military vehicle has a tow ring and is therefore able to tow vehicles. Klynoot, Tr. 19,658. Heavier vehicles have chains which could also be used to move vehicles blocking traffic. Klynoot, Tr. 19,663. It also might be expedient simply to push any vehicle blocking the roadway to the side of the road. Klynoot, Tr. 19,663.

488. The FEMA witnesses testified that consistent with NUREG-0654, Planning Standard E.2, emergency assistance provided by the National Guard "will be furnished in coordination with and supplementary to the capabilities of municipal and county governments and other state agencies and departments." Asher and Kinard, ff. Tr. 20,150, at 39. They added that primary and initial emergency response services are the responsibilities of the State, county and municipal authorities. *Id.* at 40.

(1) CONCLUSION

489. Based on the foregoing evidence the Board finds that there is reasonable assurance that the National Guard will have time to mobilize to carry out its responsibilities with regard to towing and providing emergency fuel supplies along State as well as non-State roads. Accordingly, LEA Contention 28(a) is without merit.

b. LEA-28(b)

There is no assurance provided in the Municipal or County RERPs that there are sufficient resources available to provide towing, gasoline, and snow removal along non-state roads. According to PEMA, the National Guard has neither the resources for snow removal nor the responsibilities for it, according to the Commonwealth's Disaster Operations Plan.

490. The thrust of this contention as stated by the Board in its April 20, 1984 Order is whether there is assurance of enough resources to provide towing, gasoline, and snow removal on non-State roads (LBP-84-18, *supra*, 19 NRC at 1074). As stated in Annex E, PennDOT has responsibilities for clearance of disabled vehicles and snow from evacuation routes and, in coordination with the National Guard, for providing

emergency fuel distribution points on such routes. In describing PennDOT's responsibilities, Annex E does not distinguish between State and non-State roads. Rather, these provisions encompass all evacuation routes listed in the municipal plans and referenced in plan evacuation maps. Bradshaw, ff. Tr. 12,764, at 34; Commonwealth, Exh. E-1, Basic Plan, § VII.A.22; Appl. Exhs. E-6 to E-48, § II.E.2.d and Attachs. J and Q.

491. FEMA witnesses, citing Planning Standard J.10.k (which calls for "identification of and means for dealing with potential impediments . . . to use of evacuation routes, and contingency measures"), testified that based on the 1983 plans there was not assurance that the county and municipal RERPs contain adequate procedures for providing resources for towing, gasoline supplies and snow removal. They added that additional information, including more specific implementing procedures, letters of agreement with towing services, gas station and resource requirements, is needed. Asher and Kinard, ff. Tr. 20,150, at 40.

492. Personnel from the National Guard, PennDOT or other support organizations providing tow truck, snow removal or emergency fuel services will be performing the same functions for which they have already been trained with regard to nonradiological emergencies and will be performing those tasks within the same time frame as an evacuation of the general public. Thus, they would not be required to remain in the EPZ any longer than the evacuating public. Accordingly, no special training is required for such individuals. Bradshaw, ff. Tr. 12,764, at 35. PennDOT does not consider snow clearing in a radiological emergency different from any other snow emergency. Farrell, Tr. 20,112, 20,119, 20,127.

493. Under municipal plans, snow and other obstacles on evacuation routes will be removed by the municipality and PennDOT. Each municipality either has its own snow removal resources or has contracted for such services. Those contracts encompass all snow emergencies and make no distinction as regards other possible circumstances such as a radiological emergency at Limerick. Moreover, PennDOT would be available to provide backup snow removal services to the municipalities for nonevacuation routes, if needed. The Commonwealth has a vast inventory of snow removal equipment and personnel in southeastern Pennsylvania that could be used on a priority basis in the event of a radiological emergency. Unusually severe snowstorm conditions would be considered by the Commonwealth in determining whether evacuation of the EPZ would be undertaken. Bradshaw, ff. Tr. 12,764, at 36; Appl. Exhs. E-6 to E-42, § II.E.2.k(2).

494. Henry W. Farrell and Fred Starasinic are civil engineers employed by PennDOT who testified as to PennDOT's capabilities. Farrell and Starasinic, Tr. 20,097. Depending on the severity of the situation, several procedures could be implemented to snowplow non-State roads in the EPZ. Locally based PennDOT equipment could be activated immediately. Equipment from other districts, but within a few hours response time, could also be activated. There are no union contract problems with assignment of equipment operators or support personnel to snowplow non-State highways. Farrell, ff. Tr. 20,099, at 2; Bradshaw, ff. Tr. 12,764, at 33-34.

495. Privately owned snow clearance equipment is also available and commonly utilized under contract with private services, either on a regular or standby emergency basis. Additionally, PennDOT may utilize emergency agreements for specialty-type equipment not under standby agreement. Farrell, ff. Tr. 20,099, at 2-3, Tr. 20,121-22.

496. Designated mobile emergency teams ("MET") in each district may be called upon to work in other districts during emergency situations. Further, upon declaration of a disaster emergency by the Governor, PennDOT would have blanket authority to secure needed manpower and equipment from any practical source (e.g., National Guard, municipalities, contractors, equipment suppliers and other State agencies) to keep roads open. Finally, over 700 agreements with municipalities to plow sections of State roads are on file. Those municipalities, such as Limerick Township, could also be called upon for services. Farrell, ff. Tr. 20,099, at 3-4.

497. PennDOT has about 2200 pieces of snow removal equipment Statewide. Farrell, Tr. 20,106. In an actual snow emergency, PennDOT would identify its priorities and dispatch equipment and personnel accordingly. PennDOT has operational capability to switch priorities rapidly. Farrell, Tr. 20,105-07. Given sufficient notification to clear roads before an evacuation, there would be no traffic congestion which would interfere with snowplowing. Farrell, Tr. 20,126.

498. The Pennsylvania State Police and PennDOT will provide liaison representatives to each county EOC. This will enable coordination with the county to implement State Police and PennDOT responsibilities. Additionally, the State Police have been directly involved in designating the traffic and access control points which they are assigned to man in an emergency. Bradshaw, Tr. 13,499-500, 13,513.

499. It is unnecessary for the counties to obtain agreements with tow truck operators because tow trucks are routinely dispatched by the counties on a daily basis without any agreement. Extensive towing resources

are listed in the resource manuals of the County Communications Centers. The several hundred tow trucks available in each of the three counties greatly exceed the number which might be needed. Additionally, PennDOT will provide its own equipment to assist in the removal of disabled vehicles and other road obstacles. Bradshaw, ff. Tr. 12,764, at 35; Bradshaw, Tr. 13,517; Cunningham, Tr. 13,528.

500. In many instances, it would be unnecessary to provide gas or towing services for a stranded or disabled vehicle. It could simply be pushed to the side of the road. Campbell, Tr. 20,007; Bradshaw, ff. Tr. 12,764, at 35-36. Persons having vehicles without enough fuel to travel out of the EPZ would be included as members of the general public without transportation. The public information brochure will instruct residents in the EPZ on how to obtain publicly provided transportation. Bradshaw, ff. Tr. 12,764, at 35.

501. Mr. Robert L. Reber, Director of the Berks County Emergency Management Agency, testified that the Berks County RERP, Annex K, at K-3-1 (Appl. Exh. E-1) states, "a current list of wrecker/tow operators is maintained on file in the Berks County Communications Center." This facility is fully staffed on a 24-hour basis, 7 days a week. Dispatching wreckers or tow trucks is a routine operation and there has never been a shortage of these resources in Berks County. Additionally, the Berks County plan lists gas stations or operators who have agreed to open or remain open in emergencies. Telephone numbers for 24-hour contact with those resources are on file. Given these resources, there is no need for any written agreements. Reber (Admitted Contentions), ff. Tr. 19,729, at 5. Although it has never been necessary, additional tow trucks could be obtained upon request from Schuylkill, Lebanon or Lancaster Counties. Reber, Tr. 19,824.

502. Mr. Bigelow, the Coordinator of Emergency Preparedness for Montgomery County testified that during an actual evacuation, the Montgomery County OEP would utilize police to monitor road conditions, including potential traffic congestion. Field services, such as Public Works Department personnel would also be utilized. Bigelow, Tr. 14,150. Roadway clearance resources are also available to the County (Bigelow, Tr. 14,150; Appl. Exh. E-3, Appendix K-3).

503. Mr. Timothy R. Campbell, the Director of the Department of Emergency Services (DES) of Chester County testified that in Chester County, there are more than 100 towing services which are dispatched on a daily basis; some services have more than one tow truck. Campbell, Tr. 20,007. He added that towing or road clearance can be provided from inside or outside the EPZ in accordance with customary procedures with reasonable assurance. Sufficient gas stations are expected to be

available outside the plume EPZ. The Pennsylvania National Guard will have emergency supplies of gasoline on main evacuation routes. Municipalities already have contract, or their own, equipment for snow removal. Campbell, ff. Tr. 19,852, at 15.

504. Past experience in disaster evacuations shows that vehicle breakdown and lack of gasoline are not problems and do not, therefore, impede evacuation. For example, towing demands around holidays are typically far greater. Bradshaw and Cunnington, Tr. 13,530-31. Adverse weather conditions would not necessarily increase the need for towing services or render them less available. Bradshaw and Cunnington, Tr. 13,531-33.

505. In times of emergency, there would be an increase in altruistic behavior on the part of the public. Individuals will assist motorists in moving a disabled vehicle, and offer stranded motorists a ride. Cunnington, Tr. 13,534-36.

(1) CONCLUSION

506. Based on the evidence in the record, particularly the testimony of the Applicant (Mr. Bradshaw), the Commonwealth (Mr. Farrell and Mr. Starasinic) and the three risk counties (Mr. Bigelow, Mr. Campbell and Mr. Reber) the Board finds sufficient information and procedures in the county and municipal plans to provide the additional information that FEMA testimony indicated was required regarding the adequacy of the county and municipal plans on the matter of resources for towing, gasoline supplies and snow removal. Bd. Fdg. 491. Based on the evidence of record, the Board finds that the pertinent element of Planning Standard J of NUREG-0654 has been satisfied and that Contention LEA-28(b) is without merit.

3. Staffing of Emergency Operations Centers

a. LEA-2

The unadopted RERPs fail to provide reasonable assurance that each principal response organization has sufficient staff to respond to and to augment its initial response on a 24-hour continual basis, or that the assigned staff can respond in a prompt manner in case of a radiological emergency at Limerick.

507. The thrust of this contention as noted by the Board is that unmet municipal staffing needs preclude a reasonable assurance that the requirement in 10 C.F.R. § 50.47(b)(1), i.e., that each principal response organization has sufficient staff for initial and continuous response, will

be met. Memorandum and Order on LEA's Deferred and Respecified Offsite Emergency Planning Contentions, dated October 26, 1984, slip op. at 4.

508. FEMA testified that § 50.47(b)(1) calls for each principal response organization to have "staff to respond and to augment its initial response on a continuous basis." NUREG-0654, Planning Standard A.4 calls for each principal organization to be "capable of continuous (24-hour) operations for a protracted period." Principal organizations are defined in Appendix 5 to NUREG-0654 as "federal, state, local agencies or departments or executive offices and nuclear utilities (licensees) having major or lead roles in emergency planning and preparedness." Because the emergency response network established in the Commonwealth of Pennsylvania relies on the coordinated efforts of State, county and municipal governments, along with school districts, FEMA regards municipal governments as principal organizations. Asher and Kinard, ff. Tr. 20,150, at 3.

509. FEMA also testified that in the April 1984 "Interim Findings on the Offsite Radiological Emergency Response Plans for the Limerick Generating Station," FEMA established a "Category A" deficiency that stated 24-hour emergency response at the municipal level is not assured due to the fact that many staff positions are vacant, according to the latest municipal draft plans. The problem of lack of 24-hour staffing was confirmed in sixteen municipalities during the July 25, 1984 REP exercise (see FEMA/RAC Exercise Evaluation Report, dated September 19, 1984, Summary of Category "A" Deficiencies, at 135). The Exercise Evaluation Report also revealed that certain municipalities had adequate staffing to respond to long-term emergency at Limerick but that the information, i.e., the names of response personnel, would have to be officially recorded in the plans before FEMA would regard the situation as being resolved. The municipal plans supplied earlier to FEMA by PEMA, as well as the July 25, 1984 Limerick REP exercise evaluation, indicated to FEMA that staffing of municipal EOCs remained an open issue. Therefore FEMA testified that there is not reasonable assurance that all risk municipalities have 24-hour staffing capability. Asher and Kinard, ff. Tr. 20,150, at 4; FEMA Exh. E-4, at 135.

510. The Applicant's witness testified that prior to development of the plans, few municipal emergency management agencies had any staff other than a designated coordinator. As planning requirements were clarified, the recruitment process began. Significant and steady progress in this process has been made since the first drafts of the plans. All but one (possibly two, counting South Coventry Township) of the forty-three municipalities now have a complete first shift. Most have a com-

plete second shift. The few remaining vacancies can be filled by the municipalities, but could, if need be, be passed on to the counties. Bradshaw, ff. Tr. 17,191, at 3; Bradshaw, Tr. 17,291-92, 17,384.

511. There are outstanding vacancies for only a few municipalities and positions throughout the EPZ, i.e., Colledgeville (one), Upper Pottsgrove (one), Washington (one), Union (eight) and South Coventry (accurate data unavailable; total of ten required). Bradshaw, ff. Tr. 17,191, at 5-7; Bradshaw, Tr. 20,337-39; Appl. Exh. E-35, at 10-11, Attach. I-1; FEMA Exh. E-3.

512. More-immediately-available volunteers are placed on the EOC first-shift staff. Bradshaw, Tr. 17,384. The first shift would assure initial responsibilities in the event of an emergency, regardless of the time of day. Bradshaw, Tr. 17,385.

513. In responding to radiological emergencies, as opposed to other emergencies, the municipalities have determined that they would need between three to five individuals per shift. Implementing procedures are established on a functional basis for each discrete task, which could therefore be performed by any trained individual in the municipal EOC. This was demonstrated during the July 25, 1984 exercise where the Greenlane Borough volunteers had no previous training, but were able to utilize the implementing procedures to effectively implement the municipal plan. Bradshaw, Tr. 17,359-60.

514. Although a number of Applicant's employees have volunteered their services to their respective municipalities, not all of those volunteers were ultimately selected. Bradshaw, Tr. 17,293. Only about 50 of the 400 or so EOC positions are manned by Applicant's employees. Bradshaw, Tr. 17,293. Applicant's employees with either onsite or offsite Limerick responsibilities were excluded. Bradshaw, Tr. 17,294-95.

515. The Staff noted that according "to information supplied by Energy Consultants, dated August 27, 1984, the staffing needs of most municipal EOCs had been dealt with through the assistance of Philadelphia Electric Company personnel." NRC Staff Proposed Finding 378D. That information does not reflect current staffing assignments. The most accurate and current information as to municipal EOC staffing was provided by Applicant's consultant during the hearing. As noted above, only about 50 of approximately 400 positions are filled by Applicant's employees. Bd. Fdg. 514.

516. Applicant's employees who had volunteered for the municipal EOCs would be utilized for all emergencies, not just radiological emergencies. There were no distinctions in the recruitment process with regard to whether an EOC volunteer was Applicant's employee. Municipal coordinators use their own discretion to determine whether or not a

volunteer was suitable. Bradshaw, Tr. 17,367-68. Such judgment, in the opinion of township supervisors, is competent and reliable. Bd. Fdg. 540.

517. Despite the attempt by LEA to distinguish between "municipal and PECO volunteers" (LEA Proposed Finding 596), the record does not support any such distinction. To the contrary, it demonstrates that volunteers employed by the Applicant are just as reliable and responsible as any other volunteer. Bd. Fdgs. 602-603.

518. Attachment O of each municipal plan lists personnel requirements for such activities as route alerting, traffic control, ambulances and communications, e.g., Radio Amateur Civil Emergency Service ("RACES") or Amateur Radio Emergency Services ("ARES") radio operators. Some unmet municipal needs for traffic control and radio operators have been passed on to the counties. Bradshaw, ff. Tr. 17,191, at 3.

519. Both Berks and Montgomery Counties have met municipal needs for radio operators through RACES volunteers. Chester County has passed a requirement for additional radio operators on to PEMA. Bradshaw, ff. Tr. 17,191, at 3-4. The availability of amateur radio operators in Montgomery and Berks County so far exceeds their needs that there would be an ample number of radio operators who could be assigned to Chester County, if necessary, by PEMA as with any other unmet need. Additionally, Lancaster and Delaware Counties, which are immediately adjacent to Chester County, have a considerable number of radio operators. *Id.* at 4; Bradshaw and Cunnington, Tr. 17,387-89.

520. The Chester County plan indicates that the DES intends to satisfy reported municipal EOC staff needs for seven persons in an actual emergency. Bradshaw, Tr. 17,335; Appl. Exh. E-2, at Q-1-1. The unmet need for municipal staffs in Chester County would be essentially zero, however, for a radiological emergency. This includes consideration of South Coventry Township needs. Bradshaw, Tr. 17,337, 17,361. Accordingly, Chester County has the capacity to meet additional municipal staffing needs which have not been reported yet, especially for a second shift.

521. Chester County has shown that unmet staffing needs for South Coventry can be obviated by the county's assumption of emergency response functions for that township. Bd. Fdgs. 626-628. Nevertheless, South Coventry has affirmatively stated its intent to develop a full emergency response capability. Whitlock, Tr. 18,471, 18,493.

522. Similarly, Berks County has stated its capability to support or assume Union Township's EOC functions in an actual emergency, although it expects Union to resolve staffing shortages through additional recruitment and realistic paring down of staff needs, including possible

combination of certain compatible staff functions. Reber, Tr. 19,807-10. Given the Berks County commitment of assistance, the Board expects Union Township to work in that direction and continue recruitment efforts until full 24-hour EOC staffing has been achieved.

523. On cross-examination, FEMA's witness, Mr. Kinard, testified that he would accept Mr. Bradshaw's testimony regarding current staffing of the various jurisdictions subject to verification by the jurisdiction involved and that with such verification the "Category A" deficiency stated in its April 1984 interim findings would be satisfied and resolved. Kinard, Tr. 20,253-57.

(1) CONCLUSION

524. Based on the evidence of record, the Board finds that there is reasonable assurance that there is sufficient municipal staffing, satisfying the requirement in 10 C.F.R. § 50.47(b)(1), provided that prior to operation above 5% of rated power FEMA receives verification of satisfaction of the unmet staffing needs.

4. Letters of Agreement

a. LEA-5

The Emergency Response Organizations (including federal, state, and local governments and support organizations) have failed to fully document the existence of appropriate letters of agreement with support organizations and agencies. Thus, there is no reasonable assurance that the emergency plans can be implemented.

525. In its October 26, 1984 Memorandum and Order on LEA's *Deferred and Respecified Offsite Emergency Planning Contentions*, this Board ruled that the parts of LEA-5 which call for letters of agreement with individuals, or with organizations whose response functions are covered by laws, regulations or executive orders were not acceptable. The Board commented that it remained to be determined whether letters still to be drawn up constituted an obstacle to a finding that there is reasonable assurance that the plans can and will be implemented.

526. Section 50.47(b)(3) of 10 C.F.R. calls for the identification of "other organizations capable of augmenting the planned response . . ." while NUREG-0654, Planning Standard C.4 states that "each organization shall identify nuclear and other facilities, organizations or individuals which can be relied upon in an emergency to provide assistance. Such assistance shall be identified and supported by appropriate letters

of agreement.” Asher and Kinard (Deferred Contentions), ff. Tr. 20,150, at 7.

527. Initially, it must be understood that under NUREG-0654, Criterion A.3, a letter of agreement does not express a contractual commitment, but rather serves as a statement of interest of the parties entering the agreement to provide assurance that a support organization has been notified and has agreed in principle to provide a support function. Bradshaw, Tr. 17,379. FEMA testified that the types of letters of agreement obtained by Chester and Montgomery Counties are sufficient under NUREG-0654. Asher, Tr. 20,273.

528. In this light, agreements have been sought and obtained for such support functions as host schools, host health care facilities, bus providers, reception centers, Red Cross support, Emergency Broadcast System support and decontamination stations. Mass care agreements have been developed in each county in accordance with the particular arrangements in existence between the counties and their respective Red Cross Chapter. Those arrangements have been completed for each county. Bradshaw, ff. Tr. 17,191, at 11.

529. RACES and ARES agreements are unnecessary since the sole purpose of these organizations is to assist in emergency situations. They are considered extensions of the county emergency management agencies with which they have a close working relationship. Furthermore, the ARES and RACES organizations demonstrated their commitment to assist in a radiological emergency response by their participation in the July 25 and November 20, 1984 exercises, including necessary staffing of municipal EOCs as prescribed by the municipal and county plans. Bradshaw, ff. Tr. 17,191, at 11.

530. Agreements for road clearance services are not required and are unnecessary. The county emergency management agencies routinely dispatch tow trucks. Extensive resources are available and are on file in the county EOCs. Further, additional road clearance resources are available from the National Guard and PennDOT. Bradshaw, ff. Tr. 17,191, at 11-12; Bd. Fdgs. 479-483.

531. Although FEMA testified that in most instances the draft plans it reviewed (submitted by PEMA in December 1983 — Tr. 20,177) do not include letters of agreement with organizations that have agreed to provide support in the event of an accident at Limerick (Asher and Kinard (Admitted Contentions), ff. Tr. 20,150, at 7), the record shows that about three-fourths of all agreements are now complete. Bradshaw, ff. Tr. 17,191, at 12-15. In any event, the absence of written agreements does not preclude the workability of the plan. Thompson, Tr. 18,832-33.

532. LEA asserts that there are certain "mutual aid agreements under development by local municipal coordinators," which still require municipal approval. LEA Proposed Finding 165. To the contrary, the evidence establishes that arrangements are already in place, for example, for ambulance and fire department response across municipal and county lines. Bd. Fdgs. 589, 598, 662.

533. Letters of agreement for the evacuation of schoolchildren and other transportation-dependent individuals have been or are now being obtained by means of a thorough, systematic review of transportation resources and consultation with identified providers. Based on the established mechanisms for obtaining outstanding transportation agreements under the county plans or passing unmet needs to PEMA, the Board is satisfied that all necessary agreements will be obtained. Bd. Fdgs. 121-216.

(1) CONCLUSION

534. While agreements are required for emergency planning, executed agreements are not necessary for a plan to work. There are a number of emergency plans throughout Chester County for which there are no written agreements or assurances from support organizations. Such emergency responses are based upon verbal commitments and the community spirit of support organization members. During Commissioner Thompson's tenure in office, there have been a number of disasters or potential disasters, including one incident requiring the evacuation of about 500 people. In each instance, county and volunteer agencies demonstrated an exemplary ability to sustain emergency preparedness efforts over a period of time and had absolutely minimal problems without any prior written agreements. The absence of written agreements does not preclude the workability of the plan. Thompson, Tr. 18,832-33. Accordingly, the Board finds that based on the evidence of record the letters of agreement are not necessary to demonstrate reasonable assurance that the emergency plans can be implemented. Therefore, LEA-5 is without merit.

D. Plan Adoption

1. Counties, Municipalities and School Districts Within the Limerick EPZ

a. LEA-1

The Risk Counties, Municipalities, School Districts, and Institutions haven't promulgated or adopted final radiological emergency response plans, nor have they approved and adopted plans drawn up for them by Energy Consultants, Inc., a Harrisburg firm hired by Philadelphia Electric Company. There is no reasonable assurance that the present state of planning is predictive of final approval, or that the plans are capable of being implemented.

(1) EMERGENCY PLANNING REQUIREMENTS IN THE COMMONWEALTH OF PENNSYLVANIA

535. This contention was admitted by the Licensing Board's Memorandum and Order of October 26, 1984, slip op. at 2-4. In its Memorandum and Order admitting this contention, the Board excluded the first basis, which contended that there is no reasonable assurance that PEMA can provide for the unmet needs LEA alleges exist in Chester and Montgomery Counties for buses and ambulances. *Id.* at 2. Further, this Board ruled out the fourth basis, which alleged that there is no reasonable assurance that the planning approaches some local jurisdictions are considering as alternatives to the approaches proposed by the Applicant's consultant will conform to NUREG-0654. *Id.* at 3. Thus any evidence concerning these matters has not been considered by the Board in resolving this contention.

536. Emergency planning in Pennsylvania follows the mandate of the Emergency Management Services Act of 1978, Pub. L. No. 1332, No. 323 ("Pub. L. No. 1332"). Pub. L. No. 1332 sets forth a comprehensive legislative scheme by which municipalities, counties and the Commonwealth are required to establish emergency plans, procedures and resources, *inter alia*, to reduce the vulnerability of the Commonwealth populace to injury and loss of life resulting from disasters, and to prepare for the prompt and efficient rescue, care and treatment of disaster victims. Pub. L. No. 1332, 35 Pa. Cons. Stat. Ann. §§ 7103(1) and (2). With regard to planning requirements at the local level, 35 Pa. Cons. Stat. Ann. § 7501(a) provides:

(a) *Establishing emergency management organization.* — Each political subdivision of this Commonwealth is *directed* and authorized to establish a local emergency management organization in accordance with the plan and program of the Pennsylvania Emergency Management Agency. Each local organization *shall* have

responsibility for emergency management, response and recovery within the territorial limits of the political subdivision within which it is organized and, in addition, *shall* conduct such services outside of its jurisdictional limits as may be required under this part. [Emphasis added.]

537. Under § 7502(d), each local organization is required to appoint an emergency coordinator who “shall be professionally competent and capable of planning, effecting coordination among operating agencies of government and controlling coordinated operations by local emergency preparedness forces.” Additionally, Pub. L. No. 1332 states several requirements regarding the status of emergency preparedness for each political subdivision of the Commonwealth. Section 7503 provides, *inter alia*:

Each political subdivision *shall*:

(1) Prepare, maintain and keep current a disaster emergency management plan for the prevention and minimization of injury and damage caused by disaster, prompt and effective response to disaster and disaster emergency relief and recovery in consonance with the Pennsylvania Emergency Management Plan.

(2) Establish, equip and staff an emergency operations center, consolidated with warning and communications systems to support government operations in emergencies and provide other essential facilities and equipment for agencies and activities assigned emergency functions.

(3) Provide individual and organizational training programs to insure prompt, efficient and effective disaster emergency services.

(4) Organize, prepare and coordinate all locally available manpower, materials, supplies, equipment, facilities and services necessary for disaster emergency readiness, response and recovery. [Emphasis added.]

538. Contrary to LEA’s assertion, local authorities do not retain “ultimate authority” to declare emergencies, such as a serious nuclear power plant accident, which would affect several counties. LEA Proposed Finding 163. Such authority resides in the Governor under §§ 7301(c) and 7504(a) of Pub. L. No. 1332.

539. From the testimony of the county and municipal officials and planners, there emerged a clear consensus that Pub. L. No. 1332 imposes mandatory, not discretionary, obligations upon local governments to have in place a workable emergency plan, an emergency response organization, and an emergency operations center and related resources necessary to respond to any disaster emergency, whether radiological or nonradiological, natural or man-made. Similarly, each county and

municipal official testified that it was the intention of his Board of Commissioners or Board of Supervisors to comply with the requirements of Pub. L. No. 1332, without distinction between radiological and nonradiological disaster emergencies, by working toward the adoption of a workable emergency plan. Bartle, Tr. 18,622-23; Thompson, Tr. 18,858; Grenz, Tr. 17,950-52, 17,954; Yeager, Tr. 18,046-48; Skarbeck, Tr. 17,835; Waterman and Templeton, Tr. 18,095-96, 18,099-101; Brown, Tr. 18,180-81, 18,225-26, 18,230; Whitlock, Tr. 18,471; Kelly, Tr. 18,571-72; August, Tr. 18,903; Giamo, Tr. 19,125-29.

540. Each of the county and municipal officials also expressed confidence in their respective emergency coordinators as "professionally competent and capable" as required by § 7502(d) of Pub. L. No. 1332, and stated that they would rely upon the coordinator's professional assistance and recommendations in adopting an emergency plan. Typically, the township supervisors and County Commissioners who would be responsible for approving the plans have not yet reviewed them in sufficient detail to be familiar with each of the planning concepts and principles as well as their application to the respective plans. Rather, those officials have almost entirely delegated responsibility for developing a plan to their coordinators and requested them to submit plans for consideration when deemed suitable for approval. Thompson, Tr. 18,857; Bartle, Tr. 18,582, 18,597, 18,611-13, 18,620; Grenz, Tr. 17,888-89, 17,891-92, 17,952-53; Yeager, Tr. 18,006-07, 18,047-48; Skarbeck, Tr. 17,767, 17,832-33, 17,835, 17,851, 17,862-63; Waterman and Templeton, Tr. 18,062-63, 18,094-96; Whitlock, Tr. 18,534-35; Kelly, Tr. 18,565-67, 18,655; August, Tr. 18,938, 18,973-74; Brown, Tr. 18,186; Giamo, Tr. 19,134. The record is devoid of any evidence that local coordinators have advised their respective counties or municipalities of any serious deficiency in the plans or obstacle to their ultimate adoption (e.g., Bartle, Tr. 18,613, 18,621; Skarbeck, Tr. 17,769-70, 17,834; Grenz, Tr. 17,891-92, 17,948, 17,953; Thompson, Tr. 18,841; August, Tr. 18,879, 18,961-62; Giamo, Tr. 19,129-30).

541. A number of township supervisors testified as to their personal concerns regarding certain plan provisions. In general, most concerns fell into two categories. First, a number of supervisors stated that greater work had to be done in identifying "unmet needs" at the local level and pinpointing the source which would satisfy that need. The Board sees this as nothing more than the logical culmination of the dynamic planning process in Pennsylvania under Pub. L. No. 1332, which requires municipalities to report any unmet needs at the local level to their respective counties and on to PEMA, if necessary. Hippert, ff. Tr. 19,498, at 8-9; Bradshaw, ff. Tr. 12,764, at 3.

542. As a second category, some township supervisors stated various concerns which resulted from a misunderstanding of the basic planning principles and assumptions under Annex E and Pub. L. No. 1332, a need for further coordination with county and/or PEMA officials, or an understandable lack of familiarity with the details of their plans. With the assistance of the three county coordinators and PEMA officials, all of whom demonstrated a highly professional attitude before this Board, we are convinced that those concerns, which are being pursued, will also be resolved. The unanimous declaration by all government officials of their intent to comply with Pub. L. No. 1332, in the Board's view, indicates that we can reasonably expect the relatively minor concerns stated by some officials to be adequately addressed.

543. Some township officials have felt a lack of interest on the part of PEMA in assisting them in complying with their responsibilities under Pub. L. No. 1332 or have detected indifference with respect to the enforcement of its mandatory provisions (e.g., Kelly, Tr. 18,562-63, 18,565, 18,675-76). Some officials acknowledged that, although the requirements of Pub. L. No. 1332 are mandatory and have been in existence for some time, they have not yet conformed to the law. Brown, Tr. 18,226-27. The Board finds that as PEMA and the counties continue to assist municipalities in their present efforts to comply with Pub. L. No. 1332, adherence to the statute will be effected.

(2) DEVELOPMENT OF OFFSITE EMERGENCY PLANS

544. The sixty-one county, municipal and school district draft plans received in evidence (Applicant's Exhs. E-1 through E-61) represented the current status of emergency planning for the respective jurisdictions within the EPZ at the time of the hearing. Bradshaw, Tr. 16,930. These draft plans were developed with the assistance of Energy Consultants and have undergone reviews by county and municipal emergency personnel and school district officials, as well as the Commonwealth. Bradshaw, ff. Tr. 12,764, at 1. Earlier versions of these draft plans were reviewed by FEMA. Asher and Kinard (Introduction), ff. Tr. 20,150; Kinard, Tr. 20,301.

545. The Commonwealth has officially reviewed each draft plan in full at least once in December 1983 and provided written comments on those plans to the respective jurisdictions. Previously, PEMA had reviewed the prototype municipal and school district plans in 1982. In addition, concerns related to these plans have been discussed at planning and coordination meetings involving PEMA, the risk counties and Energy Consultants. Bigelow, Tr. 14,150; Bradshaw, ff. Tr. 12,764, at 4.

546. As utilized in developing revised versions of the county, municipal and school district plans, the term "draft" means that the plan is still in a working stage and has not yet been formally approved by the local jurisdiction. Bradshaw, Tr. 12,766. This does not mean that the plan or portions of the plan are not functional, but rather that the plan is evolving and that some material awaits approval. Bradshaw, Tr. 12,767. The details of virtually all plans are evolving to a point at which each respective jurisdiction will recognize the draft as a final and adoptable plan. Feich, Tr. 14,927; Reber, Tr. 19,771; Bradshaw, Tr. 12,767-68.

547. The number of drafts generated for each jurisdiction reflects the evolution of planning policies and procedures. Planning data necessarily develops over the course of the project and as new information accumulates, it is incorporated into a new draft plan. Since the planning process is slightly different for each jurisdiction, there is no particular correlation between the number of drafts and the length of the planning process, or the number of comments by the jurisdiction on the previous drafts. Bradshaw, Tr. 12,777-78.

548. The planning process has involved Energy Consultants in providing assistance to the various jurisdictions in developing their draft plans. This process has included hundreds of meetings, thousands of correspondence exchanges and training as appropriate. Bradshaw, Tr. 12,861. Energy Consultants routinely changed the plans as requested by the respective jurisdictions. Reber, Tr. 19,790; Campbell, Tr. 19,950-51; Warner, Tr. 15,662-63; Cunnington, Tr. 16,929-30.

549. The phrase "prepared by" on the cover page of the various plans was simply intended to reflect the situation at the time the plan was ultimately adopted and to encourage jurisdictions to recognize the plans as their own. Unless the promulgation page had been signed, there could be no confusion as to the actual adoption of the plan. Bradshaw and Cunnington, Tr. 16,928-29.

550. The various plans call for review and revision at least annually and in some cases semiannually, even after the plans have been formally adopted and promulgated. Bradshaw and Cunnington, Tr. 12,775-76, 13,641, 13,714. For example, school plans will be routinely amended for changes in enrollment and administrative personnel. Cunnington, Tr. 12,777.

551. Additionally, any time a jurisdiction perceives a need to revise information, it can be added. This dynamic, ongoing process is reflected in revisions to the Downingtown School District plan subsequent to its formal adoption on February 8, 1984. Bradshaw and Cunnington, Tr. 12,850-51. Any plan must be updated to remain viable. In that sense, it

is hard to call any plan final. Waterman, Tr. 18,096; McGill, Tr. 20,369-70.

552. Energy Consultants has provided school and municipal officials with copies of Pub. L. No. 1332 and has pointed out specific sections of that law in response to questions. They have also explained that Pub. L. No. 1332 describes the responsibilities and interrelationships of the State, county and municipal governments with respect to emergency planning. School district and municipal authorities have also been directed to appropriate State or county planning officials for further information as necessary. Cunningham and Bradshaw, Tr. 12,826-27.

553. As part of the planning process, Energy Consultants has specifically advised the municipalities and school districts that they should not approve any plan which, in their opinion, cannot work. Bradshaw, Tr. 12,827-28. The objective of Energy Consultants under its contract with Applicant has been solely to develop workable plans for jurisdictions within the Limerick EPZ, not to obtain approval of the various plans. Bradshaw, Tr. 12,867-68.

554. Energy Consultants has never advised school district or municipal officials that a plan would be written for them if they chose not to adopt the draft plan prepared by Energy Consultants. Bradshaw and Cunningham, Tr. 12,828-29; Feich, Tr. 14,927; Persing, Tr. 14,792-93. Nor has Energy Consultants interfered with local decisionmaking in the formal plan adoption process by stating to local officials or planners that Limerick will be licensed whether or not they are satisfied with their plans. Bradshaw, Tr. 12,829.

555. There has never been any intent on the part of the emergency planners of the counties, municipalities or school districts to offer their draft plans for formal adoption until informal review of the plans had been completed by PEMA and FEMA and the plans had been tested in an exercise, which occurred on July 25, 1984. Nonetheless, the Downingtown and Perkiomen Valley School Districts have already adopted their plans. Bradshaw, ff. Tr. 17,191, at 2, Tr. 17,284-85.

556. Responses from FEMA on the informal Regional Assistance Committee review were not made available to the counties and municipalities until May 1984. The counties chose not to make plan amendments that close to the July 25, 1984 exercise. As expected, the July 25 exercise resulted in revisions to some plans. Municipal plan revisions incorporating the RAC comments and other changes resulting from the July 25 exercise were incorporated into the September and October municipal plan drafts. The municipalities are in the process of taking action on those changes. Bradshaw, ff. Tr. 17,191, at 2, Tr. 17,284, 17,323; FEMA Exhs. E-4, E-6, E-7. The basic planning principles and

procedures for the municipal and county plans have been essentially in place since the beginning of the planning process. Bradshaw, Tr. 17,364. There have been very few instances where municipalities objected to or revised the basic procedures in the plans. *Id.*

557. A supplemental exercise for those municipalities and school districts which did not participate in the July 25 exercise was conducted on November 20, 1984. It is anticipated that revisions to the plans resulting from the November 20 exercise will be incorporated in the plans. Bradshaw, ff. Tr. 17,191, at 2; FEMA Exh. E-5.

558. The plans in evidence provide assurance that the necessary actions can be taken in the event of an emergency. The ability to implement the emergency plans for entities within the EPZ does not depend upon formal adoption of the plans by the various jurisdictions because, as PEMA has acknowledged, the plans accurately reflect the current capacity to respond to an emergency in each jurisdiction. Bradshaw, ff. Tr. 17,191, at 2, Tr. 17,283; Commonwealth Exhs. E-10, E-13a, b, c. For example, the Collegeville plan has been utilized in response to a flood. Bradshaw, Tr. 17,283. Several families in Collegeville and Perkio-men Townships were evacuated and a mass care center was established. Cunnington, Tr. 17,317. Collegeville EOC staff were promptly notified, the EOC was activated, and all members of the general public requiring protective action were notified in accordance with the provisions of the plan. Bradshaw, Tr. 17,318.

559. The plans in evidence have been provided to municipal coordinators for review by planning staff and local officials. After completion of certain items identified in the most recent draft, the municipal plans should be considered ready for review by Commonwealth and federal authorities. For example, some plans were amended to fill in the one or two remaining staff vacancies in the municipal EOCs. Bradshaw, Tr. 17,276. In general, the time frame for consideration and adoption of the municipal plans would be February and March 1985. Bradshaw, Tr. 17,276-77, 17,284, 17,364.

560. PEMA is of the view that if the most recent drafts of the county, municipal and school district plans reflect the changes, corrections, and additions it recommended in the Fall of 1983 and those recommended by FEMA in April 1984, the plans should be adequate and capable of being implemented. Hippert, ff. Tr. 19,498, at 2. PEMA takes the position that the current plans would, in a practical sense, be the basis for the counties, municipalities and school districts to respond to a radiological emergency at Limerick if an accident occurred prior to formal adoption of the plans. The general provisions in Annex E plus

any site-specific information would be utilized by PEMA in responding to such an accident. Hippert, Tr. 19,573-74; Commonwealth Exh. E-10.

561. Although LEA solicited testimony from PEMA and FEMA officials regarding the status of their reviews (Hippert, Tr. 19,501-25; Asher and Kinard, Tr. 20,153-67), there is no evidence linking those reviews with formal adoption by the school districts, municipalities and counties of their respective plans. To the extent necessary to reach a decision on whether those plans are workable, or will be workable in final form, the Board has sufficient evidence to reach its own conclusions, independent of any review that will be conducted by PEMA and FEMA pursuant to 44 C.F.R. Part 350. Accordingly, the Board does not regard the status of those reviews as material to its disposition of the LEA/FOE contentions. See *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-776, 19 NRC 1373, 1376-78 (1984).

562. It is not essential either from the viewpoint of legal requirements or practical workability that local school districts or municipalities adopt their emergency plans before a county adopts its own plan. Bradshaw, Tr. 12,905-06; *Detroit Edison Co.* (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-730, 17 NRC 1057, 1066 (1983). Even if the municipalities and school districts have not formally adopted their draft plans, PEMA could nonetheless find them acceptable as in consonance with the county plan and Annex E where the plan is capable of being implemented. There might be unknown reasons entirely unrelated to those concerns for which a Board of Supervisors or Board of Education might not wish to sign the plan. Hippert, Tr. 19,625-26. Likewise, contrary to LEA's assertion (LEA Proposed Finding 167), nothing in Pub. L. No. 1332 mandates that a county delay forwarding its own plan to PEMA for review until it receives all municipal plans.

563. Even assuming that they are not legally required by Pub. L. No. 1322 to adopt emergency plans, school districts would adopt such plans, consistent with the plans developed by political subdivisions covered by Pub. L. No. 1322, in order to protect the health and safety of schoolchildren. Murray, Tr. 15,166. Two school districts were preparing their plans for formal submission to their school boards at the time of the hearing. Another three school districts were awaiting formal completion of host school agreements. In the interim, they are completing other aspects of their plans so that, when host school agreements are signed, their plans will be reviewable and adoptable by their respective school boards. The remaining districts are making either minor changes to their plans or developing implementing procedures prior to formal submission of their plans to the school boards. In general, the schedule for formal

submission for adoption ranges from January through April 1985. Cunnington, Tr. 17,275-76. The school superintendents unanimously stated the intent of their respective school districts to work toward the development and adoption of a workable plan (e.g., Feich, Tr. 14,927; Murray, Tr. 15,096-97, 15,166; Welliver, Tr. 15,548-49; Warner, Tr. 15,635-36).

564. Regarding the three outstanding host school agreements to be executed, the prospective host school districts already have existing mass care agreements with their counties. Cunnington, Tr. 17,352-53. There are no major obstacles which preclude completion of the remaining host school agreements. Those agreements are incomplete because of newly arising changes in the plans or procedures which require designation of a new facility. Bradshaw and Cunnington, Tr. 17,302-03.

565. The Board now discusses *seriatim* the status of plans and planning of each jurisdiction for which LEA presented witnesses.

(3) MONTGOMERY COUNTY

566. Paul Bartle is the Chairman of the Montgomery County Board of Commissioners. Bartle, Tr. 18,581. He stated that if regulatory agencies approve the operation of Limerick, Montgomery County would cooperate in every way to achieve the best possible emergency plan. This includes coordinating with all emergency authorities, i.e., volunteer firemen, emergency medical units and school districts, in order to effectuate a plan. Mr. Bartle would not permit any personal or intuitive reservations to prevent adoption of a proper plan. Bartle, Tr. 18,592.

567. Based upon previous county responses to flood and fire emergencies, Montgomery County volunteers would respond to a radiological emergency. Bartle, Tr. 18,626-27. Mr. Bartle expressed his confidence that, in an actual emergency, school districts would be responsive to requests for emergency bus transportation. Bartle, Tr. 18,631.

568. An earlier statement by Mr. Bartle as to his belief in the effectiveness of an evacuation plan was limited to the context of a late-night evacuation during cold, snowy weather. Bartle, Tr. 18,587. At this juncture in the development of a Montgomery County plan, Mr. Bartle has not had an opportunity to be informed as to the choice of protective actions that could be taken under extremely adverse weather conditions. Bartle, Tr. 18,614, 18,619. Accordingly, the Board finds Mr. Bartle's earlier opinion as one which is not likely to affect adoption of a plan for Montgomery County.

569. The Montgomery County Commissioners intend to continue working toward the development of a workable plan, addressing particular concerns as they arise. Bartle, Tr. 18,623. In the event of a radiologi-

cal emergency prior to formal adoption of a plan, Montgomery County would implement the latest draft available to carry out those provisions. Bartle, Tr. 18,633. Mr. Bigelow, the Montgomery County Coordinator of Emergency Preparedness, testified that the current draft Montgomery County plan is a workable plan. Bigelow, Tr. 14,170.

570. Rita C. Banning is the Minority Commissioner of the Montgomery County Board of Commissioners. Banning, ff. Tr. 17,752, at 1, Tr. 17,554. She has no formal education or training in emergency planning, radiation health effects or traffic engineering. Banning, Tr. 17,534-35. While she has reviewed the Montgomery County plan, Mrs. Banning had not yet become familiar with planning concepts contained in the Montgomery County plan by discussing her planning matters with any Commonwealth or county planning officials. Banning, ff. Tr. 17,752, at 1, Tr. 17,547-51, 17,554-57, 17,607-15.

571. Mrs. Banning had not contacted the Montgomery County Coordinator or other persons with regard to the specific concerns she raised in her testimony. Banning, Tr. 17,615, 17,684-88.

572. Although Mrs. Banning attributed her lack of information about the Montgomery County plan in part to her status as a minority commissioner (Banning, Tr. 17,554-55, 17,558-59, 17,730-32), the Board finds Mrs. Banning's testimony obtuse. Bartle, Tr. 18,636-38; Banning, Tr. 17,563-74, 17,620-21, 17,744, 17,749-50.

573. Mrs. Banning was unfamiliar with the requirements for complying with Pub. L. No. 1332 (Banning, Tr. 17,616-17, 17,642-43), and was not aware that training has been available to bus drivers responding to a radiological emergency. Banning, Tr. 17,671.

574. Mrs. Banning's principal criticism was the format of letters of understanding with bus providers. Mrs. Banning was not, however, familiar with the background planning or details known to the planners which formed the basis of those letters (Banning, Tr. 17,628-29), or that the format was determined by the Montgomery County Coordinator of Emergency Preparedness in consultation with the County Solicitor and PEMA. Bd. Fdgs. 96-97. She had no knowledge of the varying circumstances which school districts or providers had considered in determining how many buses and drivers could be supplied at any given time in the event of a radiological emergency. Banning, Tr. 17,629.

575. Mrs. Banning plans to review the Montgomery County plan based upon her "intuitive," "subjective" or "just common sense judgment." Banning, Tr. 17,618. For those areas she perceives as either flawed or unsatisfactory, she will, as time permits, pursue those with experts; however, she was unable to identify other specific sources of information, including planning officials or experts at the State and federal

levels whose opinions or advice she would utilize in determining whether the Montgomery County proposed plan met appropriate planning standards. Banning, Tr. 17,585-86, 17,618-19. Nonetheless, the Board notes Mrs. Banning's hope that planners would be able to address her criticisms and suggestions of deficiencies to make the plan as good as possible. Banning, Tr. 17,621. Mrs. Banning agreed that if there were an emergency at Limerick prior to formal adoption of the plan, the current draft plan should be utilized. Banning, Tr. 17,736.

(4) CHESTER COUNTY

576. Robert J. Thompson is the Chairman of the Chester County Board of Commissioners. Thompson, Tr. 18,807. Timothy R. Campbell is the Director of Emergency Services for Chester County. Campbell (Admitted Contentions), ff. Tr. 19,852, at 1. Both indicated that Chester County is well prepared for disaster emergencies. The Chester County DES has received three achievement awards from the National Association of Counties, including one for the development of an emergency plan for the Peach Bottom Atomic Power Station. Thompson, Tr. 18,857-58; Campbell, Tr. 19,943-44, 19,947.

577. Past disasters in Chester County are comparable to a radiological emergency at Limerick, i.e., life-threatening chemical spills with toxic vapors, fires and caustic spills. Thompson, Tr. 18,833. Although an evacuation of the EPZ would involve a greater area, the procedures involved, the support organizations necessary to respond and their willingness to participate would be the same. For example, in an incident involving the Turco Chemical Company in Phoenixville in January 1983, Chester County and other emergency officials sustained a 10-day response, including a plan to implement an evacuation of the Borough of Phoenixville and surrounding areas, a population of about 15,000 to 20,000 people. The same expertise would be utilized on a larger scale for Limerick if need be. Thompson, Tr. 18,836.

578. There is already in place a Chester County plan to respond to a radiological emergency at the Peach Bottom Atomic Power Plant, which is comparable in emergency planning assumptions and principles to the Limerick plan. Thompson, Tr. 18,836-37, 18,856-57.

579. Chester County believes that it is imperative that an emergency plan be reviewed and adopted prior to the issuance of a full-power license for Limerick. Thompson, Tr. 18,829. It is also important that a plan be in place to meet any nonradiological emergency. While a particular plan has not been adopted, Chester County is nonetheless prepared to meet an emergency at Limerick at the current time. Thompson, Tr.

18,831-32. Subject to further changes resulting from observer comments on the July 25 and November 20, 1984 exercises, the current Chester County plan (Commonwealth/Chester County Exh. E-1) represents the intended response of the county to an accident at Limerick. When appropriate, the final version will be presented to the County Commissioners for formal approval. Campbell (Deferred Contentions), ff. Tr. 19,852, at 2.

580. If an emergency occurred today at Limerick, Chester County would expect to use the most recent draft of its plan to respond. That plan is workable and capable of being implemented. The plan would also provide an adequate basis for responding to any nonradiological emergency requiring evacuation or other response. Thompson, Tr. 18,855; Campbell, Tr. 19,957.

581. Although draft 9 of the Chester County plan (Appl. Exh. E-2) represented the current draft at the time the hearing commenced, the Director of the Chester County DES testified as to the provisions of draft 10 (Commonwealth/Chester County Exh. E-1), which had been published in the interim. The underlying concepts and principles of draft 9 and draft 10 of the Chester County plan are the same. Draft 10, however, reflects comments by PEMA and FEMA observers of the July 25 and November 20, 1984 exercises. As such, draft 10 reflects any substantial changes that were required as the result of any deficiencies in the exercises. Additionally, draft 10 reflects comments from the informal PEMA and FEMA Regional Assistance Committee reviews and includes updated resource information. Campbell, Tr. 19,953-55; Chester County/Commonwealth, Exh. E-1.

(5) BERKS COUNTY

582. LEA did not seriously contend that the Berks County Board of Commissioners would not adopt a form of the current draft plan received into evidence. LEA presented no witness who could testify directly as to the intention of the Commissioners with regard to adoption of a plan.

583. Berks County has been engaged in planning for disaster emergencies since the passage of Pub. L. No. 1332 in 1978. The Berks County Emergency Management Agency ("EMA") has received an award for excellence in training and its Director has received two awards of excellence from the Commonwealth. Reber, Tr. 19,787-88. Robert L. Reber, Director of the Berks County EMA, has stated that after minor changes have been made to the current draft (Appl. Exh. E-1), he intends to submit the Berks County draft plan to the Board of Commissioners with his recommendation for adoption. Reber, Tr. 19,771,

19,790-802. He further stated that there is no reason to believe that the Berks County plan will not be approved by the Commissioners when submitted upon his recommendation. Reber (Deferred Contentions), ff. Tr. 19,729, at 1. Mr. Reber testified that the current draft of the Berks County plan is workable and capable of being implemented. If an accident were to occur tomorrow at Limerick, Berks County would utilize the current draft in responding to the emergency. Reber, Tr. 19,792.

584. Moreover, Mr. Reber testified that both the Commissioners and he regard the requirements of Pub. L. No. 1332 as mandatory and stated that it is the intention of Berks County to comply with those obligations. Reber, Tr. 19,795. Under those circumstances, the Board has concluded that Berks County will indeed adopt an appropriate plan.

(6) BOROUGH OF POTTSTOWN

585. Mr. Edmund Skarbeck is president of the Borough of Pottstown. Skarbeck, Tr. 17,763-64. Mr. Skarbeck testified that he is President of the Council of Area Governments, a group of area municipalities which coordinates municipal efforts. Skarbeck, Tr. 17,770. While Mr. Skarbeck testified as to certain discussions among fellow municipal officers at meetings of the Council of Area Governments (Skarbeck, Tr. 17,770-74), that Council is not a "political subdivision" within the meaning of § 7102 of Pub. L. No. 1332 and therefore has no responsibilities with regard to plan adoption or implementation under § 7501 *et seq.* Mr. Carroll Mattingly is the Pottstown transportation officer under its emergency plan. Mattingly, Tr. 17,764.

586. The only concern stated by Mr. Skarbeck was a general reservation regarding the dependability of people in an emergency situation. Skarbeck, Tr. 17,774. Nonetheless, Mr. Skarbeck expressed confidence in the borough coordinator's selection of individuals, largely borough officials, who would be available in the event of an emergency. Skarbeck, Tr. 17,852-53.

587. The Pottstown transportation officer expressed only generalized concerns regarding availability of buses, based upon speculation as to congested traffic conditions and panic. Mattingly, Tr. 17,814. The transportation officer had not reviewed the ETE study and has no experience, formal training or other background in traffic engineering, transportation engineering or model simulation of traffic flows. Mattingly, Tr. 17,830-31.

588. The Pottstown transportation officer expressed no concern over the number of transportation-dependent individuals responding to the

Montgomery County public needs survey. On checking with certain respondents, he determined that they would not need publicly provided transportation in an emergency because they would be picked up by their children. Mattingly, Tr. 17,792-93, 17,836. The existing figures in the plans are basically reliable. Mattingly, Tr. 17,837. Although the Pottstown plan states that only four buses are available locally, there are actually six available. Mattingly, Tr. 17,800, 17,843.

589. A number of Pottstown residents responding to the public needs survey who requested ambulance transportation did not actually require it. Mattingly, Tr. 17,868. The Pottstown transportation officer confirmed with the Goodwill Ambulance Company that sufficient ambulances would be available to meet the stated needs under the Pottstown plan. Mattingly, Tr. 17,800-01. Moreover, there is a mutual aid system by which townships can request ambulances from other Montgomery County townships. Mattingly, Tr. 17,843-44. Some hearing-impaired individuals were taken off the hearing-impaired list because they have hearing aids. Mattingly, Tr. 17,868.

590. The council of the Borough of Pottstown will probably adopt the plan after reviewing and satisfying any reservations it may have. Skarbeck, Tr. 17,835. Moreover, the president of the Borough of Pottstown expressed his intention to work toward the development and adoption of a workable plan for the township. Skarbeck, Tr. 17,835.

(7) UWCHLAN TOWNSHIP

591. Stephen P. Grenz is a Supervisor on the Uwchlan Township Board of Supervisors. Grenz, Tr. 17,888. He had no particular concern regarding emergency planning, but was examined by LEA on evacuation routing for Uwchlan Township. Mr. Grenz had no opinion as to whether particular segments of the roadway network in Uwchlan Township within the EPZ, or portions of Upper Uwchlan Township for which Uwchlan has traffic control responsibility, would impede or expedite evacuation in the event of a radiological emergency. Grenz, Tr. 17,938, 17,948.

592. Mr. Grenz had not reviewed the ETE study and was not familiar with simulated traffic flows related to a radiological emergency, as opposed to normal traffic flow during commuter hours. He stated that he would be satisfied if the ETE study considered traffic congestion at the intersection of Routes 100 and 113 and other potentially congested areas in Uwchlan Township, and if those traffic patterns had been reviewed by professional, competent authorities. Grenz, Tr. 17,943-45, 17,976. The record is clear that that has been done. Bd. Fdgs. 1-85. Consideration of

additional traffic control points would not preclude the Uwchlan Township Board of Supervisors from proceeding to adopt its plan. Amendments to the plan could be made as traffic and demographic changes develop. Grenz, Tr. 17,948.

(8) EAST PIKELAND TOWNSHIP

593. John Yeager is the Chairman of the Board of Supervisors for East Pikeland Township. Yeager, Tr. 18,004. While LEA attempted to establish that the Board of Supervisors had expressed certain concerns, based largely upon the statements of an *ad hoc* citizens committee which reviewed a now outdated version of the East Pikeland plan, it failed to establish any connection between the present views of the Board of Supervisors and those expressed in the report filed by the committee. Since no witness was produced to authenticate the report and to be cross-examined on its contents, LEA Exh. E-48, comprising a letter of transmittal and a committee report attached, was received but not for the truth of the contents of the attached report. Tr. 18,106-07.

594. Even if this Board were to consider the citizens committee two-page report, there is no evidence supporting the qualifications of its members with respect to State and federal planning requirements for radiological emergencies, or in the areas of transportation engineering, traffic engineering and traffic modeling. Yeager, Tr. 18,044. There is no evidence that any member of the Board of Supervisors, the East Pikeland Township Planning Commission, or even the members of the investigating committee at this time hold the views expressed in the correspondence dated July 18, 1984, and attachment. Yeager, Tr. 18,045-46.

595. Subject to making those changes they thought would be necessary to improve the plan, it is the intention of the East Pikeland Township Board of Supervisors to adopt a workable and implementable plan for radiological emergencies at Limerick. Yeager, Tr. 18,046-47. Although the citizens committee reviewing the East Pikeland plan provided certain comments to the East Pikeland Planning Commission (Yeager, Tr. 18,016; LEA Exh. E-48), there is no evidence that the committee's informal comments represent the views of the Board of Supervisors or the township coordinator. Moreover, the letter dated July 18, 1984, from the Township Clerk to PEMA does not necessarily reflect the position of the township supervisors at this time. Yeager, Tr. 18,017. Accordingly, the Board did not regard LEA-Exh. E-48 to be reliable, material, or probative evidence on the issue under consideration.

(9) UPPER PROVIDENCE TOWNSHIP

596. Virgil P. Templeton is a member of the Upper Providence Township Board of Supervisors. Templeton, Tr. 18,058. George Waterman is the Township Manager of Upper Providence Township. Waterman, Tr. 18,058.

597. Despite speculative concerns as to whether volunteers would show up to man the township EOC in an actual emergency, the Upper Providence Township witness panel testified that the township coordinator and other EOC staff had determined the suitability and qualifications of individual volunteers to perform assigned responsibilities in an emergency. Templeton, Tr. 18,089-90. The Township Manager, who is the communications officer during an emergency, stated that he is not aware of any volunteer EOC staff individual who has stated that he would be unavailable or unwilling to perform assigned responsibilities (Waterman, Tr. 18,090, 18,092), nor did any fail to do so during the July 25, 1984 exercise. Waterman and Templeton, Tr. 18,091-94. The Upper Providence Township EMC reported that there were 25-30 volunteers for the July 25, 1984 Limerick exercise and that he was more than satisfied with the volunteer program. Templeton, Tr. 18,064.

598. Although the Upper Providence Township witnesses were questioned as to letters of agreement regarding services necessary to implement the township plan (Waterman, Tr. 18,078-80), there was no evidence to establish that such agreements would be necessary to obtain existing available resources, except perhaps towing services. Waterman, Tr. 18,079-80. No particular concern regarding the level of available towing services for Upper Providence Township was raised by the township coordinator. Waterman, Tr. 18,081. Specifically, the panel stated that there are no shortages of towing services in the area and that it was understood that the county dispatcher could be called upon for additional towing services. Waterman, Tr. 18,097.

599. Short of speculative concern as to whether the plan could manage an "all-out evacuation," the Upper Providence Township panel did not cite any portion of its draft plan it regarded as unworkable. Waterman, Tr. 18,096-97. Such concern should eventually be resolved as township officials become more knowledgeable about realistic evacuation assumptions. Bd. Fdgs. 1-120. In any event, it is the intention of Upper Providence Township to work toward an adoptable plan. Waterman and Templeton, Tr. 18,096.

(10) LOWER PROVIDENCE TOWNSHIP

600. Richard Brown is the Chairman of the Board of Supervisors for Lower Providence Township. Brown, Tr. 18,132. Harry Miller is the Fire Chief of the Lower Providence Volunteer Fire Company. Miller, Tr. 18,134. Michael Conroe is one of five Captains of the Lower Providence Township Ambulance Service. Conroe, Tr. 18,135.

601. Mr. Miller testified that fire company personnel from the Lower Providence Township Volunteer Unit cannot perform route alerting in a radiological emergency because fifteen volunteers and a field officer are needed to maintain normal rescue and fire service within the township. Miller, Tr. 18,142. Route alerting during the November 20, 1984 exercise was conducted by township volunteers other than fire company volunteers. Brown, Tr. 18,147. At that time, however, forty additional unassigned volunteers were available to perform route alerting if required. Only twenty-four individuals are required to cover all route-alerting sectors. Miller, Tr. 18,184-85. Route alerting in Lower Providence Township can be performed by volunteers other than fire company personnel utilizing automobiles with portable public address units. Miller, Tr. 18,156.

602. Mr. Brown stated concerns regarding whether Applicant's employees who volunteered and were available to participate in the November 20, 1984 exercise would be available when called upon in an actual emergency. Despite those concerns, Mr. Brown acknowledged that the township coordinator is qualified to determine who would be a capable and efficient volunteer in the event of an actual emergency, and that he would trust his judgment. Brown, Tr. 18,186. The Lower Providence Township EOC was adequately staffed and demonstrated an adequate capability to respond during the November 20, 1984 exercise. Brown, Tr. 18,183; Miller, Tr. 18,189; FEMA Exh. E-5, at 6.

603. It is expected that Applicant's employees who have volunteered for these assignments would serve for both radiological and nonradiological emergencies. Brown, Tr. 18,197. Normal municipal staff turnover, including emergency staffing, ordinarily requires recruitment and retraining of new staff members. Brown, Tr. 18,197. The Board sees no merit in speculating about the motive of Applicant's employees in volunteering for such service, nor has the Board any reason to question their civic-mindedness in doing so. Brown, Tr. 18,197. Certainly, no responsible coordinator would reject a volunteer simply because he is employed by the Applicant. Brown, Tr. 18,197.

604. Lower Providence Township has passed an unmet need of four ambulances to Montgomery County to evacuate its nonambulatory residents. Conroe, Tr. 18,154; Appl. Exh. E-12, at O-1. Under the Lower

Providence Township plan, only nine residents require ambulance transportation. Appl. Exh. E-12, at F-1. Mr. Conroe raised concerns regarding his ability to contact ambulance service workers. Conroe, Tr. 18,157-58. His concern was evidently based on an exaggerated need for ambulances, created by his misreading of the plan's figures of those requiring ambulance transportation. Conroe, Tr. 18,199. Moreover, the former chief of the Township Ambulance Squad, who participated in the November 20, 1984 exercise, concluded that several of the nine individuals listed in the plan for ambulance transportation could be moved by automobile. Miller, Tr. 18,200.

605. There are two township ambulances; a third will be in service shortly. Conroe, Tr. 18,200, 18,203. The township's plan, however, commits only one ambulance for radiological emergencies. Appl. Exh. E-12, at O-1. There are forty-five to fifty-five active ambulance crew members in service at any given time. Conroe, Tr. 18,204. The one crew committed to service under the plan is always on duty and immediately available. Conroe, Tr. 18,204-05. The Board finds no notification problem with such an ample staff. Moreover, use of several individual pagers should resolve any concern.

606. Mr. Brown also contended that Lower Providence Township has responsibility for evacuating members of the public who might be within that portion of Valley Forge National Park located in Lower Providence Township in the event of a radiological emergency. Brown, Tr. 18,172.

607. The Board finds that the public alert and notification capability required under NUREG-0654, Criterion E.6, and Annex E will be provided by the siren system operated, in this instance, by Montgomery County. Appl. Exh. E-3, at C-1, C-2. One siren in particular is sited in the vicinity of that portion of the park in Lower Providence Township. Brown, Tr. 18,238. Moreover, the National Park Service will receive notification at the alert stage from Chester County. Fewlass, Tr. 14,680. The Park Service would then inform park visitors of the alert so as to give them the opportunity to take whatever actions they felt prudent. This could be accomplished by the various public address systems in the park's buildings and patrol vehicles. Fewlass, Tr. 14,681. The Board finds that this adequately addresses the NUREG-0654, II.J.10.c criterion that calls for means of notifying all segments of the population, including transients.

608. Mr. Brown also stated concerns regarding the evacuation route for Lower Providence Township and, like other witnesses unfamiliar with large-scale emergency evacuation planning or the ETE study, erroneously confused peak-hour commuter traffic problems with evacua-

tion traffic. Brown, Tr. 18,173. Like other lay witnesses, Mr. Brown was unfamiliar with the ETE study, had erroneously assumed that evacuation planning did not consider traffic congestion, and had no expertise or experience in transportation engineering, traffic engineering or traffic flow simulation of evacuation scenarios. Brown, Tr. 18,212-18. Ultimately, Mr. Brown agreed that comparisons of commuter peak-hour traffic and evacuation traffic were meaningless. Brown, Tr. 18,218.

609. With regard to his concerns relating to the construction of a new prison in the township (Brown, Tr. 18,173-74), the Board fails to see how any plan could address a facility not yet built. As with the other plans, the Montgomery County plan and/or Lower Providence Township plan will undoubtedly be amended for a variety of reasons, including specific measures to accommodate the evacuation of prisoners in the event of an actual emergency. The Board assumes that this can be done on the same basis as for the Graterford Prison, and that, with reasonable input and coordination from PEMA, the Graterford plan will serve as a suitable model.

610. Other special facilities such as the Eagleville Hospital and St. Gabriel's Hall have their own separate plans. Appl. Exh. E-3, at U-2, U-3. Accordingly, there is no need for the Lower Providence Township plan to incorporate planning details for those facilities.

611. The use of the King of Prussia Plaza as a designated transportation staging area is not information significant to the adoption of the Lower Providence Township plan, contrary to LEA's assertion. LEA Proposed Finding 242.

612. Mr. Brown stated his concern regarding emergency telephone communications, which the township intends to resolve through the introduction of a private switch network. Brown, Tr. 18,226. Once that is resolved, the Chairman of the Board of Supervisors intends to recommend supporting the adoption of the plan. Brown, Tr. 18,226. The Board finds this concern may be overstated since it regards this concern as unrealistic. It is important to bear in mind that, in the event of an actual emergency, not all EOC staff and support organization staff need to be reached immediately, nor must they be contacted by telephone. Bd. Fdgs. 462-464, 466, 512-513. Once the underlying planning principles regarding alert and notification of emergency volunteers and facilities requiring special notification become clear to township officials, the Board finds it is reasonable to expect that this concern will resolve itself. Even if there were some perceived problem in prompt telephone notification of those who must respond initially, the Board finds that the problem can and probably will be resolved, for example, by the purchase and

use of individual pagers for key personnel as recommended by Mr. Conroe. Conroe, Tr. 18,235. Therefore, contrary to LEA's assertion (LEA Proposed Finding 224), the postulated unavailability of commercial telephone lines in an actual emergency would not delay activation of necessary EOC personnel.

(11) SOUTH COVENTRY TOWNSHIP³⁷

613. W. Richard Whitlock is the Chairman of the South Coventry Township Board of Supervisors. Whitlock, Tr. 18,376. Because of certain actions taken by the township, Mr. Whitlock has not yet become knowledgeable as to the emergency planning principles and assumptions reflected in the various Limerick offsite plans. For example, Mr. Whitlock did not know that evacuation of the general public would not be in progress at or prior to the time volunteers would be reporting to the township EOC (Whitlock, Tr. 18,435-36), or that it would be impossible for South Coventry to implement its emergency plan without the existence and operation of a township EOC. Whitlock, Tr. 18,450. Finally, Mr. Whitlock did not understand that the Owen J. Roberts School District would implement its own plan and assume responsibility for the safety of its schoolchildren under that plan in the event of a radiological emergency. Whitlock, Tr. 18,465-67.

614. Despite the requirements of Commonwealth law, the South Coventry Board of Supervisors indefinitely suspended the planning process in early 1984 because of litigation with Applicant regarding installation of sirens comprising a portion of Applicant's public alert and notification system for Limerick. This action effectively created the township's current state of unpreparedness. Mr. Whitlock acknowledged that he cannot presently identify specific unmet needs and that his concerns are "conjecture." This is attributable to the township's decision to suspend planning efforts. Whitlock, Tr. 18,386-87, 18,419-21, 18,423-25; Bradshaw, Tr. 17,331-32.

615. Nonetheless, Mr. Whitlock testified that the outcome of the siren litigation would not have any impact on township planning efforts. Whitlock, Tr. 18,478-79, 18,512. The South Coventry Board of Supervisors recognizes its responsibility to pass unmet needs on to the county if the township itself cannot meet them. Whitlock, Tr. 18,491.

616. In any event, the emergency planning concerns expressed by Mr. Whitlock, as discussed below, are either being addressed or have

³⁷ The Board received service of the South Coventry Township Radiological Emergency Response Plan for Limerick Generating Station update pages dealing with Emergency Notification List and Annex B Implementing Procedure/Fire Services on April 23, 1985, from the Applicant.

been resolved by the planning process. With regard to the necessary funds to provide and maintain emergency planning equipment, the Board takes judicial notice of the provisions of Pub. L. No. 1332 which, in accordance with the undisputed testimony of local, county and Commonwealth governmental officials, imposes a mandatory obligation under §§ 7501 and 7503 to maintain an emergency plan and applicable equipment and resources in place for use in responding to *any* emergency, radiological or nonradiological, natural or man-made. South Coventry officials intend to discuss with PEMA or other Commonwealth officials the availability of reimbursement for expenses incurred for emergency planning. Whitlock, Tr. 18,445. Section 503 of Pennsylvania Act No. 147, approved July 10, 1984, was enacted in response, in part, to the concerns expressed by South Coventry regarding reimbursement for emergency planning and preparation expenses. Whitlock, Tr. 18,511. Further, Applicant has made an effort to provide EOC equipment and other resources, and any remaining unmet needs could be passed on to the county or PEMA. Whitlock, Tr. 18,401, 18,491.

617. Similarly, with regard to alleged manpower shortages, the record demonstrates that, with one other exception, each of the five counties and other forty-two municipalities involved in emergency planning for Limerick have been able to muster the necessary staff. Bd. Fdgs. 379-380. The Board therefore regards this as a problem that is capable of being resolved. The Board has given little weight to the concerns expressed by certain governmental officers, including Mr. Whitlock, as to the reliability of the general public needs survey. None of those persons demonstrated any particular expertise in emergency planning or sampling techniques. Banning, Tr. 17,637-39; Whitlock, Tr. 18,383-84; Lowery, Tr. 18,694-95. Other governmental officials and the consultants who developed the survey testified that they have no reason to doubt the validity of the number of transportation-dependent individuals listed in municipal plans (e.g., Brown, Tr. 18,208. Bd. Fdg. 45). The Board also notes that estimates of transportation-dependent individuals residing in the vicinity of other nuclear power plants in the United States have been made without such surveys. Bd. Fdg. 388. In any event, another survey of the Limerick EPZ will be taken within each of the risk counties. Hippert, Tr. 19,587-88; Bradshaw, Tr. 16,952, 17,022-23, 17,348. Given this and the undisputed testimony that in an actual emergency the vast majority of persons obtain transportation from private sources (Bd. Fdg. 145), the Board is satisfied that there has been adequate planning to provide more than enough buses for transportation-dependent individuals.

618. Mr. Whitlock's concerns as to the use of two evacuation routes for South Coventry have been resolved. The South Coventry plan now states that all South Coventry evacuees will proceed along Route 23 West to a single host facility. Whitlock, Tr. 18,395, 18,456-57; Appl. Exh. E-35, at 13, J-1, Q-1. Other than a change in the evacuation route, the South Coventry Board of Supervisors has requested no changes in the plan. Whitlock, Tr. 18,432. Redrafting was simply a matter of "filling in the blanks" to add information as to personnel and resources. Whitlock, Tr. 18,428-29.

619. Mr. Whitlock's concerns related to special institutions located in South Coventry Township, i.e., a nursing home, two pre-schools and a senior citizens center (Whitlock, Tr. 18,399, 18,472-74; Appl. Exh. E-35, at R-1), are unfounded. These are precisely the kinds of facilities which have been addressed either through separate plans for the facility or particularized provisions in the municipal and county plans. Bd. Fdgs. 365-366, 368. There is no reason why those plans cannot or will not provide reasonable assurance for the safety and welfare of affected persons on the same basis as similar facilities throughout the EPZ.

620. In estimating the need for ambulances in an emergency, Mr. Whitlock erroneously included ambulances needed to evacuate a nursing home, which has ambulances available under its own emergency plan. Whitlock, Tr. 18,406-07; Appl. Exh. E-2, at p. G-6-A-1.

621. Mr. Whitlock's concern over traffic conditions along Route 100 is insubstantial. Whitlock, Tr. 18,399; Bd. Fdgs. 71-86, 91. As for towing equipment, there is no reason why it was necessary for the township to own this equipment as opposed to dispatching a private service. Whitlock, Tr. 18,399-400. Contrary to LEA's assertion, there is no evidence that South Coventry Township would have to hire tow trucks to clear roadways in a radiological emergency. Whitlock, Tr. 18,400. Chester County resources are ample. Bd. Fdg. 503.

622. South Coventry Township does not have a designated EOC at this time. Whitlock, Tr. 18,400. The South Coventry Board of Supervisors has not, however, explored the possibility of utilizing any of three available school buildings as an EOC, asserting that the Owen J. Roberts School District would require reimbursement. Whitlock, Tr. 18,433-34, 18,436-37. The Board finds that this option should be considered, given the undisputed testimony in the record that public school resources have been and would be routinely made available to assist in emergency planning as well as in response to an actual emergency. Bd. Fdg. 208.

623. Training has been offered to all South Coventry Township officials as well as its EOC staff, although such training has not yet been accepted. Whitlock, Tr. 18,447. Because the township supervisors have

not yet received training, they understandably have a number of unresolved questions regarding the status and content of their plan. Whitlock, Tr. 18,448.

624. Nonetheless, the South Coventry Township Board of Supervisors understands that Pub. L. No. 1332 imposes a mandatory obligation to adopt an emergency plan to protect the public health and safety of its citizens and intends to work towards the adoption of a plan which meets the requirements of Pub. L. No. 1332. Whitlock, Tr. 18,471. Mr. Whitlock stated his belief that it is imperative for South Coventry Township to have a safe, workable plan, and that if a workable plan were presented, the Board of Supervisors would adopt it. Whitlock, Tr. 18,425. Mr. Whitlock stated that, unquestionably, South Coventry has to have a plan that works and that, from the beginning, it has been a premise that South Coventry is going to have a good plan. Whitlock, Tr. 18,493.

625. With the help of consultants and the representatives of county, Commonwealth and federal agencies, remaining concerns of South Coventry can be resolved. Whitlock, Tr. 18,514-15. In fact, Mr. Whitlock gained considerable insight into emergency planning for Limerick just by listening to questions at the hearing. Whitlock, Tr. 18,523. FEMA is unable to conclude that emergency preparedness is adequate to provide reasonable assurance that appropriate protective measures can be taken to protect the residents of South Coventry Township, since the township did not participate in either the initial or supplemental exercise. FEMA Exh. E-5, at 30; FEMA Exh. E-8. However, the Board reaches a different conclusion based on the evidence developed in this record and finds that appropriate protective measures can and will be taken to protect residents of South Coventry Township in the event of a radiological emergency.

626. In responding to a radiological emergency, Chester County could also protect the public health and safety of the citizens of South Coventry if that municipality had not yet adopted its plan. Thompson, Tr. 18,856. Chester County has a responsibility under Pub. L. No. 1332 to protect its residents. If an emergency occurs, the provisions of the Chester County plan would be relevant to any municipality whether or not it had a plan. Thompson, Tr. 18,866.

627. As reflected in the listing of municipal responsibilities under Pub. L. No. 1332 in its own plan (Chester County/Commonwealth Exh. E-1, at 17-18), Chester County expects that municipalities will comply with their statutory obligations. Campbell, Tr. 19,961. Chester County, therefore, expects South Coventry to strive toward the development of a workable, implementable township plan. In the event that South Coventry defaults in that obligation for any reason, however, the county has

authority under Pub. L. No. 1332 to act in order to protect the public health and safety of its citizens. Campbell, Tr. 19,971-72.

628. South Coventry has a population of 1556 persons. Campbell, Tr. 19,973; Chester County/Commonwealth Exh. E-1, at L-1-1. For a community of that size, Chester County could perform a number of the functions which ordinarily would be performed at the township EOC, i.e., notification and verification, maintenance of a relocation information point for evacuated citizens, deployment of county employees to conduct route alerting and coordination of the Pennsylvania State Police, which is the normal law enforcement agency for South Coventry. Campbell, Tr. 19,975-76. In the absence of any unique planning needs not yet identified and after appropriate instructions from PEMA, Chester County would be able to carry out all of the emergency response functions which would otherwise be performed by South Coventry under its plan, i.e., provision of bus transportation for transportation-dependent individuals, assistance to disabled persons, providing ambulances where necessary, providing equipment for traffic control points, providing equipment for route-alerting teams and other typical municipality needs. It would be possible to set up a subgroup of Chester County EOC staff in West Chester or some other location who could carry out those functions. It would not be necessary to man a local EOC within South Coventry. Campbell, Tr. 19,976, 20,010-11. PEMA concurs that this alternative means of providing an emergency response for South Coventry Township is adequate. Hippert, Tr. 19,582-83. PEMA will coordinate with Chester County and supplement its response if necessary. Hippert and Taylor, Tr. 19,611, 19,613. To satisfy the requirements of NUREG-0654, FEMA testified that the actions that would be taken by Chester County and PEMA to protect the citizens of South Coventry Township, assuming the Township's continued nonparticipation, would be adequate, if that information concerning those actions was reflected in the plans for the county and the Commonwealth and there is a demonstration that those provisions could be implemented. Asher, Tr. 20,268. There is no evidence to suggest that Chester County cannot perform those emergency response functions necessary to protect the citizens of South Coventry Township. We have found that South Coventry Township is relatively small and that the evidence indicates that the Chester County plan is workable and capable of being implemented by Chester County. Bd. Fdgs. 576-581. Chester County has participated in a full-scale emergency planning exercise for the Limerick EPZ. FEMA Exh. E-4, at vii. Further, PEMA has been negotiating with Chester County to finalize those actions it could take in conjunction with the county to protect the residents of South Coventry Township. Taylor, Tr. 19,613.

Moreover, in the event that South Coventry defaults in its obligations for any reason, Chester County has the responsibility and authority to act under Pub. L. No. 1332 to protect the public health and safety of the residents of South Coventry Township. Bd. Fdgs. 626-627. Based on this record, the Board finds there is reasonable assurance that the residents of South Coventry Township will be adequately protected by Chester County in the event of a radiological emergency at Limerick even if South Coventry does not participate in emergency planning as required by Pub. L. No. 1332.

(12) DOUGLASS TOWNSHIP, MONTGOMERY COUNTY

629. Hugh Kelly is the Chairman of the Board of Supervisors for Douglass Township. Kelly, Tr. 18,540. Based upon his discussions with the Douglass Township coordinator, Mr. Kelly was concerned with the listing of individuals who may require special assistance and notification of hearing-impaired individuals. Kelly, Tr. 18,545. Specifically, the coordinator is concerned whether the information concerning transportation-dependent and hearing-impaired individuals in the plan is complete, but has not yet determined whether any additional surveys will be necessary. Kelly, Tr. 18,575. No particular problem exists, however, with conducting another survey to supplement the 1983 county survey. Bd. Fdg. 642. Additionally, there are township or county agencies which could assist in identifying hearing-impaired or nonambulatory persons who might require assistance in an evacuation. Kelly, Tr. 18,656.

630. Mr. Kelly expressed concerns regarding school planning, but had not yet had an opportunity to review the Boyertown Area School District plan. Kelly, Tr. 18,576-79. He would be satisfied if there were a workable school district plan in place. Kelly, Tr. 18,579.

631. Mr. Kelly's concern regarding operations of a township industrial plant (Kelly, Tr. 18,648) have been adequately addressed by the special notification procedure for major county industries. Appl. Exh. E-3, at X-1, X-2, X-3, X-1-1.

632. The Board finds Mr. Kelly's admittedly speculative concern that drivers might disobey traffic officers at traffic control points in an actual emergency unsupported by any competent evidence in this record. Kelly, Tr. 18,650-51; Bd. Fdg. 69.

633. In expressing concern that farmers might not wish to evacuate, Mr. Kelly had not yet reviewed the special provisions in the plans to treat them as emergency workers authorized to reenter the EPZ. Kelly, Tr. 18,658-59; Bd. Fdgs. 442-444.

634. Mr. Kelly also expressed reservations about the effectuation of an actual evacuation. Kelly, Tr. 18,552-53. As with other witnesses, Mr. Kelly's concerns regarding commuter peak-hour traffic congestion (Kelly, Tr. 18,669-70) have no bearing upon an emergency evacuation because of the inherent differences in the origin and destination of commuter and evacuation traffic flows. Bd. Fdg. 57. In any event, there is very little that Douglass Township can do to reduce overall traffic congestion. Therefore, this is not an issue which we find is likely to affect the adoption of the Douglass Township plan.

(13) UNION TOWNSHIP

635. A little less than half of Union Township lies within the EPZ. Lowery, Tr. 18,762; Commonwealth Exh. E-9. Mary C. Lowery is the Union Township emergency coordinator. Lowery, Tr. 18,683. Ms. Lowery has informed the Board of Supervisors some time ago that she might not participate in an actual emergency, depending upon her personal situation. Lowery, Tr. 18,733; Reber, Tr. 19,804. Ms. Lowery has missed all but a half dozen monthly training sessions over the past 3 years. Reber, Tr. 19,803-04. As a coordinator, she will not vote on final approval of a plan, nor did she state that her testimony, with one exception, represented the views of the Union Township Board of Supervisors. Lowery, Tr. 18,714. Accordingly, the Board gave Ms. Lowery's testimony little weight.

636. The only obstacle to a workable, adoptable plan for Union Township expressed by Ms. Lowery was that adequate personnel to implement the plan were not yet available. Lowery, Tr. 18,714. With regard to EOC staffing concerns, Ms. Lowery has identified five key personnel positions for each shift, which results in a total of ten individuals necessary to man the Union Township EOC in the event of an actual emergency. Lowery, Tr. 18,704. At the November 20, 1984 exercise, Union Township demonstrated a complete first-shift capacity (at least five) and indicated that additional staff were available. Bradshaw, Tr. 17,329; FEMA Exh. E-5, at 22. At this point, Union Township has eight EOC volunteers. Lowery, Tr. 18,703. Ten individuals, however, have received training. Bradshaw, Tr. 17,329. The names of suitable volunteers were made available to Ms. Lowery by Energy Consultants and Berks County (Lowery, Tr. 18,703, 18,727-29; Reber, Tr. 19,777; Appl. Exh. E-94), and each individual indicated on initial contact a willingness to volunteer. Further efforts could be made to recruit those individuals. Lowery, Tr. 18,729-31; Reber, Tr. 19,777.

637. Ms. Lowery has not compared her estimated staffing needs with other townships of comparable size. Lowery, Tr. 18,734. The Board has reviewed Ms. Lowery's explanation of her staffing needs in that context. Given the comparatively small population of Union Township, about 1100 people living in the EPZ (Reber, Tr. 19,800; Appl. Exh. E-47, at 1), the Board finds that those staffing needs are overestimated and that many of the functions identified by Ms. Lowery (Tr. 18,746-48) could be eliminated altogether or combined with other assigned functions as Mr. Reber has recommended. Reber, Tr. 19,801. This view is supported by Mr. Reber's testimony that the unmet staffing needs reported by the Union Township EMC are beyond all belief. Reber, Tr. 19,776-77.

638. Only ten persons are needed to man the Union Township EOC effectively on a 24-hour basis in the event of an emergency. Many unassigned functions under the Union Township plan could readily be combined with other functions to reduce outstanding needs, i.e., the deputy police service officer could also be the fire coordinator, the deputy fire/rescue officer could also be the deputy radiological officer, and the transportation officer could function as the medical officer. Reber, Tr. 19,801-03; Appl. Exh. E-47, at I-1.³⁸ Mr. Reber had scheduled a meeting for February 5, 1985, with the Union Township Board of Supervisors to resolve unmet EOC staffing needs. Reber, Tr. 19,782.

639. Mr. Reber, Director of the Berks County EMA, testified that it might be desirable for Union Township to find another emergency coordinator who would be more interested in the job and willing to do whatever is necessary to get the job done. Reber, Tr. 19,805-06. A replacement need not be a resident of Union Township. Reber, Tr. 19,806. Mr. Reber stated that he would assist Union Township in finding a replacement (Reber, Tr. 19,804), and do whatever is necessary in assisting Union Township to achieve full preparedness. Appl. Exh. E-93. In the Board's view, the unmet staffing needs for the Union Township EOC is an isolated problem. Given the evident determination by Berks County and Union Township, the Board finds it is reasonable to expect that the problem will be satisfactorily resolved.

640. If an emergency at Limerick occurred tomorrow, Berks County could assume a number of the functions ordinarily performed by the Union Township EOC, i.e., notification, traffic control, obtaining a mutual-aid fire company to perform route alerting, communications, and distribution of dosimetry/KI supplies. Routine township security is

³⁸ The Board received service of the Union Township, Berks County, Radiological Emergency Response Plan for Incidents at Limerick Generating Station updated pages dealing with the Emergency Operations Center on April 23, 1985, from the Applicant.

normally provided by the Pennsylvania State Police because there is no township police force. Based upon those considerations, Berks County could assume primary responsibility for the protection of the public health and safety of Union Township residents within the EPZ in the event of a radiological emergency. Reber, Tr. 19,807-10. The Berks County Office of Emergency Management Services has indicated its willingness to continue providing assistance to Union Township in developing a plan. Lowery, Tr. 18,726; Appl. Exh. E-93.

641. Ms. Lowery stated that, at the present time, the Union Township Fire Company has been unwilling to identify volunteers or make a commitment to performing its assigned responsibilities under the Union Township plan. Lowery, Tr. 18,707. A maximum of six individuals would be needed for route alerting in Union Township. Twenty-six fire company volunteers have been trained for this and other assignments given the fire company under the Union Township plan. Lowery, Tr. 18,737-38. The only apparent stumbling block is Ms. Lowery's belief that not all twenty-six trained individuals are qualified to perform route alerting and her unwillingness to survey the firemen with regard to this assignment. Lowery, Tr. 18,738-42. There is, however, a substantial historical record that volunteer fire companies do have available personnel and the capacity to respond to emergencies when needed. Campbell (Admitted Contentions), ff. Tr. 19,852, at 14. Finding no significant problem which would preclude the fire company from performing its assigned responsibilities, the Board finds that the Union Township Board will be able to overcome this problem.

642. Comparing the list of persons requiring special assistance in an evacuation with actual survey responses and an interview with a manager of a boarding home, Ms. Lowery stated that she found certain discrepancies. Lowery, Tr. 18,694-97. Although concerned with conflicting responses, Ms. Lowery has not yet contacted the respondents to obtain clarification but intends to do so. Lowery, Tr. 18,722. Another survey will be taken by all three counties. Hippert, Tr. 19,587-88; Bradshaw, Tr. 16,952, 17,022-23, 17,348. Ms. Lowery can check any particular responses or nonresponses of concern to her at that time.

643. Ms. Lowery's concerns regarding traffic congestion along the evacuation route arise from her apparent assumption that such congestion would be unanticipated or would somehow render a planned evacuation ineffective (Lowery, Tr. 18,711-13), and a misunderstanding of the time frame within which it is anticipated that an evacuation would be accomplished. Lowery, Tr. 18,758-59. The Board regards both misconceptions as immaterial. Bd. Fdgs. 30, 57, 61-62.

(14) BOROUGH OF PHOENIXVILLE

644. Bonnie K. August is the president of the Phoenixville Borough Council. August, Tr. 18,870. There are twelve members on the Phoenixville Borough Council. August, Tr. 18,871, 18,980. Although Mrs. August has been very active in sharing her views on emergency planning with the public (August, Tr. 18,917-28, 18,979, 18,998), she has not yet become conversant with some basic planning principles and many details of the Phoenixville plan. Mrs. August has not yet obtained instruction or training in emergency planning or the operation of Limerick. August, Tr. 18,998.

645. Some of Mrs. August's prior statements raise doubts as to her knowledge of planning for Phoenixville. For example, she has publicly questioned whether \$5000 worth of equipment contributed to Phoenixville by Applicant for emergency preparation would be adequate, but has not discussed the equipment with the Phoenixville emergency coordinator. August, Tr. 18,928-30; Appl. Exh. E-97. Nor did Mrs. August attempt to resolve any other outstanding concerns with the Phoenixville coordinator (August, Tr. 18,931) or representatives of Energy Consultants, Applicant or Chester County DES. August, Tr. 18,971-72. Only one other councilmember has allegedly expressed concerns similar to those of Mrs. August, and those concerns related solely to the adequacy of the evacuation routes. August, Tr. 18,909-10.

646. In expressing concern regarding the needs of transportation-dependent individuals or others requiring ambulance service or special assistance, Mrs. August apparently misunderstood or was not familiar with the terms of the Phoenixville plan. For example, she did not understand that the Phoenixville Hospital has its own plan, including a statement of ambulance needs, distinct from the Phoenixville plan. August, Tr. 18,880-81, 18,882, 18,935. There is an unmet need for ten ambulances under the Phoenixville plan, far less than the number of ambulances Mrs. August seemed to suggest. August, Tr. 18,880-83; Appl. Exh. E-33, at O-1. Moreover, the Phoenixville coordinator has not expressed any concern to her regarding the availability of ambulances and buses reported as an unmet need to Chester County. August, Tr. 18,877.

647. With regard to senior citizens in the community, the Board likewise finds no basis for Mrs. August's assumption that a large number of ambulances would be required. August, Tr. 18,881, 18,882-84. Mrs. August was unfamiliar with the borough's list of transportation-dependent and special needs residents identified by the Chester County survey and could not state whether particular individuals of concern to her were included in the list. August, Tr. 18,933-34; Appl. Exh. E-33, at F-1,

G-1. Further, her reference to a few wheelchair residents in a senior citizen apartment house does not demonstrate any deficiency in the plan. August, Tr. 18,883. Persons in wheelchairs frequently travel by automobile and it is quite possible that those individuals have made prior arrangements with friends or families. Even if necessary, it would be a simple matter to survey the fifty apartments in that building to confirm the accuracy of these data. August, Tr. 18,883, 18,938. In short, Mrs. August's concern regarding the need for more ambulances than those listed in the Phoenixville plan is speculative. August, Tr. 18,941-42.

648. Mrs. August also asserted that there are more than the eighty-two hearing-impaired individuals identified in the plan. August, Tr. 18,880-81, 18,940; Appl. Exh. E-33, at F-1. Her testimony was not based upon her personal knowledge or review of the plan. August, Tr. 18,940. In fact, the record demonstrates that the number of hearing-impaired in some plans has been overstated because persons who can hear properly with the help of hearing aids frequently responded to the survey. Bd. Fdg. 447. In short, there is no basis to doubt the accuracy of the figures compiled for Phoenixville in the public needs survey conducted by Chester County. August, Tr. 18,933. The Phoenixville coordinator has not expressed any concern regarding the accuracy of public needs survey figures. August, Tr. 18,879.

649. Mrs. August also expressed concern regarding the failure of certain Phoenixville residents to respond to the public needs survey and the fact that four individuals had allegedly contacted her with regard to their need for transportation in the event of an emergency. August, Tr. 18,878. She did not know, however, whether those persons had responded to the public needs survey or contacted the Phoenixville coordinator to be included on the municipal list. August, Tr. 18,936-37.

650. Mrs. August was unfamiliar with municipal plans for dispersing pickup points for transportation-dependent individuals, and did not understand that a person who could not walk to a pickup point would be listed as an individual requiring special assistance. August, Tr. 18,945-50. She identified a few individuals who might require special assistance in an emergency, but had not yet checked with the Phoenixville coordinator to determine if those individuals had responded to the survey. August, Tr. 18,944. Nor did she understand the special arrangements made to notify day care and other special facilities, such as the King Terrace Senior Citizen Apartment House, at the alert stage of an emergency. August, Tr. 18,950-52.

651. Mrs. August's concerns regarding traffic congestion at the intersection of Routes 23 and 29 arise from a misimpression that an evacuation would have to be accomplished quickly and without significant traf-

fic queuing. August, Tr. 18,955. The Board finds that Mrs. August has not yet become familiar with the purposes of the ETE study and the principles and assumptions associated with a planned evacuation. Bd. Fdgs. 1-85. Mrs. August has not yet discussed with the Phoenixville Police Chief whether he believes the traffic control points in the Phoenixville plan are adequate to maintain traffic control in the event of an evacuation. August, Tr. 18,957.

652. There are more than enough towing services available in Phoenixville. The only problem described by Mrs. August was a claim by some services that they were not getting enough business referrals from the police department. August, Tr. 18,953-54.

653. Mrs. August expressed concerns regarding the possible contamination of Phoenixville water supplies in the event of an accident at Limerick. The Board finds that the generic concern among all Schuylkill users would be addressed by Commonwealth planning authorities such as PEMA, the Bureau of Radiation Protection and Department of Environmental Resources. Mrs. August stated a willingness to resolve her concerns with those agencies. August, Tr. 18,965-66. Accordingly, the Board believes that concerns regarding possible contamination of Phoenixville water supplies will not affect adoption of its plan.

654. Despite personal reservations at the time, Mrs. August acknowledged that the Phoenixville coordinator and all EOC volunteers are dedicated individuals and gave an excellent performance during the July 25, 1984 exercise. August, Tr. 18,973-74. The Board also finds no basis in Mrs. August's suggestion that EOC volunteers execute an agreement. Such a requirement does not exist under NUREG-0654, Criterion A.3, and, as Mrs. August concedes, the Phoenixville coordinator is in the best position to determine the qualifications of volunteers. August, Tr. 18,961. No other jurisdiction has required volunteers to sign agreements.

655. If there were a radiological emergency at Limerick prior to adoption of a final plan by the Borough Council, Mrs. August would expect the existing draft plan to be utilized in responding to an emergency. August, Tr. 18,983. Ultimately, it is the intention of Mrs. August that the Borough Council adopt the most workable plan possible for the protection of Phoenixville residents. August, Tr. 18,903.

(15) SKIPPACK TOWNSHIP

656. Michael Giamo is a supervisor on the Board of Supervisors for Skippack Township. Giamo, Tr. 19,068. While Mr. Giamo stated generally that no progress has been made in the ability of Skippack Township

to provide for its transportation-dependent individuals (Giamo, Tr. 19,082), the plan states that Skippack Township has requested two buses and that Montgomery County has identified and will meet that transportation need. Appl. Exh. E-3, at I-3-3; Appl. Exh. E-20, at O-1. Similarly, the unmet need for traffic control point personnel has been passed on to Montgomery County. Appl. Exhs. E-3, at Q-1-1; Appl. Exh. E-20, at O-1. Mr. Giamo did not appear to understand the planning process by which unmet needs at the township level are passed on to the county for satisfaction. Giamo, Tr. 19,110; Bd. Fdg. 541.

657. Apparently confusing training sessions with the exercises conducted on July 25 and November 20, 1984, Mr. Giamo also expressed concerns regarding the readiness of EOC staff. His only specific point seemed to be that public notification during the exercise should actually have been given rather than simulated. Giamo, Tr. 19,089-90, 19,142. Actually, both PEMA and FEMA gave the Skippack Township EOC a satisfactory rating on its activities during the November 20, 1984 exercise. Giamo, Tr. 19,119-20; FEMA Exh. E-5, at 15. There is no reason to question whether the Skippack Township EOC staff is currently in an adequate state of readiness to respond to any radiological emergency (Giamo, Tr. 19,121).

658. The principal concern expressed by Mr. Giamo was the potential evacuation of prisoners from the Graterford Prison. Giamo, Tr. 19,073. His specific concern with respect to adopting a workable plan for Skippack Township was designation of evacuation routes in the context of a potential evacuation of Graterford Prison. Giamo, Tr. 19,093, 19,129.

659. Mr. Giamo attended a briefing session with officials from PEMA and the Commonwealth's Bureau of Corrections regarding the concerns of Skippack Township relating to the potential evacuation of Graterford prisoners in September 1984. Giamo, Tr. 19,098-99. At that time, Mr. Giamo received a briefing on the details for such plans. Giamo, Tr. 19,100. The Board is satisfied that final plans will accommodate the evacuation of these disparate populations.

660. Basically, Mr. Giamo did not know the source of evacuation routes designated in the Skippack Township plan or how evacuation was coordinated, nor had he consulted with Montgomery County or PEMA planning officials regarding any perceived inadequacy in those routes. Giamo, Tr. 19,113-15, 19,128; Appl. Exh. E-20, at 14. Although Mr. Giamo had briefly examined the ETE study, he did not specify any particular area of disagreement. It is clear to the Board that Mr. Giamo has not yet achieved an understanding of the principles and assumptions as-

sociated with an emergency evacuation and the choice of an appropriate protective action. Giamo, Tr. 19,115-18, 19,151.

661. Although the Skippack Township Fire Company, a volunteer unit, initially indicated that it was not going to participate in any phase of an emergency response, it has since volunteered to participate at all but the general emergency stage. Giamo, Tr. 19,078-79. At that point, responsibility for route alerting would be passed on to Montgomery County as an unmet need. Giamo, Tr. 19,079; Appl. Exh. E-3, at Q-1-1; Appl. Exh. E-20, at O-1. At the time of the November 20, 1984 exercise, however, the township was able to obtain seventeen volunteers from the fire company who agreed to conduct route alerting. Bradshaw, Tr. 13,437; FEMA Exh. E-5, at 16. This is consistent with the historical record of the availability of volunteer fire company personnel. Bd. Fdg. 496. The Board finds there would be at least as great a response in an actual emergency.

662. In response to a letter to PEMA, dated June 22, 1984, from the Skippack Township solicitor (Giamo, Tr. 19,100-02; Appl. Exh. E-98), PEMA Director John Patten suggested that Skippack Township attempt to develop an auxiliary force of volunteers to perform route alerting at the general emergency stage. Mr. Giamo has not yet acted on this suggestion or determined from nearby fire companies whether, under the mutual-aid program, another fire company could provide route alerting at that time. Giamo, Tr. 19,106. Likewise, the township has not yet surveyed individual fire company volunteers to determine their personal willingness to perform assigned route alerting in an actual emergency. Giamo, Tr. 19,107.

663. In the event of an actual emergency, volunteers would likewise be solicited at the local level and, if they were not obtained, the need for route-alerting personnel would be passed on to the county, which would assign another fire department through the county mutual assistance plan. Bradshaw, Tr. 13,437; Bigelow, Tr. 14,148, 14,396. Mutual aid is a routine emergency response procedure expressly mandated by § 7504 of Pub. L. No. 1332.

664. Mr. Giamo initially asserted that assignments for traffic control points in Skippack Township have not been resolved. Giamo, Tr. 19,082. He later acknowledged that township fire police have volunteered to man traffic control points as stated in the township plan. Giamo, Tr. 19,123-24; Appl. Exh. E-20, at 15.

665. Notwithstanding any expression of concerns by Mr. Giamo, it is the intention of Skippack Township to resolve outstanding concerns in order to achieve a workable plan. Giamo, Tr. 19,129. The township is

most anxious to cooperate in planning. Giamo, Tr. 19,130. Thus, Skip-pack Township intends to adopt a plan before a full-power license is issued for Limerick. Giamo, Tr. 19,159. If an actual radiological emergency occurred prior to formal adoption of a plan, Skippack Township would rely upon the current draft in responding to the emergency. Giamo, Tr. 19,145.

(16) CONCLUSION FINDING ON LEA-1

666. The Board has previously addressed South Coventry Township with respect to this contention (Bd. Fdg. 628) and thus finds no need to address it further. For the remaining risk counties, municipalities, school districts and institutions, the Board finds, based on the entire record, that the plans in contention have been sufficiently developed so that there is reasonable assurance that the present state of planning is predictive of final approval. Moreover, we find there is reasonable assurance that the plans can and will be implemented by either municipality or the appropriate county.

2. Bucks County

a. Bucks County

The Montgomery County RERP fails to provide reasonable assurance that the public will be adequately protected in that the Bucks County Support Plan, which is essential to the workability of the MontCo RERP, may not be approved. The present Board of Commissioners have [sic] little knowledge of the contents and implications of the Bucks County Support Plan. There is no assurance that the County will assume the responsibilities assigned to it in the Support Plan, rather than use County resources to help Bucks County people first. The Montgomery County Plan relies on the Support Plan in at least these ways:

1. facilities for relocation and mass care of evacuees
2. augmentation of emergency workers, including use of county resources, on a continuous 24-hour basis
3. See attachment "Excerpts and comments on the Bucks County Draft Evacuation Plan" for additional areas of support and interface.

It is contended that without the approval of Bucks County Support Plan, the MontCo RERP is unworkable as it now stands.

667. In our April 20, 1984 Special Prehearing Conference Order, this Board deferred ruling on the admissibility of LEA-3. While we agreed that LEA's concerns that the responsibilities Bucks County agreed to fulfill for Montgomery County in the event of a radiological

emergency might, if not performed, leave a deficiency in the Montgomery County plan, this Board did not, by then admitting the contention, want to burden this proceeding with unnecessary litigation if the Bucks County RERP were subsequently adopted. LBP-84-18, *supra*, 19 NRC at 1041-44. However, that plan was not adopted in the interim, and in response to this Board's August 15, 1984 Memorandum and Order LEA reworded and resubmitted this deferred contention for reconsideration. In support of its contention, LEA appended a July 17, 1984 letter from the Bucks County Commissioners to PEMA which sets forth the County's reservation about its role in the emergency planning for Limerick. In light of Bucks County's stated concerns, this Board admitted LEA-3 for litigation. Memorandum and Order dated September 24, 1984, slip op. at 5.

(1) BUCKS COUNTY SUPPORT PLAN

668. Bucks County has maintained an emergency plan for at least 15 years. An Annex to the plan addresses preparedness for radiological emergencies. McGill, Tr. 20,365. At the time of the Three Mile Island incident in 1979, Bucks County assumed responsibility to receive and care for 15,000 evacuees. Although contacted on Sunday morning, plans were in effect by Monday afternoon to accommodate 15,000 potential evacuees from the Lancaster County area. McGill, Tr. 20,366-67; Taylor, Tr. 19,585.

669. The Bucks County Fixed Nuclear Facility Incidents Support Plan, which was identified as Applicant's Exh. E-4 dated October 1984, could be implemented in the event of a radiological emergency at Limerick so as to accommodate evacuees from Montgomery County. In order to respond to such an emergency, Bucks County would utilize the current draft plan. McGill, Tr. 20,367-69, 20,401-02.

670. The November 20, 1984 exercise indicated that Bucks County has the capability of implementing its support plan adequately. The exercise demonstrated the availability and willingness of emergency workers, such as police departments, fire companies, ambulance squads, fire, police and school officials, to participate. There is no doubt that response would be adequate in a full-scale exercise. Asher and Kinard (Update), ff. Tr. 20,150, at 2, Tr. 20,169, 20,280; McGill, Tr. 20,386-87; Reiser, Tr. 18,338-39.

671. The Bucks County Commissioners are withholding formal action on their support plan while awaiting the outcome of the evidentiary hearing before this Licensing Board as well as litigation in Bucks County regarding the construction of the Point Pleasant Pumping Station. McGill, Tr. 20,381. In the interim, there is no reason why Bucks

County emergency planning officials cannot rely upon the unadopted plan as a basis for responding to any radiological emergency at Limerick. McGill, Tr. 20,400-02.

672. The Bucks County population is not at risk in a postulated Limerick emergency because the nearest portion of Bucks County is at least 13 miles from Limerick. McGill, Tr. 20,385; Bradshaw, ff. Tr. 17,191, at 9; 10 C.F.R. § 50.47(c)(2). Mass care centers in Bucks County are at least 20 miles from Limerick and are in consonance with State and federal guidance in this regard. Planning assumptions conservatively arrange for the mass care of 50% of the evacuating population, although actual evacuation statistics demonstrate that only 10 to 15% of the evacuees seek mass care or temporary relocation shelters in a disaster. Thus, adequate space would be available in the designated Bucks County mass care centers for any residents spontaneously evacuating from areas of the county closer than 20 miles. Bradshaw, ff. Tr. 17,191, at 9, Tr. 17,353-54.

673. Inasmuch as the designated mass care centers for Bucks County are located as close as 20 miles from Limerick, it is likely that any residents of Bucks County who choose to evacuate despite the lack of any realistic threat to their safety would relocate to areas more distant from Limerick than any portion of Bucks County. Planning arrangements for such individuals are well beyond the scope of planning requirements and constitute an unfounded hypothetical concern. Bradshaw, ff. Tr. 17,191, at 9.

674. The same emergency services personnel designated in the existing Bucks County plan as capable of 24-hour response would be utilized to address the emergency requirements of any spontaneous evacuation of Bucks County residents to other areas of the county. This presents no additional burden on emergency services because the need for mass care space has been conservatively estimated. Bradshaw, ff. Tr. 17,191, at 9.

675. In the opinion of emergency planning professionals, there would not be any massive, spontaneous, evacuation of Bucks County residents which might affect the Bucks County support plan as drafted. Bradshaw, Tr. 17,235-36. Based on the historical record, the most common problem in evacuation scenarios is that residents do not want to evacuate. The Bucks County coordinator, who has more than 18 years experience in emergency planning, has never stated that spontaneous evacuation would be a problem. Bradshaw, Tr. 17,369-71.

676. There is no basis to assume that Bucks County will not adopt, in some form, a support plan to provide for approximately 24,400 Mont-

gomery County evacuees. Based upon a recent meeting with the Bucks County Commissioners, Mr. Hippert stated his belief that Bucks County would not refuse to cooperate in the event of an incident at Limerick. Hippert, ff. Tr. 19,498, at 5. Additionally, the Director of PEMA has stated that, at this time, he does not believe it is necessary to seek another support county to replace Bucks County because he believes that any concerns expressed by Bucks County can be addressed within the context of the existing draft plan. Bradshaw, Tr. 17,338.

677. A meeting was held on November 7, 1984, between PEMA Director John Patten and Commissioner Carl Fonash of the Bucks County Board of Commissioners. Tr. 19,526. To memorialize their discussions, Mr. Patten prepared a Memorandum of Understanding, which he signed and sent to Commissioner Fonash. In the memorandum, PEMA recognized some of Bucks County's concerns and stated its willingness to work with Bucks County to resolve or eliminate those concerns. Hippert, Tr. 19,529, 19,532; LEA Exh. E-61. The Memorandum of Understanding prepared by PEMA to record discussions in the November 7, 1984 meeting between Bucks County and PEMA accurately reflects the discussion and agreement that took place at that time. McGill, Tr. 20,380-81. However, no action has been taken by the Bucks County Commissioners on this Memorandum of Understanding. McGill, Tr. 20,380. Although the Board regards the Memorandum of Understanding between PEMA and Bucks County (LEA Exh. E-61) as a useful frame of reference, execution of the Memorandum by the Bucks County Commissioners is not a prerequisite to adopting its plan. Nor must it precede a finding by this Board that reasonable assurance exists that a workable plan can be implemented in the event of a radiological emergency. PEMA asserts that the Bucks County Board of Commissioners has raised some legitimate questions regarding the impact of an evacuation of approximately 24,000 persons from Montgomery County on the safety and well-being of Bucks County residents and indicates that it acknowledges those concerns. Hippert, ff. Tr. 19,498, at 5. There is no evidence, however, to establish that the Board of Commissioners' concerns require further planning or analysis under 10 C.F.R. § 50.47, NUREG-0654 or Annex E. The current Bucks County plan does ensure that its populace would not be adversely affected by the evacuation from Montgomery County. A hypothesized spontaneous evacuation from Philadelphia is beyond any planning objective contained in the NRC's regulations or Annex E and therefore requires no further emergency planning.

678. From the perspective of PEMA, the Bucks County Commissioners' concern that emergency planning should include residents of

Bucks County residing from 15 to 30 miles beyond Limerick results largely from a lack of communication and understanding. Hippert, Tr. 19,535. At this point, the Bucks County Commissioners have not indicated to PEMA their decision regarding what, if any, measures they might choose to implement to protect Bucks County residents in the event of a radiological emergency. Hippert, Tr. 19,545. PEMA believes that Bucks County has the resources and expertise to meet the requirements of Annex E and NUREG-0654 as a support county. Hippert and Taylor, Tr. 19,585.

679. William H. Reiser, the Chief Clerk and County Administrator of Bucks County, supervises all operating departments under the County Commissioner's jurisdiction, including the Bucks County Department of Emergency Services; however, he was unfamiliar with the draft support plan for Bucks County. Reiser, Tr. 18,264-65, 18,267; Appl. Exh. E-4. Charles McGill, the Director of Emergency Services for Bucks County (McGill, Tr. 20,363) did in fact testify as to his review and development of the Bucks County support plan.

680. The Bucks County Commissioners have not assigned Mr. Reiser any particular responsibilities with regard to emergency planning. Reiser, Tr. 18,286. Mr. Reiser was not familiar with any meetings held between the Bucks County Commissioners and PEMA officials since the July 25, 1984 exercise regarding the Bucks County support plan. Appl. Exh. E-4. The Commissioners have not given any direction to Mr. Reiser with regard to particular plan procedures, or discussed their views with regard to reviewing and adopting a final draft of the Bucks County support plan. Reiser, Tr. 18,296-97, 18,306-07. As regards the letter dated July 17, 1984 from two Bucks County Commissioners to PEMA, Mr. Reiser edited drafts of the letter at the request of the Bucks County Commissioners, but he did not know the source of the draft provided to him, and he had had no discussions with either Commissioner prior to sending the letter. His knowledge of the matter was limited to the content of the letter itself. Reiser, Tr. 18,301, 18,308.

681. Nonetheless, Mr. Reiser acknowledged that the Bucks County Board of Commissioners supports helping its neighbors in times of emergency and will try to adopt a plan based upon what they regard as reasonable concerns. Reiser, Tr. 18,325, 18,344, 19,302-03. The Commissioners have never stated that they would be unwilling to consider a workable support plan for Bucks County. Reiser, Tr. 18,309.

682. Mr. Reiser, who is the supervisor of the Director of Emergency Services (Reiser, Tr. 18,265), testified that Mr. McGill is professionally competent and has adequately performed his responsibilities. Both Mr. Reiser and the Bucks County Commissioners would look to Mr. McGill

with regard to his opinions and judgment as to the adequacy of emergency planning for Bucks County. Reiser, Tr. 18,315.

(2) CONCLUSION FINDING ON LEA-3

683. Based on the evidentiary record before us, this Board has reasonable assurance that, in the event of a radiological emergency at the Limerick Generating Station, Bucks County would implement its RERP and perform its support function of Montgomery County.

IV. CONCLUSIONS OF LAW

In reaching this decision, the Board has considered all the evidence of the parties and the entire record of this proceeding on the seventeen (17) offsite emergency planning issues, including all proposed findings of fact and conclusions of law filed by the parties. Based upon a review of that record and the foregoing Findings of Fact, which are supported by reliable, probative and substantial evidence, the Board, with respect to the issues in controversy before us, reaches the following conclusion pursuant to 10 C.F.R. § 2.760a:

The emergency plans, subject to conditions set forth in the Order, meet the requirements of 10 C.F.R. § 50.47, and Appendix E to 10 C.F.R. Part 50, as well as the criteria of NUREG-0654, and provide reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

V. ORDER

WHEREFORE, in accordance with the Atomic Energy Act of 1954, as amended, and the Rules of Practice of the Commission, and based on the foregoing Findings of Fact and Conclusions of Law, IT IS ORDERED that:

Prior to operation above 5% of rated power, the Director, Office of Nuclear Reactor Regulation shall (a) receive verification of plans to implement a level of traffic control in the King of Prussia area sufficient to assure that all the traffic evacuating along the Route 363-to-Pennsylvania Turnpike corridor can continue to move upon reaching the EPZ boundary, as implicitly assumed in NUREG-0654 Planning Standard J.10.1; and (b) FEMA shall receive verification of the satisfaction of the unmet municipal staffing needs as they relate to a capability of continu-

ous 24-hour operation during a radiological emergency, prior to operation above 5% rated power.

Pursuant to 10 C.F.R. § 2.760(a) of the Commission's Rules of Practice, this Third Partial Initial Decision will constitute the final decision of the Commission forty-five (45) days from the date of issuance, unless an appeal is taken in accordance with 10 C.F.R. § 2.762 or the Commission directs otherwise. *See also* 10 C.F.R. §§ 2.764, 2.785 and 2.786.

Any party may take an appeal from this Decision by filing a Notice of Appeal within ten (10) days after service of this Decision. Each appellant must file a brief supporting its position on appeal within thirty (30) days after filing its Notice of Appeal (forty (40) days if the Staff is the appellant). Within thirty (30) days after the period has expired for the filing and service of the briefs of all appellants (forty (40) days in the case of the Staff), a party who is not an appellant may file a brief in support of or in opposition to the appeal of any other party. A responding party shall file a single, responsive brief regardless of the number of appellant briefs filed. *See* 10 C.F.R. § 2.762(c).

IT IS SO ORDERED.

**THE ATOMIC SAFETY AND
LICENSING BOARD**

**Helen F. Hoyt, Chairperson
ADMINISTRATIVE JUDGE**

**Richard F. Cole
ADMINISTRATIVE JUDGE**

**Jerry Harbour
ADMINISTRATIVE JUDGE**

Dated at Bethesda, Maryland,
this 2nd day of May 1985.

[Appendix A has been omitted from this publication but may be found in the NRC Public Document Room, 1717 H. Street, NW, Washington, DC, 20005.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

**Ivan W. Smith, Chairman
Sheldon J. Wolfe
Gustave A. Linenberger, Jr.**

In the Matter of

**Docket No. 50-289-SP
(ASLBP No. 79-429-09-SP)
(Restart Remand on
Management-Training)**

METROPOLITAN EDISON COMPANY,

et al.

**(Three Mile Island Nuclear
Station, Unit No. 1)**

May 3, 1985

In response to ALAB-772 (19 NRC 1193 (1984)) remanding the issue of the adequacy of training for licensed operators at Three Mile Island Unit 1, the Licensing Board finds that the training program is fundamentally adequate, but that a licensing condition must be imposed to assure needed improvements.

The Licensing Board concludes that the Licensee has responded appropriately to the cheating incidents identified in the Partial Initial Decision of July 27, 1982 (LBP-82-56, 16 NRC 281) by acknowledging responsibility for the cheating; improving channels of communication among management, operators and training employees; by establishing adequate security measures to prevent cheating on examinations, and by improving the TMI-1 licensed-operator training program.

LICENSED-OPERATOR TRAINING

Licensing Board finds that a licensed-operator training program must have a method of assessing the performance of trained operators in the job setting for revisions to or for validating the training program.

LICENSED-OPERATOR TRAINING

Although the Commission's Policy Statement on Training and Qualification of Nuclear Power Plant Operators (50 Fed. Reg. 11,147 (Mar. 20, 1985)) endorses accreditation by the Institute of Nuclear Power Operations (INPO) of operator training programs as an acceptable method of demonstrating an adequate training program; and although the TMI-1 licensed-operator training program has been accredited by INPO, the Licensing Board declined to give *prima facie* effect to the accreditation because: (1) other parties had no opportunity to challenge the accreditation and (2) even if *prima facie* effect had been afforded the accreditation, other evidence of record indicates that INPO failed to follow its own criteria and the accreditation was therefore inaccurate.

APPEARANCES

On behalf of the Metropolitan Edison Company, Licensee: **Deborah B. Bauser, Esq., and Ernest L. Blake, Jr., Esq.**

On behalf of the United States Nuclear Regulatory Commission: **Mary E. Wagner, Esq., and Jack R. Goldberg, Esq.**

On behalf of the Union of Concerned Scientists, Intervenor: **William S. Jordan, III, Esq., and Ellyn R. Weiss, Esq.**

On behalf of Three Mile Island Alert, Intervenor: **Ms. Louise Bradford.**

On behalf of the Commonwealth of Pennsylvania: **Thomas Y. Au, Esq.**

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PARTIAL INITIAL DECISION ON THE REMANDED ISSUE OF LICENSED-OPERATOR TRAINING AT TMI-1

I. INTRODUCTION AND BACKGROUND

A. The Remand on Training

On May 24, 1984, the Appeal Board remanded this proceeding to the Licensing Board for further hearings on three discrete management-related issues. ALAB-772, 19 NRC 1193 (1984). This Partial Initial Decision addresses the remanded issue of licensed-operator training at Three Mile Island, Unit 1 (TMI-1).

In August 1981 after an extensive hearing on management issues, including the substantive adequacy of the TMI-1 licensed-operator training program, the Licensing Board issued a decision favorable to Licensee. LBP-81-32, 14 NRC 381 (1981). However, because of the then-recent discovery of cheating on NRC licensed-operator examinations, the Board retained jurisdiction to consider the impact of this new information on its findings and conclusions. *Id.* at 403. The Board subsequently reopened the management proceeding and appointed a Special Master to hear evidence on the impact of the cheating incidents at

TMI-1. Further hearings were conducted, culminating in a report to the Board by the Special Master and a partial initial decision by the Board. See LBP-82-34B, 15 NRC 918 (1982); LBP-82-56, 16 NRC 281 (1982). The Licensing Board found that there had been a breakdown in the integrity of Licensee's training and testing program at TMI-1 and imposed several requirements, primarily future audits, directed at obtaining future assurance of the adequacy of the training program. LBP-82-56, *supra*, 16 NRC at 300, 365, 384. The Board also concluded, however, that the identified weaknesses in the program did not undermine the Board's earlier decision favoring restart. *Id.* at 301.

In ALAB-772, the Appeal Board reviewed the entire record on the ability of GPU Nuclear Corporation's management to operate TMI-1 safely. 19 NRC at 1201. The Appeal Board endorsed the Licensing Board's characterization of the question that had to be answered following the cheating incidents at TMI-1, *viz*, "is the instruction adequate to prepare the operators to operate the plant safely?" It disagreed, however, with the Board "on its affirmative answer to that question." *Id.* at 1232-33. The Appeal Board believed that the record in the reopened proceeding had perhaps raised more questions than it satisfactorily had answered. "For example, does the training program actually enhance the operators' knowledge or simply encourage memorization for test-taking purposes? Are the licensee and NRC examinations an effective way to measure an operator's ability to run the plant? Do the format and content of the examinations encourage cheating?" *Id.* at 1233.

The Appeal Board held that the "principal difficulty" of the Licensing Board's decision was its "failure to reconsider, as promised and in a meaningful way, its earlier finding that licensee's training program was 'comprehensive and acceptable.'" *Id.* Instead, the Board "relied on the post-cheating testimony of only licensee and the staff." *Id.* Of particular additional significance was the large degree of reliance by the Licensing Board on the testimony of a panel of GPU consultants known as the "OARP Review Committee"¹ who reviewed Licensee's Operator Accelerated Retraining Program in 1980-1981 before the cheating became known. As the Appeal Board stated: "[T]he Board essentially presumed that the earlier, favorable expert testimony by the outside consultants would not have been altered by the cheating revelations." *Id.*

¹ The OARP Review Committee was a select committee made up of experts in the fields of educational psychology, engineering/human factors psychology, nuclear engineering education, nuclear power generation, and nuclear power plant operator training. The OARP Review Committee issued a report in 1980 that reviewed the Operator Accelerated Retraining Program (OARP) conducted at TMI in 1979-1980. The OARP was a onetime intensive program designed to significantly improve licensed-operator performance. See LBP-81-32, *supra*, 14 NRC at 451-53; see also § III.D, *infra*.

The Appeal Board discussed many other specific matters and concerns throughout its decision. The most important are:

- a. Whether deficiencies in operator testing, as manifested by the cheating episodes, are symptomatic of more extensive failures in the overall training program. *Id.* at 1233.
- b. Whether the training program enhances operators' knowledge or simply encourages memorization for test-taking purposes. *Id.*
- c. The presence in supervisory positions of several individuals implicated in the cheating episodes. *Id.*
- d. The failure of employees, including training instructors, to take the courses or examination process seriously. *Id.*
- e. Whether the positive assessments of Mr. Frank Kelly and Dr. Julien Christensen regarding the "pride and enthusiasm" of employees in their training program and the professionalism of the instructors would have been altered by post-cheating testimony reflecting "a lack of these qualities." *Id.* at 1234.
- f. Whether training facilities are adequate. *Id.* at 1235.
- g. Whether the OARP Committee's brief but favorable comments on the written exams would be revised by the new evidence. *Id.* at 1234-35.
- h. Whether the Committee's favorable perceptions of the instructors would be changed by knowing that one or more of those they evaluated were involved in the cheating episodes. *Id.* at 1235.
- i. Whether the criteria for training instructors are adequate. *Id.*
- j. Whether top management is aware of the real and perceived problems of its employees. *Id.* at 1236.
- k. Whether post-cheating changes in the training program adequately ameliorate any lack of communication between top management, training staff and operating crews. *Id.*
- l. The appropriateness of the promotion and current assignments of several persons within the GPU organization, specifically including Dr. Robert Long, director of Training and Education during the cheating incidents, promoted to GPUN vice president for Nuclear Assurance; Dr. Richard P. Coe, who has replaced Dr. Long; Samuel Newton, former Operator Training Manager, promoted to Manager of Plant Training; Edward J. Frederick, a TMI-2 control room operator at the time of the accident, promoted to supervisor of Licensed Operator Training. *Id.* at 1236 n.56.

- m. Whether simulator testing should be required of all operators.
Id. at 1236.

The Appeal Board summarized its remand order as follows:

The most significant issue requiring further hearing is training. Because the safe operation of the plant is so heavily dependent upon the operators' skill, the importance of training cannot be overstated. The cheating and related incidents called into question the adequacy and integrity of licensee's entire training and testing program. Although we have found that the reopened record on the cheating itself was as fully developed as possible, the impact of those findings on the Licensing Board's earlier conclusions on licensee's training program was not given the full consideration it warrants. *In particular, the Board should have sought further testimony, in light of the cheating incidents, from the OARP Review Committee, whose views the Board previously found so persuasive.*

Id. at 1279 (footnote omitted) (emphasis added).

B. Participation in the Proceeding

In addition to Licensee and the NRC Staff, the Commonwealth of Pennsylvania (the Commonwealth), Three Mile Island Alert (TMIA) and the Union of Concerned Scientists (UCS) were the parties participating in the remand on training.²

UCS' proposed subissues were:

- (1) Are the operators equipped to safely operate the plant particularly in emergency situations?
- (2) Do the NRC and company examinations reliably measure the operators' ability to safely operate the plant?

Memorandum and Order on Lead Intervenors, July 13, 1984, slip op. at 2.

After further comments by the parties on the scope of the proceeding, UCS' subissue (1) was modified by the Board as follows:

- (1) Are the operators trained to safely operate the plant in accordance with approved procedures, particularly in emergencies?

²The Intervenors agreed to utilize lead intervenors in the remanded proceeding. Memorandum and Order on Lead Intervenors, July 13, 1984 (unpublished). They were directed to make good-faith efforts to consolidate their case with the presentation of the lead intervenor before proceeding independently. Because of TMIA's failure to cooperate, the consolidation effort was not successful.

Memorandum and Order on Licensee's July 31, 1984 Comments on Lead Intervenors and Motion to Partially Exclude UCS from Management Phase, August 30, 1984 (unpublished), slip op. at 3.

The Board ruled that the adequacy of the NRC examinations could not be litigated by the Intervenors in this reopened proceeding unless the OARP Review Committee relied upon these exams as a measure of operator competence. Consistent with that ruling, we held that Licensee may not claim any credit for the NRC exam process; the issue of operator competence must stand or fall solely on the basis of GPU's own training and testing process. The OARP Committee's Special Report did indicate a degree of reliance by them on the NRC exams as providing assurance of operator competence. Special Report, ff. Tr. 31,749, at 46. However, after being informed of the Board's ruling, the Committee asserted that it has not relied on the NRC exams. Letter from GPU counsel to the Board, September 27, 1984.

The subissues advanced by TMIA were the following:

- (1) Has GPU properly responded to the problems in its training program identified internally and/or by the Special Master, the Licensing Board and the Appeal Board?
- (2) Are the people responsible for the management and implementation of the training program properly equipped by their own experience and attitude to impart the information and values necessary for safe operation of TMI-1?
- (3) Do the operators have the appropriate attitude toward the training program; do they believe it is effective?
- (4) How does the history of GPU's problems with training and its current training program reflect on the competence and integrity of GPU management?

Because the wording of TMIA's proposal suggested to the Board that TMIA might pursue matters that were *res judicata*, the Board simply approved TMIA's lead on the training issues to the extent that ALAB-772 authorized an inquiry into cheating and integrity as they relate to training. Memorandum and Order on Lead Intervenors, *supra*, at 3. Proposed subissue (4) was later rejected by the Board. Memorandum and Order of August 30, 1984, *supra*.

C. The Scope of the Proceeding

The focus of the Appeal Board's remand of training is on the views of the OARP Review Committee concerning the cheating incidents. However, the Appeal Board raised numerous evidentiary questions about Licensee's training program as set out above. The Board did not interpret

narrowly the Appeal Board's directive remanding the issue of training. While it could be argued that the Appeal Board remanded the training issue solely to hear the views of Licensee's consultants, we ruled that the right of other parties to confront those views necessarily broadened the scope of the hearing. See Memorandum and Order Following Pre-hearing Conference, July 9, 1984, slip op. at 3.

The broad issue on remand was the adequacy of the training program to prepare the TMI-1 licensed operators to operate the plant safely. See *id.* at 2-3; see, e.g., Tr. 32,270-74 (Chairman Smith). However, this broad issue was confined by the Appeal Board in § III.C of ALAB-772 to the implications of cheating and other deficiencies which came to light in the reopened proceeding on cheating. Management findings which were not placed in issue by the Appeal Board were *res judicata* in the remanded proceeding. Memorandum and Order of July 9, 1984, at 3. For example, the remand did not permit the relitigation of the cheating incidents themselves. Also, only *licensed-operator* training was in issue. *Id.* at 3, 6.

The parties' interpretation of the scope of the remanded training issue varied, and this fact was reflected in their respective cases. The NRC Staff considered the remand to be limited to the views of the OARP Review Committee about licensed-operator training at TMI-1, taking into consideration the cheating and subsequent changes to the program. The Staff did not address the actual content of the training program in its testimony.³ Rather, the Staff testimony addressed the issue of whether the "methodology" used by the Committee was adequate to support the Committee's conclusions. See Testimony of Julius J. Persensky, Joseph J. Buzy and Dolores S. Morisseau on the Remanded Training Issue from ALAB-772 (Staff), ff. Tr. 33,148, at 2.

UCS similarly presented an expert witness, Dr. James J. Regan, who offered his recommended methodology for analyzing training at TMI-1. Testimony of Dr. James J. Regan (Regan), ff. Tr. 33,532; see also Surrebuttal Testimony of Dr. James J. Regan (Regan), ff. Tr. 32,693.

The Licensee presented the panel of the five experts who made up the reconstituted OARP Review Committee. See Testimony of the Reconstituted OARP Committee (Dr. Julien Christensen, Dr. Eric Gardner, Mr. Frank Kelly, Dr. William Kimel and Dr. Robert Uhrig) on the

³ By letter of November 26, 1984, to this Board, counsel for Licensee expressed concern that the Staff's testimony did not address the actual content of the TMI-1 training program, and suggested that the Board might wish to call Staff members as its own witnesses on the subject. The Board did not call on the Staff to present such testimony. No negative inference concerning the Staff's view of the adequacy of the training program may be drawn from the fact that the Staff did not present testimony on this subject. See Tr. 33,261-66. As Staff counsel noted at the hearing, the Staff has very clear obligations if its position on a matter before the Board should change. Tr. 33,266.

TMI-1 Licensed-Operator Training Program (Committee), ff. Tr. 31,749; Rebuttal Testimony of the Reconstituted OARP Committee (Committee Rebuttal), ff. Tr. 33,320. Licensee also presented three panels of company witnesses who described the program in detail. This testimony also specifically addressed questions contained in § III.C of ALAB-772 about post-cheating management actions related to training. See Licensee's Testimony of Dr. Robert L. Long and Dr. Richard P. Coe on the Issue of Licensed-Operator Training at TMI-1 (Long and Coe), ff. Tr. 32,202; Licensee's Testimony of Mr. Samuel L. Newton, Mr. Bruce P. Leonard and Mr. Michael J. Ross on the Issue of Licensed-Operator Training at TMI-1 (Newton *et al.*), ff. Tr. 32,409; Rebuttal Testimony of Dr. Ronald A. Knief and Mr. Bruce P. Leonard (Knief and Leonard), ff. Tr. 33,364.

UCS and TMIA challenged the substantive adequacy of the licensed-operator training program, both through cross-examination of Licensee's witnesses and through the introduction of exhibits offered for the purpose of establishing inadequacies in the program. See UCS Training Exhs. 1-34; TMIA Training Exhs. 1-11.

The Licensee did not limit its presentation to the issues specifically mentioned in ALAB-772. Instead its strategy was to bound those issues by presenting its entire current licensed-operator training program for the Board's consideration. UCS followed Licensee and challenged the entire program. As noted, the Staff did not believe that a litigation of such breadth had been intended by the Appeal Board. While we agreed with the Staff on that point, we also believed that it was prudent for the Licensee to defend its current program in its entirety, and, in the long run, probably just as efficient given the many facets of ALAB-772. However, having put its program on the line, Licensee must now accept greater consequences than might have been the result of a narrow interpretation on the remand order.

II. COMMENTS

In the decision below the Board concludes that the Licensee has made an appropriate response to the 1981 cheating episodes and to the concerns of the Appeal Board set out in ALAB-772. There are four essential requirements to Licensee's response, each of which has been satisfied. The members of management who deemed themselves particularly responsible for the cheating episodes have conceded their failures and have persuaded the Board of their commitment to prevent any recurrence of cheating. There have been extensive improvements in communications between Licensee's management on one hand and the

TMI-1 operators and training personnel on the other hand. There has also been much-improved communications between training and operating personnel.

A formal survey by psychologists following the decisions concerning cheating by this Board and the Special Master in 1982 revealed unacceptable employee attitudes concerning management, training, and the licensing process. The best evidence is that attitudes have improved and that management's communications efforts are effective. The Board believes that permitting the restart of TMI-1 will alleviate any lingering attitude problems.

Examination security is very tight. If implemented as described, we do not see how the examinations can be defeated. The intervening parties, however, are convinced that unless the "root causes" of cheating are confronted, no amount of examination security or preventive measures will be effective. The Board shares the opinion of the OARP Review Committee that resources are better expended by removing any need for cheating and foreclosing any opportunity to cheat rather than agonizing over the basic anatomy of cheating.

Improving the training program is the fourth essential step to Licensee's response. We looked at the training program from several perspectives. The training program itself, considered directly on its merits, has changed from a traditional, knowledge-based program that depended heavily upon the prior knowledge of the instructors to a very modern, structured, performance-based program. Evidence was presented concerning the curricula and testing methods used in the replacement operator training program; the replacement senior reactor operator program, the annual requalification program required of all licensed personnel, and special training. Extensive use is made of state-of-the-art simulators in training and testing. Soon a Singer-Link replica simulator will be installed at TMI. The replica simulator is a first-principles simulator, which basically means that built-in nuclear engineering principles make it predictive rather than requiring that every behavioral mode be programmed. The replica simulator also has the serendipitous value of being useful in the analysis of abnormal events and in testing proposed plant and procedural modifications.

UCS extensively challenged the training program. While acknowledging that the methodology of Licensee's Training System Development (TSD) model was on the right track, UCS criticized the implementation of the program on several scores. Most importantly UCS would have the Board find that the training and testing program depends too heavily on subjectivity and judgment. For example, a final walk-through of trained operators by the Manager of Operations to demonstrate familiarity with

plant systems and procedures is deemed by UCS and its expert witness to be unreliably subjective, as is the entire oral examination process. The Board believes that, while objective measures should be encouraged as training validators and predictors of performance, we endorse the use of judgmental, even intuitive, probing by seasoned plant operators as an extra screening of those who may have slipped through other testing.

However, the Board has found one aspect of the TMI-1 training program to be deficient. There is no provision for any formal evaluation of trained operators in the job setting for the purpose of validating or revising the training program. Licensee argues that other methods, especially simulator testing, satisfy any need for an empirical demonstration of training effectiveness. UCS has pressed this issue above all others. We agree that some method of formal evaluation of trained operators on the job, under both normal and abnormal conditions, for feedback to training should be implemented. We have required an implementation plan for evaluation and have retained jurisdiction to approve the plan.

After the hearing the TMI-1 licensed-operator training program was accredited by the Institute of Nuclear Power Operations (INPO). Also after the hearing, the Commission issued its Policy Statement on Training and Qualification of Nuclear Power Plant Personnel. The Policy Statement endorsed the INPO accreditation program and five elements of a performance-based program employed by INPO. The Board found that the five INPO elements were logical and consistent with Licensee's TSD model. Although Licensee requested that the INPO accreditation be accepted by the Board as *prima facie* evidence of the adequacy of its licensed-operator training program, we decline to do so. No party had an opportunity to address the effect of the accreditation and the Policy Statement during the hearing, and we believe that the INPO Accreditation Board failed to apply its own criteria when it approved the TMI-1 program.

The OARP Review Committee concluded that the licensed-operator training program was adequate to train personnel to operate TMI-1 safely. This conclusion was predicated upon many relevant findings. The Licensee urged the Board to accept the Review Committee's conclusion as an independent basis for our conclusion that the training program is adequate. UCS criticizes the Review Committee's methodology as too informal and superficial. The NRC Staff believed that the Review Committee should have taken evaluation steps that it did not take, but that, in view of the Committee's acknowledged expertise, its findings should be accepted by the Board but weighed against its methodological limitations. The Board found that the Review Committee could have taken additional steps, but that perhaps it did more than was necessary. It all

depends upon the use made of the Committee's findings and conclusions. The Committee's methodology was sufficient for the limited purpose of responding to ALAB-772. It did not hold itself out to be an accrediting group nor did it claim to have conducted a quality assurance evaluation of the training program.

The Board valued the Review Committee's expertise very highly and relied heavily upon the collective and individual opinions of its members in our analysis of the training program. However, other evidence, mostly from Licensee's employees, was also offered on the issues. The evidence was comingled and could not be separated.

Since the Board would not accept the Committee's conclusions based solely upon its expertise and methodology (without a separate weighing of its findings), we did not find that the Committee's conclusion was an independent basis for finding the training program adequate.

During the hearing the Licensing Board Chairman expressed concern that the hearing process might be used unfairly and inaccurately to affect individuals employed by Licensee. This concern was cited by UCS, the Commonwealth, and TMIA as one of the grounds in support of their motions for disqualification. As it turned out, no party proposed any action adverse to the tenure of any employee, and the Board itself found no basis to make findings adverse to individuals. Therefore the problem perceived by the Chairman and the problem perceived by the parties moving for his disqualification never materialized.

III. FINDINGS OF FACT

A. Licensed-Operator Training

1. Organization

a. Key Management Personnel

1. Organizationally, the training of licensed operators for TMI-1 lies within the Nuclear Assurance Division, which reports directly to the Office of the President of General Public Utilities Nuclear Corporation (GPU Nuclear). The Nuclear Assurance Division is headed by the Vice President-Nuclear Assurance. Reporting to him is (among others) the Director of Training and Education, to whom reports the Manager of Plant Training (TMI). The latter has reporting to him a Deputy Manager for Plant Training, an Operator Training Manager, a Technician Training Manager and a Simulator Training Manager. This training organization is described more fully in the prefiled testimony of Drs. R.L. Long and R.P. Coe. Long and Coe, ff. Tr. 32,202, at 25-26; *see also id.* Attachs.

3-5. Career summaries of management personnel associated with this organizational structure that are key to the training effort are now provided.

2. *Robert L. Long, Vice President and Director-Nuclear Assurance Division.* Effective April 1982, Dr. Long was elected to the position of Vice President-Nuclear Assurance. The Board described Dr. Long's credentials in its initial management decision of August 1981, when Dr. Long held the position of Director of Training and Education. See LBP-81-32, *supra*, 14 NRC at 444 (¶ 171); see also Long and Coe, ff. Tr. 32,202, at 27-29. Dr. Long has over 20 years of experience in a variety of aspects of nuclear energy, reactor operations, and education and training. He holds the degrees of B.S. in Electrical Engineering from Bucknell University (1958) and M.S.E. and Ph.D. in Nuclear Engineering from Purdue University (1959 and 1962, respectively). While with GPU Nuclear, Dr. Long has completed the Edison Electric Institute 4-week Executive Management Program (1982) and Emergency Support Director training for both TMI and Oyster Creek. *Id.* at 27.

3. Dr. Long served as Director of Training and Education from February 1980 to March 1983. During a significant part of that time, he also served as Acting Director of the Nuclear Assurance Division (NAD) (February to September 1980) and as Director of NAD (from April 1982 to March 1983). Dr. Long also served full time for approximately 3 months in early 1982 as head of the Failure Analysis Task Force for the TMI-1 Steam Generator Repair Project. He has had responsibility for major changes in organization, staff, and function of the diverse areas of Nuclear Safety Assessment, Emergency Preparedness, Training and Education, Quality Assurance, and the Systems Laboratory. While serving as Director of Training and Education, much of Dr. Long's effort was directed to the development of facilities, the hiring and training of staff, and the evaluation and development of requirements for the TMI simulator training program, leading to the purchase of the basic principles and replica simulators. Dr. Long also oversaw the development of the training programs which are now in place at TMI. *Id.* at 28-29.

4. *Richard P. Coe, Director-Training and Education Department.* Dr. Richard P. Coe began serving as Director-Training and Education for GPU Nuclear on March 14, 1983. He has over 20 years of experience in a variety of educational settings, including public school, university, and industrial education and training. He holds the degrees of B.A. and M.A. in Industrial Education, and Ph.D. in Educational Administration-Labor Relations. From 1961 to 1975, Dr. Coe was a teacher and administrator in the field of secondary school education. As a secondary

school administrator, Dr. Coe was involved in the accreditation of high school programs and served as an accreditation peer evaluator. During the 3 years he was at the University of Pittsburgh, Dr. Coe was extensively involved in the development and certification of vocational training instructors. He also was actively involved in the development of the Competency Based Teacher Education Program, a nationwide program centered at Ohio State University. Following completion of his Ph.D. degree, Dr. Coe also worked as an industrial training manager and consultant in training and educational development with several large U.S. corporations. He also taught several MBA courses at the university level in organizational development and management. Long and Coe, ff. Tr. 32,202, at 29-30. Prior to joining GPU Nuclear, Dr. Coe completed professional development programs in decision analysis, budgeting and cost control, and performance management of human resources. Dr. Coe has completed GPU Nuclear's 6-day management development program and has participated as an instructor in GPU Nuclear's instructor development program. *Id.* at 30-31; *see* Tr. 32,084 (Gardner). He was recommended to Licensee as an excellent classroom teacher and as an individual with effective interpersonal and management skills. Long and Coe, ff. Tr. 32,202, at 31; *see* Tr. 32,084 (Dr. Gardner described an instructor training class given by Dr. Coe as "one of the best presentations I think I've seen"). It is Dr. Long's opinion that Dr. Coe has exhibited strong leadership in the development of instructors, in management and supervisory training, and in the preparation for accreditation of the licensed-operator training programs by the Institute of Nuclear Power Operations (INPO). Long and Coe, ff. Tr. 32,202, at 32.

5. *Samuel L. Newton, Manager-Plant Training.* Mr. Newton became the Manager-Plant Training in June 1983. Mr. Newton's credentials were described by the Board in its initial management decision of August 1981, when Mr. Newton held the position of Operator Training Manager. LBP-81-32, *supra*, 14 NRC at 445 (¶ 175); *see also* Long and Coe, ff. Tr. 32,202, at 32-34. Mr. Newton has nearly 12 years of experience in the Nuclear Navy and approximately 4½ years in the TMI Training Department. He has a B.S. degree with a major in Political Science and Economics from the U.S. Naval Academy (1968), and a Master's degree in Management from the U.S. Naval Postgraduate School (1969). His Navy training and experience include 1 year at the Naval Nuclear Power Training School; a half year advanced course at the Naval Submarine School; completion of the qualifications prerequisite to becoming Chief Engineer and Command of Submarines; a 2-year tour as Company officer, U.S. Naval Academy; and almost 8 years of

operating and training management experience on assignments on two nuclear submarines. Long and Coe, ff. Tr. 32,202, at 32.

6. In April 1980, Mr. Newton began his employment with GPUN as the Supervisor of Licensed-Operator Training at TMI. He was promoted to Operator Training Manager in September 1980. In these positions, Mr. Newton was responsible initially for supervision of the licensed-operator training instructors and subsequently, as Operator Training Manager, for supervision of licensed and nonlicensed operator and shift technical advisor (STA) instructors. He was actively involved in developing training programs and procedures that were responsive to the numerous post-TMI-2 accident training reviews and recommendations. *Id.* at 33. Mr. Newton also had served as Acting Manager of Plant Training on several occasions. In the past year and a half, Mr. Newton has managed the installation and integration into the operator training program of the Basic Principles Training Simulator (BPTS) and has prepared portions of the TMI training program for the Institute for Nuclear Power Operation accreditation. *Id.* at 33-34.

7. *Bruce P. Leonard, Operator Training Manager.* Mr. Leonard became Operator Training Manager on June 1, 1983. He has approximately 6 years of experience with the Nuclear Navy and 2 years in the TMI Training Department. He holds the degree of B.S. in Engineering-Naval Architecture from the U.S. Naval Academy (1976). His Navy training and experience include the 1-year Naval Nuclear Power Training School; completion of qualifications as Chief Engineering Officer; a variety of short programs (e.g., Quality Assurance, Water Chemistry Control, and Instructor Training); and operating and training management experience on assignments to a nuclear submarine and the S3G prototype reactor. At the S3G prototype Mr. Leonard was Staff Training Officer and had responsibility for the initial and continuing training of approximately 150 Navy staff instructors. In November 1982, Mr. Leonard began his employment with Licensee as Technical Program Specialist in the TMI Operator Training subsection. Since joining GPUN, Mr. Leonard has completed the 6-day management development program and short courses in instructor development and decision analysis. His assignments included work on the review, evaluation, and revision of training programs for licensed and nonlicensed operators and shift technical advisors (STA). Mr. Leonard is working toward obtaining a senior reactor operator (SRO) license on TMI-1. He has completed 4 months of an approximately 6-month training program for the TMI-1 SRO license, including extensive training on TMI-1 systems and on-shift operations. Long and Coe, ff. Tr. 32,202, at 34-36.

8. *Ronald H. Maag, Supervisor-Licensed-Operator Training.* Mr. Maag recently was appointed to the position of Supervisor-Licensed-Operator Training after serving as Acting Supervisor since August 1984. He has approximately 8½ years of experience in the Navy, about 3 years in the TMI-1 Operations Department and about a half year in the Operator Training subsection. Mr. Maag holds an Associate in Science degree (1981). His Navy training and experience include the Machinist Mate A School; the 1-year Navy Nuclear Power School; about 2½ years as a staff prototype instructor; a variety of short programs (e.g., Instructor, Training, Quality Assurance, and Machine Tool Operator); and about 4 years of operational and maintenance experience on a nuclear submarine, where he qualified as a watch supervisor. Long and Coe, ff. Tr. 32,202, at 36; Tr. 32,946 (Ross).

9. Mr. Maag began his employment with GPU Nuclear in January 1982 as a candidate TMI-1 reactor operator. Long and Coe, ff. Tr. 32,202, at 36. He has completed the reactor operator (RO) and SRO license training programs, as well as the short courses given in supervisory development and decision analysis. *Id.* Mr. Maag was at the top of his class in the reactor operator replacement program; he was at the top of his class in the on-the-job training (OJT) program. Tr. 32,946-47 (Leonard). He received his NRC RO license in May 1983 and his NRC SRO license in May 1984. Long and Coe, ff. Tr. 32,202, at 36. He performed the duties of a licensed TMI-1 shift foreman for about 2 months prior to joining the Training Department as a licensed-operator instructor in July 1984. *Id.* at 36-37.

10. *Dennis J. Boltz, Simulator Development Manager.* Effective January 7, 1985, Mr. Boltz, previously Supervisor, Simulation Instruction, assumed the position of Simulator Development Manager. Mr. Boltz has approximately 8 years of experience in the TMI-1 Operations Department (RO, 1974; SRO, 1976), and almost 8 years in the Training and Education Department as an instructor and Supervisor. His experience includes 6 years as a TMI control room operator and 18 months as a TMI Operations shift foreman. *Id.* at 38; Tr. 32,488 (Leonard). Mr. Boltz has been intimately involved with the specification, design, acceptance testing, and instructor training for the Basic Principles Training Simulator, including approximately 9 months spent in essentially full-time residence at the simulator manufacturer. Long and Coe, ff. Tr. 32,202, at 38.

11. *Herbert J. Lapp, Jr., Manager-Educational Development.* Mr. Lapp began serving as Manager of Educational Development for GPU Nuclear on October 1, 1984. He has approximately 15 years of experience in public school and industrial education and training. He holds the

degrees of B.S. in Physics and M.A. in Secondary Education. From 1969 to 1980, he served as a high school science instructor, advancing to department chairman in science and math. From 1980 until joining GPU Nuclear, he served in training supervisory positions with Commonwealth Edison's nuclear plant training programs. *Id.* at 39. Mr. Lapp brings to Licensee considerable experience in developing performance-based training and instructor development programs. He has also served as a peer evaluator on an INPO accreditation team. *Id.*

12. The personnel described are members of the Nuclear Assurance Division having management responsibilities associated with the development and implementation of the licensed-operator training and requalification program. The adequacy of that program is discussed in later findings. Thus, we do not here comment upon the various proposed findings of UCS wherein it is pointed out that certain of the above-described people have no commercial operating experience at nuclear power plants. UCS Proposed Findings 169-171, 173.

13. As noted previously, responsibility for the training of licensed operators lies within the Nuclear Assurance Division, which is organizationally independent of plant operational activities. Licensee has stated that, despite this independence, the manager of TMI-1 plant operations is heavily involved in operator training for TMI-1 by company mandate and GPU Nuclear's interest in ensuring that the operators are trained to operate TMI-1 properly. Licensee's Proposed Findings at 31. This statement about the inter-involvement of operations and training is consistent with the discussion of the activities of Mr. Henry Hukill (Vice President-TMI-1) and his organization, which includes the manager of TMI-1 plant operations. *See* Long and Coe, ff. Tr. 32,202, at 6-9. Intervenors do not dispute the existence of this interactive relationship but cite it as a violation of the principle of separation of quality assurance and operations. *See, e.g.,* UCS Proposed Finding 300.b.

14. *Michael J. Ross, Manager-Plant Operations, TMI-1.* Although we do not at this point address the merits of the interactive relationship between operations and training, it is appropriate here to present the career summary of the Manager-Plant Operations, TMI-1. Mr. Ross has served in this position since January 1978. We reviewed his credentials in our decision of August 1981. LBP-81-32, *supra*, 14 NRC at 439 (¶ 154). His background includes over 20 years of nuclear power plant operations and supervision, initially with the U.S. Navy and subsequently in civilian nuclear power. While in the Navy, he spent over 6 years operating and maintaining nuclear power plants at sea and on land-based power plants. He achieved qualification as Engineering Officer of the Watch (Navy designation for Shift Supervisor), and also spent 1½ years

assigned to the Atomic Energy Commission as a Technical Representative. His civilian nuclear power experience began in December 1968 when he joined the Saxton Nuclear Experimental Corporation as a Reactor Plant Technician. In July 1969, he obtained his Atomic Energy Commission Operators License. In September 1970, he was assigned as a Shift Foreman at the Three Mile Island Nuclear Generating Station. He presently holds the Position of Manager, Plant Operations, TMI-1, and has a Senior Operators License at TMI-1, where his responsibilities also include the supervision of radwaste processing and solidification. Newton *et al.*, ff. Tr. 32,409, Attach. 3.

15. Based upon our review of the backgrounds and experience of the management personnel reviewed above, we conclude that they are adequately qualified to take responsibility for the training and requalification program for TMI-1 licensed operators.

b. Training Staff

16. The GPU Nuclear licensed-operator training staff for TMI-1 is larger and more highly qualified than when this Board previously reviewed the training program. In 1981, it consisted of one supervisor and two instructors, who were SRO-licensed. Two contractor-supplied personnel also were assigned. None of these individuals held degrees. Newton *et al.*, ff. Tr. 32,409, at 25-26. Today, manpower in the Operator Training section devoted to TMI-1 licensed-operator training consists of one manager, one administrative assistant, two staff positions (both with responsibilities as instructors), one supervisor, and three instructors (one of whom is assigned as Supervisor, Nonlicensed Operator Training). Of the six persons designated to conduct licensed-operator training, four have been licensed or certified as senior reactor operators. Three of these licenses are current; the other is not, but that instructor is now requalifying for a current SRO license. Tr. 32,486-88 (Leonard). The combined nuclear power plant experience of the staff is 48 years, of which 25 years are commercial. The combined instructor experience for the Operator Training staff is 29 years, of which 22 years are in the nuclear field. Five of the staff hold bachelor's degrees; one of these has a master's degree as well. Newton *et al.*, ff. Tr. 32,409, at 26; *see also* Committee, ff. Tr. 31,749, at 10.

17. In addition to GPU Nuclear personnel, two contractor-supplied people will supplement the Operator Training staff through mid-1985. These contractor personnel previously were licensed as senior reactor operators at TMI-1. One served as a shift foreman and the other as a shift supervisor. They have 40 years of nuclear power plant experience,

of which 26 are commercial. They have 11 years of instructor experience in the nuclear field. Newton *et al.*, ff. Tr. 32,409, at 26. These two instructors ultimately will be replaced by permanent staff. Tr. 32,673 (Leonard).

18. Supporting the Operator Training Section is an Administrative Assistant who tracks attendance, documents examinations, and maintains records required for certification by the Vice President, TMI-1. The assignment of these tasks to the Administrative Assistant has enabled the Supervisor and Manager to devote more time to nonadministrative tasks. In addition, a Technical Programs Specialist assists the Operator Training Manager in ongoing review, evaluation, and revision of licensed-operator programs. This person also is assigned to instruct operators in theoretical subjects such as reactor theory, heat transfer, fluid flow, and thermodynamics. The addition of the Technical Programs Specialist has provided Training with additional instructor availability, and has reduced the workload of the Operator Training Manager and Supervisor, Licensed-Operator Training, in order that they may devote more time to program development and delivery. Newton *et al.*, ff. Tr. 32,409, at 27-28.

19. In addition to the Licensed-Operator Training Section, there is now a separate Simulator Development Section of the TMI-1 Training Department that consists of one manager and three instructors. The credentials of Mr. Boltz, the Manager, already have been described. The three instructors assigned to this section are presently in an SRO training program in preparation for qualification as SRO-licensed simulator instructors. All three have Bachelor's degrees and have 18 years combined nuclear power plant experience, of which 12 years are commercial. In addition, two licensed reactor operators are assigned from the Operations Department to assist in development of the Basic Principles Training Simulator (BPTS) and replica simulator programs. Newton *et al.*, ff. Tr. 32,409, at 27.

20. UCS questioned whether there is an adequate complement of instructors. See Tr. 32,486-90 (Jordan cross-examination of Leonard). Prior to being hired as an instructor, however, each candidate has to perform a practice teach, during which his instructional skills are evaluated. As part of the instructor certification process, each candidate must perform another practice teach, either in the 1-week instructor development program or as part of the interim certification process. Furthermore, before an instructor is hired, there is an evaluation of the individual's credentials, and after an instructor is hired there are both informal instructor evaluations and required (formal) instructor evaluations. Tr. 33,061 (Leonard); see also § III.C.3.b, *infra*.

21. The Board is satisfied that since 1981 GPU Nuclear has increased the licensed-operator training staff in order to improve the training programs. We conclude that the present operational and instructor experience in the TMI-1 training department adequately supports the training programs in place.

2. Training Facilities

22. A review and critique of Licensee's Operator Accelerated Re-training Program (OARP) was conducted by an independent OARP Review Committee (Committee) and published in June 1980. The Committee's report contained recommendations for improvements to the program and to the training facilities supporting it. Committee, ff. Tr. 31,749, at 1-3, and Attach. 1, at 28-37.

23. An upgrading of training facilities and support equipment has been in progress since 1980. The majority of classroom training for licensed operators now takes place in a modern, 20,000-square-foot training center built for this purpose and first occupied in mid 1981. The center, used entirely for training purposes, has fifteen classrooms (two of which can be combined into an auditorium). It houses the Basic Principles Training Simulator (BPTS) and its support equipment, a control room mockup, office space for a training staff of sixty-two, a library, file room, audio-visual equipment room, conference room and photocopier, vending machine, storage and rest room areas. A considerable increase in the amount of audio-visual equipment available for training has occurred since 1980. The equipment is now maintained and repaired on site to improve on its availability. Computer terminals in the training center give it access to an IBM mainframe computer in Reading, Pennsylvania, that provides storage of training record data. A new, identically sized building has been designed with construction to begin in the Spring of 1985. This building will house the BPTS and the new replica simulator (under construction), the Communications Division, and will provide more instructor work areas. Relocation of the BPTS will make additional classroom space available in the existing building. Newton *et al.*, ff. Tr. 32,409, at 54-56.

24. In addition to use of the training center, some training is conducted in space available at the TMI-1 site, where in-plant training on components on a hands-on basis is carried out. Such training includes circuit breakers, the emergency diesel generators, the loose parts monitor, the remote shutdown panel, and the plant process computer. Conference rooms in the plant serve as classrooms for this purpose. Such an approach eliminates some of the need for transportation to and from the

site and provides a more efficient use of time. Facilities at the GPU Service Corporation building in Reading, Pennsylvania, have also been used for requalification training of licensed operators. Here, operators see the system power grid distribution center, and are trained on the role of and their interface with the load dispatchers. *Id.* at 56-57.

25. A full-scale plywood mockup of the control room console and control panels, with updated photographs of actual meters, indicators, switches, etc., has been set up in the training center. It is used for procedures reviews, oral examinations and classroom systems training. It displays console and panel indications appropriate to full-power operation. *Id.* at 58. The mockup has proven particularly useful, for example, in operator training with respect to procedures associated with abnormal transient operator guidelines (ATOG). It enables operators to gain increased familiarity with the procedures and locations of controls. Tr. 32,905 (Leonard). The operators review the ATOG procedures with instructors and perform a step-by-step walk-through of each procedure and refer to the action controls displayed on the mockup panels. Committee, ff. Tr. 31,749, at 17. Dr. Christensen described a valuable exercise he observed on the mockup, whereby an instructor called on various students to go to the mockup and identify the proper controls to handle the particular transient with which they were dealing. Tr. 32,077-78 (Christensen). The last replacement class favorably received the mockup training; the trainees appreciated the control room atmosphere as well as the chance to observe the controls during breaks. Tr. 32,905-06 (Leonard).

26. The BPTS was delivered in February 1984; operators were made familiar with its capabilities during April and May; and requalification training using it was resumed in October 1984. Newton *et al.*, ff. Tr. 32,409, at 57. The OARP Review Committee stated its belief that the BPTS is the most advanced trainer in the United States, and that Licensee is one of only three U.S. utilities that trains its operators on both a BPTS and a full-scale simulator (at B&W). The BPTS requirements and specifications were generated by Licensee personnel along with instructional plans for integrating it into the training program. Its purpose is to teach operators basic principles of neutronic behavior, reactor kinetics, thermodynamics, heat transfer, fluid flow and PWR operational characteristics. Further information about the BPTS has also been presented by the Licensee. *Id.* at 57-58. One member of the OARP Review Committee praised the flexibility of the BPTS and cited it as representing innovative thinking on the part of the Licensee. Tr. 32,080 (Kimel). Two other Committee members have commented favorably about the value

of the BPTS for the training of operators and about the wisdom of procuring it. Tr. 32,080-81 (Kelly, Christensen).

27. As stated previously, in addition to the BPTS, Licensee is procuring a full-scale replica simulator scheduled for delivery in December 1985, and for use with the training program in the second quarter of 1986. Tr. 32,932-33, 32,940-41 (Newton). As with the BPTS, an extensive specification for the replica simulator was prepared by Licensee personnel. After a review of bids, Singer-Link's Simulation System Division was chosen to manufacture the simulator, which will duplicate the appearance and configuration of the TMI-1 control room. The TMI replica is a first-principles simulator, which basically means that it will be predictive rather than programmed, such that unanticipated or heretofore unrecognized transients will be capable of being simulated. A specific malfunction does not have to be preprogrammed into the software in order for the simulator to respond accordingly. The most important advancement was the development of an advanced core model, which models the complexities of core physics and thermohydraulics into twenty-four radial and nine axial core regions. This model permits high iteration rate, yields a more accurate depiction of diffusion effects, and provides greater accuracy and precision in calculating local anomalies and asymmetric conditions. The primary advantages gained are in the area of modeling of potential fuel failures from locally high heat flux, and in a more accurate depiction of core flux patterns and the thermohydraulics of accident conditions. Thus, in reality, the simulator will be more than a training device. In the opinion of Licensee, the replica simulator could have analyzed the malfunctions that had been experienced at TMI-2. Given an abnormal occurrence in an actual plant, the simulator will be capable of predicting the response to proposed remedial measures before they are actually tried out to bring the plant under control. Tr. 32,931-32 (Newton). The simulator will be tested utilizing engineering models that calculate plant behaviors in off-normal conditions and employ realistic engineering assumptions. Most of the current generation of simulators have not used first principles models, and the simulation of off-normal behaviors has been compared with (or actually has used data generated from) the worst-case assumptions from final safety analysis report hypothetical accident analyses. Newton *et al.*, ff. Tr. 32,409, at 59-60.

28. Prior to the availability of the replica simulator, a full-scale plant simulator at the Babcock and Wilcox (B&W) facility at Lynchburg, Virginia, is currently being utilized by GPU Nuclear. This training is contracted for with Power Safety, Inc. (PSI), which conducts the training services at Lynchburg. The training is designed to reinforce classroom

and on-the-job training (OJT) concepts, and to develop the operators' knowledge of integrated plant responses. Newton *et al.*, ff. Tr. 32,409, at 6. More details about this training effort are discussed in § III.C, *infra*.

29. In summary, the Board is of the opinion that the Licensee has initiated and is pursuing significant measures toward upgrading and adding to its training facilities in support of its reactor operator training and requalification program. Of particular note are the addition of two new buildings dedicated to training, and the addition of two simulators of advanced designs that will permit added emphasis to be placed upon simulation training activities. We note that none of Intervenor's proposed findings disputed the importance or effectiveness of the training support facilities, extant and proposed. Our own review of the evidence convinces us that the facilities are adequate to support the training program.

B. Management's Response to Cheating

1. Introduction

30. In this section we evaluate whether Licensee's management appropriately addressed the practical implications of the cheating incidents (aside from improving the substantive quality of the training program). Initially, the Board agrees with Licensee's identification of the three critical elements of the correct response to cheating: (1) acknowledgment of management's responsibility; (2) establishing effective communication with operating and training personnel in order to restore the integrity of the training and testing program; and (3) establishing exam security. For the purposes of this analysis we approach cheating as a rather uncomplicated consideration: people cheat when a need or benefit is perceived and when an opportunity is presented. In this instance the cheaters cheated simply to pass the exams.⁴

2. Management's Responsibility for Cheating

31. In the Board's partial initial decision on the cheating matter, we discussed management's responsibility for the cheating incidents and noted that, without Licensee's open acknowledgment of fault, the Board

⁴ The phenomenon of cheating is dealt with in this Decision and by the parties in two discrete but related ways. The Appeal Board was particularly concerned about broader implications of cheating and expressed the concern that the cheating episodes "may be symptomatic of more extensive failures in licensee's overall training program." ALAB-772, *supra*, 19 NRC at 1233. Intervenor and the Commonwealth fault Licensee and its OARP Review Committee for their failure to explore the basic anatomy of cheating. This elemental aspect of cheating is discussed in our later findings concerning the OARP Committee's analysis of the cheating problem. See § III.D.5.a, *infra*.

could have no confidence that the GPU Nuclear training and testing program would be brought to acceptable quality. LBP-82-56, *supra*, 16 NRC at 296. We found that it was appropriate for TMI-1 Vice President, Mr. Hukill, and Manager of Operations, Michael Ross, not to quibble about accepting responsibility for the cheating of the operating personnel (*id.* at 380), but our summary conclusion was that:

the integrity of Licensee's training and testing program failed because there was not a clear appreciation of which personnel or which component of Licensee's management had responsibility for the integrity of the program; and because there was a failure to apply the principles of quality assurance and quality control to the instruction and examination process.

Id. at 379.

32. Noting that training and testing is a responsibility assigned to the Nuclear Assurance Division and its Training and Education Department, the Board was especially critical of Dr. Robert Long who was, during the relevant period, Director of Corporate Training. *Id.* at 380-81. We questioned whether Dr. Long fully understood whether his training department had failed in its responsibility. *Id.* at 381. The Appeal Board noted our misgivings about Dr. Long in ALAB-772. 19 NRC at 1233 n.48.

33. Dr. Long came to the hearing to acknowledge that he, and Samuel Newton, who was Operator Training Manager at the time of the cheating, fully recognize that their failures in managing the training program led to the cheating incidents. Long and Coe, ff. Tr. 32,202, at 2, 33.

34. Dr. Long explained that the investigations and reviews of training which followed the TMI-2 accident generated a large number of recommendations. These recommendations focused on numerous ways in which various review groups felt that nuclear plant training programs, particularly for licensed operators, should be changed. None of these recommendations addressed the need for control of the examination process. Licensee's failure must be evaluated in the context of the attention that was being focused on responding to the post-TMI-2 accident recommendations. *Id.* at 2.

35. The direct cause of cheating was the failure to provide full-time proctoring for written examinations. *Id.* at 3. Dr. Long testified that he does not believe that this failure stemmed from any disrespect by the TMI instructors for the examination process; rather, he feels there was a belief among the training personnel based on their experience in educational and training programs and their knowledge of the operators, that everyone recognized that one is expected to do one's own work on an

examination and that cheating not only is unacceptable, but results in penalties if apprehended. *Id.*

36. Dr. Long admits that in retrospect, these beliefs, which he shared, were naive and should have been challenged; particularly in light of the unprecedented requirement imposed by the NRC, i.e., that all licensed operators would have to undergo an additional complete NRC license examination to continue in their positions as licensed operators at TMI-1. Operations and Training management personnel should have been monitoring closely the attitudes and concerns of each individual license holder to ensure that management understood and addressed any fears, uncertainty, or gaps in the operators' acceptance of the importance of the NRC exam and their preparations for it. *Id.*

37. Given the personal pressures on individuals that might lead to attempts to cheat, Dr. Long acknowledges that management should have clearly articulated the guidelines for taking examinations and should have been looking for any evidence (e.g., attempts to cheat, feelings of discouragement) that would have indicated that individual license candidates were experiencing difficulties. Also, Dr. Long states, the GPU Nuclear training program should have been structured to reinforce the view that tests are one's own work product. It was not. Dr. Long takes particular responsibility for this. *Id.* at 4.

38. The Board agrees with Dr. Long's observation that the individuals who cheated also have to accept the responsibility and consequences of that choice. However, we believe that the point is somewhat irrelevant, because it is Licensee, not the cheaters, who must shoulder the first-line responsibility of assuring that its operators are competent. But Dr. Long made the additional point which we agree is relevant. The cheaters could have, and should have, requested additional help from their Operations or Training supervisors or indicated in some manner that they were not ready to take the exam in question. Had they done so, Dr. Long believes Operations or Training would have been responsive and, for example, would have provided the extra training needed to prepare for quizzes and examinations. *Id.*

39. UCS, however, is not very forgiving of Dr. Long and suggests that his testimony, submitted in written form, is not sincere.⁵ It is true, as UCS suggests, that Dr. Long, knowing about the concern of the Licensing Board and Appeal Board, could have recited the necessary words to satisfy that concern. *See* UCS Proposed Finding 186. However,

⁵ UCS' argument that the Board cannot judge the creditability of Dr. Long's *mea culpa* testimony because it was not given orally is not fair. The testimony had to be presented in writing to provide UCS and others with the notice they are entitled to.

Dr. Long testified at length during the remanded hearing, and we have no basis to believe that he is not candid. GPU Nuclear management's acknowledgment of its responsibility for the cheating pervaded the testimony and pleadings during the original cheating proceeding. Dr. Long's testimony has reinforced the Board's view that management fully understands and accepts its responsibility. The OARP Review Committee also observed and noted with approval management's sense of responsibility for the cheating that occurred. Committee, ff. Tr. 31,749, at 6.

3. Management-Personnel Communications

40. Dr. Long went into considerable detail in explaining the efforts made by GPU Nuclear management to improve communications with Licensee's operating and training personnel and to restore the integrity of the training program. Long and Coe, ff. Tr. 32,202, at 5-12. Both the Commonwealth (Proposed Finding 6) and UCS (Proposed Finding 187) acknowledge that these efforts are appropriate and helpful. The Commonwealth, however, withholds total approval of Licensee's efforts because of its continuing concern that they may be only "ministerial fixes" and that they are not effective because the "root causes" of cheating have not been identified. Proposed Finding 6. The Board approves of Licensee's efforts toward improving communications with TMI personnel and the steps taken to restore the integrity of the training program, and we have accepted, almost in its entirety, Dr. Long's testimony in that regard in the paragraphs that follow.

41. The initial management response to the cheating on the NRC exams was focused on the "mechanics" of the examination and testing processes. Long and Coe, ff. Tr. 32,202, at 5. Immediately after the cheating incident and during the several months of subsequent investigations, Dr. Long was directly involved with the Training and Education Department managers and supervisors in analyzing and developing appropriate responses to these events. On several occasions Dr. Long met personally with the entire staffs of the Training Departments at both TMI and Oyster Creek. These meetings were basically question-and-answer discussion sessions to clarify issues and gain acceptance for and commitment to enforcement of the stringent examination control procedures Licensee was implementing. Initially, some instructors and trainees felt that the contents of the examination procedures were an over-reaction to the cheating incidents and that Training and Education was now unfairly assuming that everyone was a potential cheater. Through the open discussion of such concerns, Dr. Long believes that management was able to persuade both instructors and trainees that the compa-

ny had a special obligation to adopt practices that would prevent any recurrence or unjust accusations of cheating. *Id.*

42. Contemporaneous with the issuance of the Special Master's Report and the Licensing Board's 1982 decision, Licensee followed up on its initial response with additional activities, including the use of outside reviewers, to respond further to the "lessons learned" from the whole sequence of events brought out by the cheating hearings. See Board's discussion of the "RHR Report" in the following section. The Office of the President was actively involved in these activities and met quarterly with the Director of Training and Education and the Training and Education Managers to ensure active followup of identified problem areas. Through analysis and discussion, management, including Dr. Long, the Office of the President, and the Training and Operations departments identified a number of "root cause" concerns which had to be addressed.⁶ These included the need to restore and maintain credibility in the training programs. The integrity of the entire training process was reviewed and more formal procedures developed for test preparation, instructor evaluation, program planning, and training interfaces with all the training "user groups." Although Dr. Long recognized from the beginning of his assignment as Director of Training and Education that instructors can and do influence employee attitudes, additional steps were taken to stress this impact to instructors and, particularly, to identify clearly the value of the training process to all employees. Long and Coe, ff. Tr. 32,202, at 6. .

43. A significant step in restoring and maintaining credibility in the management of the Training and Operations departments has been the activity of Mr. Hukill, Vice President of TMI-1. At a minimum, each licensed operator is interviewed annually by Mr. Hukill, who specifically interviews all licensed-operator candidates prior to certifying them for their initial licensing or relicensing. The following subjects are discussed and instructions and guidance given to the operators during these interviews:

- Importance of their duties to the safety and health of the public and their fellow employees;
- Requirement for procedural compliance;
- Importance of the NRC examination process in licensing operators;

⁶ The term "root cause" of cheating has been assigned different meanings by the parties. Dr. Long used the term generally to indicate a failure of personnel to respect the training program and licensing and testing requirements and a failure in the integrity of the training program. Intervenors have used the term to refer to the underlying motivation to cheat, which, as we have noted, Intervenors contend has not been identified. *E.g.*, Commonwealth Proposed Finding 6.

- Duties and responsibilities of Licensee and its employees as a regulated industry;
- The need for honesty and integrity in all aspects of plant operation and maintenance, including training and the examinations associated therewith;
- The cheating that occurred in 1981, including possible causes therefor and the corrective measures taken;
- The requirement to address openly all nuclear safety-related questions or problems with management, and if they are not satisfied with the answers thereto from management, their personal responsibility to bring them to the attention of the NRC;
- Current events, schedules, problems and incidents; and
- The difference between honest mistakes and intentional/willful violation of procedures and rules.
- A discussion of the bases for procedures, rules, and regulations.

Each operator is given the opportunity during the interview to ask questions or raise issues and problems with the Vice President. Mr. Hukill attempts to resolve, through his staff and Training personnel any issues or questions raised by the operators. *Id.* at 6-8.

44. Another step in restoring and maintaining credibility in the training programs and management commitment to quality training has been the active program of both unannounced and announced visits to observe classroom delivery of training (as required by a condition imposed by the Board in LBP-82-56 (16 NRC at 384)). TMI operator training is "audited" by both Training and Operations management and the Vice Presidents of Nuclear Assurance and TMI-1. These audits/visits provide management visibility and first-hand observation and evaluation of training. The results and conclusions of audits are, for the most part, fed back to Training except for those audits of special interest where managers feel that they have seen what they came for, are satisfied with the results and believe there is no further need for communication. Thus, GPU Nuclear management makes frequent visits to the TMI Training Center and the visits are visible to the students in the classes. The fact that management is there and that students, including operators, can have first-hand discussions with management about their training provides the students with concrete evidence of management's ongoing concern that the training activities are carried out effectively. *Id.* at 8; *see also* Committee, ff. Tr. 31,749, Special Report at 45.

45. Another method of keeping management informed regarding the implementation and effectiveness of the training programs is the

submittal by the Training and Education Department of biweekly "significant events" reports which highlight to the Division Director and Office of the President such things as training attendance, program initiations and completions, licensing and requalification exam performance, and simulator training activities. Long and Coe, ff. Tr. 32,202, at 9.

46. In August 1982, Licensee initiated, during each week of requalification training, a 1-hour "Management Interface" meeting for operations, maintenance, and technician personnel attending training. This meeting is designed to inform employees of programs and policies being implemented that affect their daily work patterns, and to assure them that management is aware and appreciates the end result of changing policies on the worker. Either the Vice President TMI-1, the Operations and Maintenance Director, or the Plant Engineering Director attends each meeting. A second manager, typically from a support organization (e.g., Training, QA, Rad Con, etc.), also attends. These managers address the status of situations in their respective areas and respond to questions from the trainees in give-and-take discussions. *Id.*; see also Tr. 33,079-80 (Newton). Mr. Hukill also meets with the operators when a significant event occurs. Mr. Hukill explains the reasoning and the consequences of the Licensee's actions, and allows the operators to comment. Tr. 32,938-39 (Ross).

47. The Board believes that the Management Interface meetings, established at Mr. Hukill's initiative, are important. Tr. 33,079-80 (Newton).

48. Yet another activity to keep management informed and in touch with Operations personnel is the attendance by senior managers from Nuclear Assurance, Operations, and Training at the simulator training sessions at B&W's facility in Lynchburg, Virginia, to evaluate training being conducted by Power Safety, Inc. (PSI), B&W's contractor. This allows management to evaluate the quality of PSI's training at the simulator as well as to evaluate licensed operators' and licensed-operator candidates' performance on the simulator. Long and Coe, ff. Tr. 32,202, at 10. The first week of a requalification training cycle at the PSI simulator is attended by instructors and management representatives in order to identify and correct any problems with the training before the operating shifts begin their training. Tr. 32,349-51 (Long); Newton *et al.*, ff. Tr. 32,409, at 21; see also Tr. 32,481 (Leonard).

49. An important process in restoring the integrity of the training program through better communications consisted of improved and extensive cross-fertilization among TMI-1 Operations management and personnel and Training management and personnel. Operations management is very much involved in the training and testing process and

Training personnel are required to become involved in operational matters even to the extent of standing control room shifts. See § III.C.4.b(2), *infra*, for a discussion of training assessed against performance. The process will be improved by a condition imposed by the Board to require formal feedback to training from evaluations of operator performance following training. *Id.*

50. The OARP Review Committee found extensive evidence of effective communications between management and persons involved in the licensed-operator training program. Committee, ff. Tr. 31,749, at 22-24. The Board is encouraged by the many avenues of apparently open communication between management and operating and training personnel which did not exist at the time of the cheating. We agree with the OARP Review Committee that this enhanced communication is well conceived and find it to be an appropriate response to the cheating incidents. However, the Intervenors and the Commonwealth raise legitimate questions about the effectiveness of Licensee's communications with its personnel which we discuss within the context of the employees' attitudes toward the training program in the following section.

4. Employee Attitudes

a. Introduction

51. The Appeal Board stated its strong concern about the attitudes of TMI-1 personnel concerning management and the training program.⁷ The Licensing Board had previously expressed its concern about operator morale in the initial decision on cheating. LBP-82-56, *supra*, 16 NRC at 383. We had also found that the underlying factor in the cheating episodes was Licensee's failure to instill a sense of respect for training and testing. *Id.* at 296.

52. In the preceding section on Management-Personnel Communications, the Board made favorable findings concerning management efforts to restore the integrity of the training program by improving its communications with operations and training personnel. See § III.B.3,

⁷ The Licensing Board identified three subsidiary evidentiary issues from ALAB-772 relating to employee attitudes:

- The failure of employees, including training instructors, to take the courses or examination process seriously. 19 NRC at 1233.
- Whether the positive assessments of Mr. Kelly and Dr. Christensen regarding the "pride and enthusiasm" of employees in their training program and the professionalism of the instructors would have been altered by post-cheating testimony reflecting "a lack of these qualities." *Id.* at 1234.
- Whether top management is aware of the real and perceived problems of its employees. *Id.* at 1236.

supra. However, as we noted there, Intervenors raise legitimate questions about the effectiveness of management's communication efforts, so we look to the attitudes of the employees concerning management and the training program as one indicator of the effectiveness of communications.

b. Discussion

(1) THE RHR REPORT

53. Following the report of the Special Master and the Board's initial decision on the cheating episodes, Licensee commissioned a psychologist's survey of operator attitudes in 1982 because of its concern about the morale and attitudes of its employees. Licensee Proposed Finding 220; Tr. 32,038-39, 33,293 (Gardner). The product, the so-called "RHR Report," issued in March 1983. UCS has introduced the entire report into evidence.⁸ As UCS characterizes it, the RHR survey "reached a number of disturbing conclusions . . ." UCS Proposed Finding 290.

54. The RHR Report contained many references critical of management and indications of serious problems of employee attitude. The survey included operators at TMI and Oyster Creek. UCS and the Commonwealth identified several important items which we believe to be noteworthy:

Implementation is important now that expectations have been raised again by our recent interviews and survey. Operators in the small groups have been spontaneously inquiring whether anything will come of these interviews. They have been through several such meetings before. From some previous inquiries they have seen no action and from others, temporary action which quickly petered out. There is expressed pessimism that this intervention will lead to any lasting improvements in areas of their concern.

UCS Exh. 6, at 15.

A majority of trainees at TMI disagreed with the proposition that top management is more concerned about public safety than it is about generating electricity.

Id. at 21.

⁸ See UCS Exh. 6, "Priority Concerns of Licensed Nuclear Operators at TMI and Oyster Creek and Suggested Actions Steps," March 15, 1983, by Dr. Paul F. D'Arcy and Dr. John R. Sauer, of Rohrer, Hibler and Replege, Inc. (RHR Report). The underlying data to the report are in evidence as UCS Exh. 7.

Only a slight majority of operators agree that despite cumbersome procedures, the Licensee policy on compliance is followed. Foremen are said to push operators to keep things moving, and this requires deviating from written procedures.

Id. at 24-25.

Only 60% of those who responded agreed that the content of the last exams was relevant to their jobs, and only one-third agreed that the oral portion of the exam tested how one would act in an emergency.

Id. at 27.

Three-quarters of the operators were dissatisfied with the training for licensing, and an even greater proportion were strongly dissatisfied with requalification training. Most considered that the training department was not oriented to the needs of the operators. Trainees and SROs at TMI disagreed that the quality of the training staff was good.

Id. at 27-28.

Three-quarters of the operators denied that training prepared them for what they actually do. In their perception, training prepared individuals to pass examinations, but does not adequately prepare them to operate the plant. This is particularly true at TMI.

Id. at 28.

Only one in five believe that GPU Nuclear management is as concerned about employees and organizational issues as it is about public relations and technical issues. Nine out of ten deny that their management work together as a team. Four out of five see management as not sufficiently in touch with what is going on at their level. This last is across all subcategories. Two out of three deny that management has committed to an accountable organization which resolves problems at the correct level. Even more disagree that management sees to it that there is cooperation between departments. Only trainees at TMI agree to this.

Id. at 34.

55. Licensee counters by acknowledging the negative aspects of the report but points out that there are also reports of positive feelings by operators toward their jobs. Licensee Proposed Finding 221 n.74. The Board also notes that UCS was selective in the portions of the RHR Report it called to our attention.⁹ For example, the Report also noted:

⁹ On the other hand UCS could have cited from the report other examples of poor operator attitude which it ignored.

There is always griping about management among the rank and file and a good deal of this cannot be taken at face value. Management is a convenient target. There is invariably a mixture of scapegoating on the one hand and of the workers' accurate perception of some real deficiencies. These need to [be] disentangled.

UCS Exh. 6, at 34.

56. Licensee would like to put some distance between itself and the RHR consultants by disparaging the report. *See* Licensee Proposed Finding 221. The Board also noted infirmities in the survey. It is not in a skilled survey format. For example the four available answers are "Strongly agree," "Agree," "Disagree" and "Strongly disagree." A response of "No opinion" could not be recorded, but some of the questions must have invited "No opinion" responses. *See* UCS Exh. 7. The Appeal Board also had misgivings about the RHR Report, noting that a co-author had referred to it as "one-sided." ALAB-738, 18 NRC 177; 198-99 (1983).

57. The NRC Staff expert psychologist testified that the survey format contained ambiguities and that the Staff would not use the RHR interview process to solicit information. Tr. 33,206, 33,215-16 (Morisseau).

58. Mr. Ross, TMI-1 Operations Manager, under extensive cross-examination by UCS' counsel, virtually refused to recognize any validity to the report at all. Tr. 32,563-89. However, the Board believes that Mr. Ross was unrealistically defensive. Despite its faults, the RHR survey demonstrated that in about late 1982 there were serious problems with operator attitudes and management communications at TMI.

(2) TRENDS IN ATTITUDES

59. UCS enhanced its credibility on this issue by placing the negative aspect of the RHR Report into proper perspective. It could have put on a circus with some of the reported criticisms. UCS acknowledges that the substantive validity of the report was not litigated and that the survey was conducted soon after the cheating incidents and hearings. UCS Proposed Finding 291.

60. The important thing, according to UCS, is not so much how the employees felt at any particular time but how their attitudes change over time. *Id.* UCS also points to the expert opinions of Dr. Regan, for UCS, and Dr. Gardner, for Licensee, to that effect. UCS Proposed Finding 288. Licensee is of like mind, urging a finding that the RHR Report is simply one datum in a continuum, also citing Dr. Gardner's opinion. Licensee Proposed Finding 221, *citing* Tr. 33,293-94 (Gardner).

61. The problem, as UCS sees it, is that, after the RHR survey, there has been no adequate and structured survey to inform us whether operator attitudes have changed. The Staff agrees. Licensee's view is that informal observation of the operators provides adequate opportunity to assess attitudes. We have seen the same theme repeated throughout this proceeding. For example, in matters of oral examinations and operator-performance feedback, as discussed in succeeding sections, Licensee argues that informal judgmental evaluations are sufficient, while UCS consistently argues that only formal methodical surveys and evaluations can do the job.

62. Mr. Ross testified about the current attitudes of the TMI-1 operators. He stated that he has close and regular contact with them every day, both in training and in the control room. Tr. 32,562 (Ross). He believes that their attitudes are good. *Id.*; see also *Newton et al.*, ff. Tr. 32,409, at 60 (Ross). Mr. Ross points to the steady improvement on weekly quizzes and requalification examinations as an indication of a more positive approach to trainee participation. Other managers in Operations and Training share his view. *Id.* at 60-61 (Ross). Mr. Ross also believes that the low attrition rate is an indication of good employee morale. He has not lost an operator through resignation in years. Tr. 32,939 (Ross).

63. Mr. Ross stated:

It is inevitable and appropriate that we as operators will always have some negative comments about the Training Program. It is my view, however, which I believe the TMI-1 operators share, that the licensed-operator training program is of high quality and is accepted by the licensed operators. The operators understand that training not only is a job function, but it is their responsibility to be committed to participating in it in order to properly discharge their licensed duties.

Newton et al., ff. Tr. 32,409, at 65.

64. The Board disagrees with UCS' contention that Mr. Ross' observation of operators must be disregarded because it lacks the formal structure of a methodical survey. UCS Proposed Findings 294, 295. There is no question that Mr. Ross has the opportunity and inclination to measure operator attitudes. Himself a licensed operator, he works closely with operators in training and on the job. His testimony about improved test performance is objective, reasonable, and reliable. The low attrition rate among operators is also objective and persuasive evidence.

65. UCS questions Mr. Ross' overall objectivity, particularly given his optimistic disinclination to see negative aspects in the RHR Report. As noted, the Board also had trouble with Mr. Ross' testimony about the RHR Report. But we also recall that during the cheating hearing Mr.

Ross forthrightly admitted that his operators were then "bitter" about the repeated need to take NRC examinations. LBP-82-56, *supra*, 16 NRC at 383.

66. Moreover, Mr. Ross does not deny that an attitude problem existed at the time of the RHR survey. He was not ignoring that problem. Management was working to address it. Tr. 32,566. In sum, Mr. Ross recognized the problem, but had little confidence in the RHR survey, and certainly did not believe matters were as bad as the RHR Report indicated during that period.

67. On balance, the Board accepts Mr. Ross' opinion that operator attitudes have improved. However, the opinion should be discounted somewhat because he appears to lack the objectivity one might wish for. This is understandable, however. He is hardly a disinterested observer.

68. In the process of evaluating the training program, the OARP Review Committee also inquired about the attitude operators have about their training, the cheating and management's response to cheating. Tr. 32,062-63 (Uhrig). Their interviews were extensive. Dr. Gardner, Mr. Kelly and Dr. Christensen interviewed five licensed-operator or simulator instructors, four replacement operators, and approximately twenty-seven licensed ROs and SROs including all six shift supervisors who are the on-the-job supervisors. Committee Rebuttal, ff. Tr. 33,320, at 4. The Committee's impression was that the operators recognize the value and have respect for the licensed-operator training program, recognize and accept their responsibility as licensed operators to participate in the program, and believe that it is an effective program. Review Committee, ff. Tr. 31,749, at 31.

69. UCS disparages the Review Committee's efforts to discern operator attitudes because it was an unstructured approach and because the interviewed personnel were aware of the purpose of the interviews and identity of the Review Committee members. UCS Proposed Finding 289. These criticisms are relevant and appropriate, but we, nevertheless, afford considerable weight to the Review Committee's observations. These seasoned professionals in their respective fields are certainly not naive.

(3) MANAGEMENT RESPONSE TO RHR REPORT

70. Although Mr. Ross held the RHR Report in low regard and seemed to brush it aside, his view was not shared by other components of Licensee's management.

71. Dr. Long, Vice President for Nuclear Assurance, testified that management regarded the RHR Report as significant and has responded

to it. Tr. 32,315-16, 32,347-49 (Long). The response is formal. Licensee agreed with forty-eight of the fifty RHR findings; for example, the recommendation for an Operator Training Review Committee. *Id.* According to Dr. Long, as of December 1984, significant progress had been made in the action steps set out in the RHR Report. Licensee Exh. 1 (step-by-step analysis of response to RHR).

(4) CONCLUSIONS – OPERATOR ATTITUDES

72. To digress to a related issue for a moment, the Board believes that commissioning the RHR survey by outside experts was a very responsible and laudable action. It was an appropriate management response to cheating and morale concerns. As we have seen in this case (e.g., the BETA Report) and generally throughout the nuclear industry, efforts at self-improvement such as here sometimes cause problems for the utility when outside consultants return with unfavorable information. This is not surprising. That result confirms that the utility was prudent and perceptive in identifying a possible problem in the first instance, and it reinforces confidence in the use of paid consultants where independence is often questioned. In any event, these self-improvement efforts should not be discouraged by overreaction to them.¹⁰ On the other hand, when they produce unfavorable information, as in the case of the RHR Report, that information must be realistically considered.

73. Operator attitudes toward training and management were unsatisfactory in late 1982. According to the reliable testimony of Mr. Ross and the OARP Review Committee, these attitudes have improved. Perhaps a formal, structured and independent survey following up on the RHR Report would have provided better assurance that the problem has been resolved. Although we find that operator attitudes are today satisfactory, the finding is not made with the assurance we would prefer.

74. The important point, however, is that all agree that attitudes change. The experts in this proceeding speak of a continuum spreading over years. We believe that attitudes such as those involved with the TMI-1 operators are much more changeable, that swings probably occur in much shorter cycles – weeks, months – depending upon perceived good and bad news. But overall improvement in management communication channels and in the training program must have had a long-term and steadily favorable effect on the attitudes of the operators.

¹⁰ The Appeal Board has expressed the same thought. See ALAB-738, *supra*, 18 NRC at 199.

75. In remanding this issue to the Licensing Board, the Appeal Board noted its sensitivity to morale problems among the TMI-1 employees whose training and job performance remain under scrutiny despite eventual successful retesting by the NRC. ALAB-772, *supra*, 19 NRC at 1237. There is indication in this remand that the hearings themselves have contributed to the morale problems, that was one of the reasons for the RHR survey. After very carefully examining the evidence on remand, we returned to the partial initial decision on cheating to examine our earlier conclusion on employee integrity and attitudes. It is still as valid today as it was in 1982:

There is no evidence whatever that the large majority of the TMI-1 operators lacked competence and integrity. They have good cause to be unhappy with their treatment. Although the Commission appropriately acted in the broader public interest, the effect of the Notice of Hearing in this case was to void the full-power operator licenses of all the TMI-1 control room staff without the scarcest element of due process. The need to take the second NRC reexamination in October 1981 wiped out the benefits fairly earned by the honest candidates who passed the April reexamination. The entire proceeding with respect to examination integrity, although necessary, has been demoralizing, unfair to the honest operators, and, we are concerned, it may have been a distraction from their duties as control room operators.

LBP-82-56, *supra*, 16 NRC at 383, Finding 2417.

76. If unwanted operator attitudes still linger at TMI-1, they will be relieved substantially when the operators are permitted to perform the duties they were trained for.

5. Examination Security

77. A very important part of Licensee's response to cheating has been its security effort to ensure that individuals would never again be in a position to be tempted to cheat. The GPU Nuclear Control of Examinations procedure is a detailed process that clearly communicates to all parties Licensee's commitment to the security of examinations and the responsibility of everyone involved in ensuring the proper conduct of such exams. Long and Coe, ff. Tr. 32,202, at 19.

78. Examinations are classified in four basic security categories: Category 1 — written examinations where grades serve as a basis for certifying satisfactory completion of training; Category 2 — written examinations used as rapid feedback to assist the examiner in assessing the effectiveness of training; Category 3 — oral examinations conducted by an individual examiner or a board; Category 4 — practical factors examinations where evaluation of skill levels is based on performance of actual or simulated tasks. *Id.* This division into categories allows for different

levels of security and administrative controls. Security of Category 1 examinations applies from the time the questions are assembled until final administration and grading. Security also applies to question-and-answer banks in this category. Category 1 examinations are not reused without written approval by the Manager of Training. Access to Category 1 examination materials is restricted on a need-to-know basis and the policy also includes provisions for locked storage, assuring security passwords for data processing systems, limited access to exam materials, numerical accounting of exam copies, and an established question bank. In addition, there must be a 40% content difference for Category 1 consecutive weeks' training (cyclic) exams. Noncyclic training requires multiple exam versions differing at least 50% in content. The procedure also identifies the methods of transporting examinations between sites and the shredding of surplus examination material. The security for Category 2 exams applies from initial assembly through final grading. These exams may be reissued to subsequent classes. Category 3 and 4 examinations are less restrictive in their security. *Id.* at 19-20. Administration requirements and specific instructions for proctoring are clearly identified by category as well.¹¹ Detailed instructions for proctoring responsibilities are given.¹² *Id.*

79. Detailed instructions are given to the students regarding their conduct in the exam. Students must also sign a statement that indicates their understanding of the examination instructions, including an oath that the work on the examination is their own. Specific instructions are provided to those grading the exams and Category 1 examinations are graded in accordance with approved answer keys. A ± 2 percentage points variation from the passing score is reviewed by supervision and the Operator Training Manager. Examinations are also graded in a manner that provides specific attention to detecting suspicious parallelisms among various examinations. All instances of suspicious parallelism are investigated thoroughly within 1 week by persons designated by the Manager of Plant Training, who receives a written report of the investigation. The Manager of Plant Training then reviews the matter with the

¹¹ Each Category 1 examination has a cover sheet that identifies the following information: examination title and location where administered; whether the examination is open-book or closed-book; authorized reference material; any special instructions; title of each section of examination; point value of each section; total point value of examination; time limits for completing exam; minimum acceptable passing grade. Long and Coe, ff. Tr. 32,202, at 20-21; see, e.g., UCS Exhs. 21-27.

¹² The proctor must ensure that student work surfaces are clear of unauthorized materials; seating assures maximum workspace for each individual by separating students as much as possible; no unauthorized information is available, e.g., from blackboards or wall charts; authorized reference materials are free of any unauthorized markings; a seating chart is made for selected examinations; examination cover sheets are reviewed with the students. At least one proctor must be present at all times and student movement is minimized. *Id.* at 21.

Director of Training and Education. *Id.* at 21-22; see Newton *et al.*, ff. Tr. 32,409, at 42-44.

80. After exams have been graded, an additional measure is taken to ensure that the examination has not been compromised. Comprehensive examinations, as described previously, are reviewed by either the Supervisor, Licensed-Operator Training, or the Operator Training Manager, or his written designee. This collusion review consists of the reviewer selecting one-half of the questions from one-half of the students and reviewing a matrix listing the students who took the exam and the graded value of their answers for suspicious parallelisms. *Id.* at 44.

81. Since the control of examination procedure has been implemented there have been no known incidents of cheating or the need to pursue further initial investigations for suspicious parallelism in licensed-operator training at TMI. The entire control of examinations procedure is an area of major emphasis in the GPU Nuclear instructor qualification and development programs. Long and Coe, ff. Tr. 32,202, at 22.

82. In our discussion under § III.D.5.a, *infra*, the Board explains that it agrees with the OARP Review Committee that cheating is a highly situational phenomenon. We favor a very practical approach to the problem. Therefore, the evidence on exam security was to us more important than it seemed to be to the parties. The OARP Committee reported that it had never seen such stringent examination security procedures. Committee, ff. Tr. 31,749, at 6. No party has faulted the security procedures as such, and for ourselves, we cannot envision a way to improve them. UCS, however, while conceding that the exam security procedures should improve matters, withholds its blessing because, in the absence of knowing what caused the cheating in the first place, one cannot tell whether the exam security will be effective. UCS Proposed Finding 185. We believe the point is rather obscure as it applies to the mechanics of exam security, and doesn't help. The Board is satisfied with the Licensee's exam security procedures.

6. *The Promotions of Messrs. Frederick and Husted*

a. *Introduction*

83. The Licensee presented, as a part of its affirmative case, a defense of its promotions of Mr. Frederick to Supervisor, Licensed-Operator Training, and Mr. Husted to Supervisor, Nonlicensed Operator Training. Long and Coe, ff. Tr. 32,202, at 12-19. Licensee stated that ALAB-772 raised questions concerning the promotions, but we do not agree with Licensee that the Appeal Board required any defense of those actions. With respect to Mr. Frederick, the Appeal Board directed the

OARP Review Committee to take into account several changes within the Training Department, including Mr. Frederick's promotion. ALAB-772, *supra*, 19 NRC at 1236 n.56. As we note below, Mr. Frederick was removed from his position by Mr. Hukill before the hearing and that matter became moot. The Appeal Board itself required Mr. Husted's removal from his position as Supervisor of Nonlicensed Operator Training. *Id.* at 1224.

84. Licensee, however, is concerned that promoting Messrs. Frederick and Husted could be seen as an inappropriate response to the implications of cheating and, presumably, a reflection on the Training Department. Licensee's Proposed Findings at 66. UCS and TMIA do, in fact, point to Mr. Frederick's promotion as a bad mark against the training management. TMIA asserts the same with respect to Mr. Husted, while the Commonwealth has nothing to say about either. For our part, we see the debate as marked sometimes by under-analyses of complex problems, and sometimes by over-analyses of too little data. In any event, the Frederick/Husted actions provided very little information about the quality of the Licensee's training program and management.

b. Mr. Frederick

85. Mr. Frederick began with GPU Nuclear (Met Ed) in November 1973 after 5 years of experience in the Navy Nuclear Power Program. He since gained nearly 5 years of experience as an auxiliary operator and licensed reactor operator on TMI-2, and approximately 5 years of experience in the TMI Training Department as an instructor and supervisor. He received an NRC RO license on TMI-2 in October 1977, and an SRO license on TMI-2 in January 1982. Mr. Frederick was one of two licensed reactor operators on shift at the time of the initiation of the TMI-2 accident. Long and Coe, ff. Tr. 32,202, at 12-13.

86. In July 1979, Mr. Frederick became an operator training instructor at the TMI Training Department. Dr. Long testified that Mr. Frederick was conscientious in his preparation, and enthusiastic and effective in his classroom presentation. *Id.* at 13. In February 1982, Mr. Frederick was promoted to Supervisor, Nonlicensed Operator Training, based on ability as an instructor and effective interactions with others. He also had capably served as an interim Supervisor, Licensed-Operator Training. Dr. Long believes that Mr. Frederick had shown a particular sense of responsibility in assisting trainees in learning how to respond to events identified in the lessons learned from the TMI-2 accident. Dr. Long concurred with and approved the Training Department recommendation to promote him. *Id.*

87. Mr. Frederick was considered a primary candidate for Supervisor, Licensed-Operator Training TMI-1 when that position became available in March 1983. At that time he was rated by Mr. Newton, Manager of Plant Training, as "technically superb." See UCS Exh. 2-5. He had maintained his TMI-2 SRO license and was seen to be enthusiastic about working toward acquiring an NRC SRO Instructor Certification on TMI-1. The TMI-1 Operations Department expressed some lingering concern about what some perceived as an old "know-it-all" attitude problem, but they agreed that he had performed well in his recent assignments and that similar performance could be expected in the new position. Long and Coe, ff. Tr. 32,202, at 14.

88. His performance reviews indicated that Mr. Frederick was effective as the Supervisor, Licensed-Operator Training, and on occasion in early 1984, as Acting Operator Training Manager in Mr. Leonard's absence. Thus, in all of his assignments in the TMI Training Department he demonstrated his ability both to teach and to supervise the activities of other instructors according to the unrefuted testimony of Dr. Long. *Id.*

89. Then Mr. Frederick's fortunes began to wane. In March 1984, while serving as Supervisor, Licensed-Operator Training, he failed the NRC TMI-1 SRO examination. The Training and Education Department management and Dr. Long were satisfied that his failure related primarily to a lack of sufficient time in the plant to be intimately familiar with TMI-1 Administrative Procedures. Most March 1984 candidates had also experienced difficulty with that section. Dr. Long confirmed that Mr. Frederick did not have any attitude problem, such as over-assuredness or lack of recognition of the importance of the exam process. *Id.* at 14-15.

90. In June 1984, the TMI Training Department assigned an Acting Supervisor of Licensed-Operator Training to free Mr. Frederick full time to prepare for his NRC reexamination. While Mr. Frederick was in full-time study, the NRC issued NUREG-0680, Supp. 5 (July 1984), which raised questions about Mr. Frederick's conflicting testimony and statements concerning the morning of the TMI-2 accident and concerns about the TMI-2 leak-rate testing. UCS Exh. 1. The Staff indicated an intention to withhold Mr. Frederick's TMI-1 SRO Certification until those issues were resolved.

91. In the meantime, Mr. Ross, Manager of TMI-1 Operations, gave Mr. Frederick only a *marginal* pass on his oral examination and reported that Mr. Frederick had only a 50-50 chance of passing the NRC orals. Nevertheless the Training Department and Mr. Ross for Operations recommended that he be certified for reexamination by the NRC.

92. Mr. Hukill, however, rejected the recommendation and declined to certify Mr. Frederick for the NRC examination, citing the NUREG-0680 Supp. 5 report, his marginal pass on the oral exam, the spirit of a commitment not to use TMI-2 licensed operators to operate TMI-1, and a concern that a second failure would essentially be, by GPU Nuclear procedures, a bar to further participation. UCS Exh. 1.

93. TMIA makes an unhelpful syllogistic argument to the effect that: (1) inappropriate operator action was one of the primary causes of the severity of the TMI-2 accident; (2) Mr. Frederick was one of the two reactor operators on shift when the accident began; (3) therefore Mr. Frederick is an individual with a demonstrated lack of technical knowledge. TMIA Proposed Findings 30-32.

94. UCS approaches the matter more analytically. UCS acknowledges that the testimony cannot support significant conclusions about Mr. Frederick, himself, and we agree. UCS Proposed Finding 265. UCS would have us analyze the Frederick episode in terms of what it tells us about the training program. *Id.* We agree with this point too. But then we depart from UCS' reasoning.

95. UCS makes two related, and sometimes inconsistent, arguments. First UCS states that it should have been the Training Department, not Mr. Hukill, who removed Mr. Frederick from the supervisor job. Proposed Finding 264. Second, UCS alleges that Mr. Frederick was a "favorite of his superiors" because he had been a "good soldier" who stuck with the company through bad times (a reference to Mr. Newton's comment that Mr. Frederick was a "lawyer's favorite" during litigation); and that these factors suggest that Mr. Frederick "barely passed" the "subjective" oral examination for those reasons. Proposed Finding 266.

96. With regard to UCS' first point, we see no failure by the Training Department, nor does Mr. Hukill's refusal to accept the department's recommendation suggest a failure. Mr. Hukill's memorandum makes it clear that he approached the matter in very large part as a policy issue, as compared to a technical evaluation of Mr. Frederick's competence. UCS Exh. 1. As a line officer of GPU Nuclear, Mr. Hukill considered other factors that would seem to be beyond the purview of the supporting Training Department.

97. Moreover it is inconsistent for UCS to suggest that the Training Department and Manager of Operations, Mr. Ross, rewarded Mr. Frederick for being the "lawyers' friend" and "good soldier" in the face of the fact that Mr. Hukill would not do that. If any level of management would be inclined to reward an employee for faithful service during litigation, it would be at the higher, not lower levels.

98. Finally, UCS' argument that Mr. Frederick "barely passed" the oral examination only because he was a favored employee is factually flawed for yet another reason. As stated, the oral exam was administered by Mr. Ross, Manager of the TMI-1 Operations Department — the same department that officially entered into Mr. Frederick's personnel file a concern that he had once possessed a "know-it-all attitude." Long and Coe, ff. Tr. 32,202, at 14. Moreover, Mr. Ross predicted only a 50-50 chance that Mr. Frederick would pass the NRC exam. Mr. Frederick might well disagree that Mr. Ross favored him.

99. The promotion and subsequent reassignment of Mr. Frederick tells little about the quality of the TMI Training Department. The record indicates that each of the actors, Training, Operations and Mr. Hukill, acted rationally from their differing perspectives and responsibilities.

c. Mr. Husted

100. The Appeal Board describes the event and findings concerning Mr. Husted in ALAB-772, and, as we noted, questioned Licensee's judgment in promoting Mr. Husted to Supervisor, Nonlicensed Operator Training. It conditioned any restart on a requirement that he have no such supervisory responsibility. 19 NRC at 1221-24.¹³

101. Dr. Long testified on remand concerning Mr. Husted's long Naval and civilian power reactor career and his satisfactory employment experience with GPU Nuclear. He also testified that Mr. Husted had resolved the attitude problem that the Licensing Board had criticized in LBP-82-56 (16 NRC at 318-20). Long and Coe, ff. Tr. 32,202, at 16-18. Licensee now proposes that the Licensing Board conclude that Management's response to Mr. Husted's conduct was appropriate, thorough, and circumspect. Licensee Proposed Finding 96.

102. During the remanded hearing, the Board, by its Chairman, expressed strong concern about Licensee's handling of Mr. Husted from the point of view that he had been removed as a settlement stipulation in this proceeding despite his favorable employment record. Tr. 32,318-23 (Smith). Now we must reconsider the propriety of those comments. During the hearing, the Licensing Board had not been aware that the stipulation removing Mr. Husted from his duties as a licensed instructor of licensed reactor operators had been approved by the Appeal Board. We have since learned that the stipulation had been approved by the

¹³ The Commission afforded Mr. Husted an opportunity to request a hearing on this action. See CLI-85-2, 21 NRC 282, 317 (1985).

Appeal Board in its unpublished memorandum of December 22, 1983.¹⁴ The Appeal Board's approval of the stipulation ended the matter as far as this Board is concerned and we may not now consider the handling of that matter.

103. By the same token, we cannot accept Licensee's proposed finding that Mr. Husted's promotion was appropriate, because the Appeal Board has already ruled that it was not. ALAB-772, *supra*, 19 NRC at 1224.

104. Accordingly, the Board reaches no conclusion with respect to the Husted matter.

C. The Licensed-Operator Training Program

1. Introduction

105. As we noted at the outset, Licensee seeks to prevail in this remanded proceeding on three separate grounds, each of which are asserted to be sufficient: (1) the substantive adequacy of the training program on its merits considered in this section; (2) the accreditation of the program by the Institute of Nuclear Power Operations (INPO), advanced by Licensee as a legally sufficient basis (discussed in § III.C.5, *infra*); and (3) the conclusions of the OARP Review Committee in response to ALAB-772 (discussed in § III.D, *infra*).

106. Each of these considerations overlap. The Review Committee's approval of the training program necessarily depends upon the program itself as does INPO's accreditation. Licensee sometimes cites the opinions of individual members of the Review Committee as expert support for particular aspects of its program.

107. In general the Board did not find the proposed findings of the parties to be as helpful as they might have been. UCS was the only Intervenor to litigate fully all the major issues. UCS and Licensee seemed to disdain the merits of the other's case so much that the important disputes between them were not sharply focused.¹⁵

108. On March 14, 1985, the Commission issued its Policy Statement on Training and Qualification of Nuclear Power Plant Personnel. 50 Fed. Reg. 11,147 (Mar. 29, 1985). The Policy Statement endorses the INPO-managed training accreditation program as an acceptable way

¹⁴ In the Memorandum and Order Denying Motions for Disqualification, February 20, 1985, slip op. at 32, 42, Judge Smith mistakenly stated that the stipulation had never been approved by any Board and that the Appeal Board had never addressed the matter.

¹⁵ By contrast the NRC Staff set out specifically and unequivocally its differences with Licensee on the Review Committee's methodology, but the differences are not of major significance.

of demonstrating that an effective training program has been implemented. The Policy Statement has two very significant legal implications. One is that INPO accreditation is itself a sufficient demonstration of implementation. Slip Statement at 4. The other implication, the corollary of the first, is that the five INPO elements for acceptable performance-based training programs are essential and, by implication, sufficient in any such training program. These elements are:

- systematic analysis of the jobs to be performed
- learning objectives derived from the analysis which describe desired performance after training
- training design and implementation based on the learning objectives
- evaluation of trainee mastery of the objectives during training
- evaluation and revision of the training based on the performance of trained personnel in the job setting.

Id. at 3-4.

109. We do not discuss until § III.D, below, the appropriate legal effect to be given the Policy Statement in this proceeding. However, it is useful to have the five INPO elements in mind as we review in this section the substantive merits of the licensed-operator training program. Legal implications aside, the INPO elements make sense. GPU Nuclear personnel were heavily involved in developing the INPO program, but the GPU Nuclear program is not based on the INPO elements. No witness specifically addressed the INPO elements. The program development began before the INPO guidelines were issued. Tr. 33,376-77 (Knief). However, the INPO elements are consistent with Licensee's program and are implicitly supported by the testimony of those expert witnesses who addressed the issue, including Dr. Regan for UCS and the Staff's panel. The difficulty is that the testimony was not organized around the INPO elements, and the main body of proposed findings did not address the INPO elements.¹⁶

110. In our findings in the paragraphs that follow, we attempt to correlate the elements of the GPU Nuclear licensed-operator training program with the five INPO elements and determine whether the program satisfies the elements. In this exercise we ignore for now the fact that INPO has actually accredited the licensed-operator training program by applying the same elements.

¹⁶ Supplemental pleadings addressed the Policy Statement and the effect of the INPO-management accreditations program. See § III.C.5, *infra*.

2. Program Development and Methodology

111. The Operator Accelerated Retraining Program (OARP), developed in the aftermath of the TMI-2 accident, was a typical and traditional, knowledge-based program that emphasized subject-matter topics and prior knowledge of the instructors. As a traditional program, it was diverse and thorough. However, it was not correlated with specific job performance requirements. Knief and Leonard, ff. Tr. 33,364, at 4; *see generally* LBP-81-32, *supra*, 14 NRC at 451-55 (¶¶ 196-207).

112. In mid-1980, the Training and Education Department of GPU Nuclear was formed, with Dr. Long as Director and Dr. Knief as Manager of Plant Training at TMI. Dr. Long and Dr. Knief were familiar with concepts of validation and took immediate steps to shift the focus of operator training to a performance basis. Program validity was sought in terms of both subject-matter content and job performance. Information in both areas developed in-house was compared to that available from external sources such as INPO and the NRC. Systematic training development using feedback from a variety of cognizant personnel increased content and performance validity. Knief and Leonard, ff. Tr. 33,364, at 4.

113. Instructor training, which started in 1980, placed special emphasis on the development and use of behavioral learning objectives. In addition, instructors were introduced to the principles of training needs analysis, job and task analysis, and testing and evaluation — topics that were later formalized as key elements in GPU Nuclear's and INPO's Training System Development (TSD) models and the NRC's Systematic Approach to Training (SAT) model. These models were developed at approximately the same time. Tr. 32,898-99 (Leonard, Newton). Subsequent revisions to the replacement and requalification operator training programs incorporated these principles. Knief and Leonard, ff. Tr. 33,364, at 4-5.

114. Licensee implemented the TSD model as a method to develop a performance-based training program. *Id.* at 5; *see generally* Newton *et al.*, ff. Tr. 32,409, at 29-31; Tr. 32,898-904 (Newton, Leonard). The model includes five basic elements — analysis, design, development, implementation, and evaluation. In summary, the TSD model recommends that a new training activity be constructed using the following steps: (1) *Front-end analyses* first identify the nature and extent of the training needs and then identify the elements of the job and tasks of which the job is composed. (2) *The design phase* focuses on developing behavioral learning objectives and job performance measures that correspond to the tasks required to perform the job. (3) *The development component* is primarily involved with developing curricula, training strategies, lesson

plans and other materials. (4) *Implementation* includes the actual scheduling and delivery of the training to the subject audience. (5) Although *evaluation* is listed as the final step of the TSD process, and indeed in its summative form can be a final wrapup exercise, formative (in-line) evaluations should be conducted during and between each of the other steps to assess consistency and provide for in-line feedback to modify and improve the resulting training program. Knief and Leonard, ff. Tr. 33,364, at 5-6.

115. It is apparent to this Board that, although the TSD elements do not precisely track the five INPO elements, they capture the same program needs and they progress in much the same order. As we see it, the TSD first element (front-end analysis) is roughly equal to INPO elements 1 (systematic job analysis) and 2 (learning objectives derived from job analysis). The TSD third element (development) is roughly equal to aspects of INPO element 2 and INPO element 3 (training design). The TSD fourth element (implementation) can be equated to INPO element 3 and INPO element 4 (evaluation of training mastery). The similarity of the TSD fifth element (evaluation) and the INPO element 5 (evaluation and revision of the training program) is evident in that, as applied, and as we note next, the TSD fifth element is also used as a formative tool.

116. When a TSD approach is applied to an existing training program, in contrast to a new program under development, the initial focus would logically be on the evaluation step. Strengths and weaknesses should be identified with the latter becoming the primary focus of attention and resources. Beginning in 1980, application of these principles to the licensed-operator training programs at TMI-1 showed that the development and implementation phases were already conducted effectively. Licensee decided, however, that analysis, design, and evaluation could benefit from additional attention to assure proper focus on job performance. Use of the TSD model was formalized in 1983. *Id.* at 6. UCS and its witness, Dr. Regan, severely criticize the early emphasis of the development and implementation phases, as we discuss later.

117. The transition to performance-based training at TMI began through emphasis on behavioral learning objectives. These objectives identify not only subject areas required, but skills or cognitive behaviors to be mastered. *Id.* The behavioral learning objectives for the licensed operator were developed or revised by job incumbents or other subject-matter experts. This approach included an inherent element of informal, or "tabletop" job/task analysis. *Id.*; see also Tr. 32,457-59 (discussion of "tabletop" analysis), Tr. 33,372-74.

118. Evaluation in the TSD setting is based on matching test items directly to the behavioral learning objectives. Focus on objectives paid the immediate dividend of allowing progress to be made simultaneously on three of the phases of the TSD model (analysis, design, and evaluation). Knief and Leonard, ff. Tr. 33,364, at 7.

119. To ensure that instructors unfamiliar with the use of behavioral learning objectives utilized them properly in the classes they taught, instructors and supervisors were trained on the writing and use of behavioral learning objectives as a means of focusing instructional and student attention on training performance requirements and of communicating program content to Operations management personnel for their added input and ultimate concurrence. Instructor training courses, given routinely, continue the process of educating instructors in the performance-based methods utilized at TMI. In addition, the Manager of Plant Training has worked with Training staff on improving the quality of the behavioral learning objectives through instructor classroom evaluations and review of selected lesson plans. *Id.*

120. The validation process used at TMI evolved further between 1980 and 1982. With the issuance of NUREG/CR-1750, Analysis, Conclusions, and Recommendations Concerning Operator Licensing (January 1981), generic job analysis information for the licensed-operator job was available for the first time. GPU Nuclear reviewed this document to assess both the content of the then recently issued TMI-1 licensed-operator training program and new qualification cards developed to support on-the-job training activities. *Id.* at 7-8. The training program closely correlated with the NUREG/CR-1750 generic industry job/task analysis. Newton *et al.*, ff. Tr. 32,409, at 30.

121. INPO guidelines for licensed-operator training also were issued in this time frame. Knief and Leonard, ff. Tr. 33,364, at 8; *see also* Newton *et al.*, ff. Tr. 32,409, at 30; Tr. 32,461-62, 33,376-78 (Leonard, Knief). Comparison of their subject matter to that of the TMI-1 program showed substantial agreement and content validity according to Licensee's witnesses. Knief and Leonard, ff. Tr. 33,364, at 8. The two programs also matched in terms of administrative requirements, such as the types of evaluations and review-and-approval mechanisms, which enhance performance validity. *Id.* In response to cross-examination by the NRC Staff as to how the GPU Nuclear training program will continue to be consistent with the INPO guidelines, Dr. Knief stated that Licensee is committed to continuing to evaluate its training program against the INPO guidelines and either to maintain consistency or have a definite reason for taking exception to them. Tr. 33,377 (Knief).

122. Dr. Knief's testimony was received before the Policy Statement on INPO elements issued. Therefore it did not address the effect of the Policy Statement. We infer from his testimony that Licensee's commitment pertains to the guidelines set out in the INPO accreditation criteria, e.g., January 1985 version, and not the INPO elements endorsed by the Commission in the Policy Statement. Those elements, as we discuss under § III.C.5 have become enforcement requirements which may be satisfied in various ways.

123. In 1980, GPU Nuclear instituted a program of management evaluation of simulator training. Due to their inherent integration of the entire range of job performance skills, simulator drills and evolutions have been especially important evaluation methods providing feedback to both the training and operational arenas. They are also important mechanisms in performance validation. Knief and Leonard, ff. Tr. 33,364, at 8.

124. In addition, in 1982 the formal process for operator certification as ready to operate the plant was established to consist of an integration of several training-related performances — classroom quizzes and examinations, on-the-job qualification, simulator and plant drills, and final written and oral examinations. Based initially on consultation by Dr. Eric Gardner with the TMI Training Department, a workshop on testing and evaluation provided some specific guidance on construction and use of a variety of examination methods. During the workshop, the instructors developed a TMI-specific taxonomy of cognitive skills against which existing quizzes and examinations were compared to assess relative balance between memorization and higher-order mental processes, such as problemsolving and decisionmaking. This training provided background for developing test specifications for annual requalification examinations. *Id.* at 8-9; *see also* Tr. 31,879-82, 32,082-83 (Gardner).

125. In 1981, INPO began its industry-wide job/task analysis project. TMI-1 supported the effort by having licensed operators complete surveys and participate in validation exercises conducted at INPO headquarters in Atlanta. Educational technologists from both the TMI and Oyster Creek Training Departments participated in workshop sessions at INPO to become trained in the process in support of plant-specific validation of the job/task lists. Training and Education Department management and educational technology personnel reviewed INPO's 1982 draft guidelines for accreditation of nuclear power plant training programs for consistency with the TMI-1 licensed-operator training program.

126. In LBP-82-56, this Board imposed a condition that the training and testing program be subject to an in-depth and independent audit by auditors approved by the Director of Nuclear Reactor Regulation. 16

NRC at 384. Accordingly, GPU Nuclear contracted with Data Design Laboratories (DDL) to perform an extensive evaluation of these programs using the draft INPO criteria as a basis. Their assessment of program strengths provided assurance of overall validity, while identification of specific weaknesses provided guidance for program improvement. Knief and Leonard, ff. Tr. 33,364, at 9-10.

127. The 1983 INPO generic job/task analysis was used in the continued development of the TMI licensed-operator training program. This 1983 publication by INPO allowed comparison of the analyses to TMI-1 licensed-operator on-the-job training (OJT) task sheets. Through this process, TMI Training revised the OJT training program using the performance requirements established by INPO. Perhaps even more importantly, the INPO analysis provided a useful benchmark for developing training materials for the Basic Principles Training Simulator (BPTS). The design of the BPTS itself owes much of both its hardware configuration and instructor-console software to upfront tabletop task analysis and resulting behavioral learning objectives developed by Operations, Training, and Technical Functions personnel. BPTS training development used the much more detailed INPO results to identify those tasks for which the device is best suited. At the same time, tasks suited for training on a full-scope simulator were also identified. This process supported ongoing training at what was then the B&W simulator and also was used in development of specifications for the TMI-1 replica simulator ultimately ordered from Singer-Link. *Id.* at 10-11.

128. The Operations Plant Manual (OPM) provides a single reference for the basic subject matter that licensed operators need for their jobs. Developed primarily by Operations personnel, it has been supplemented through reviews by the Training Department and Technical Functions Division. The presence of behavioral learning objectives for each division of the OPM provides focus not only on the key subject matter but also on the important cognitive levels associated with each element. It is extremely useful to training personnel, operators, and operator candidates as a reference tool that corresponds to both the training subject matter and the job performance requirements. *Id.* at 11-12; *see also* Tr. 31,825, 33,325-26 (Kimmel).

129. The Training Department also has taken the INPO generic job/task analysis results and prepared a job-analysis task list for the licensed operator, by using the plant-specific information provided previously to INPO by the TMI-1 licensed operators and a supplemental job analysis conducted by GPU Nuclear. Using this list, tasks are being identified that are appropriate for inclusion in the licensed-operator training program. A matrix will identify whether each task is taught in the classroom

and/or on the job. The matrix also will be used to upgrade the task descriptions and performance standards contained on the OJT qualification cards. Knief and Leonard, ff. Tr. 33,364, at 11.

130. The following activities thus far have been completed in support of TSD model implementation: (1) System operating procedures and surveillances have been reviewed to determine if the surveys missed any tasks; (2) the task lists have been revised to reword the tasks in such manner that they can be incorporated into OJT and simulator training programs; (3) the completed task list has been reviewed to eliminate repetition and to standardize, as much as possible, the scope of tasks on the list; (4) Operations and Training have reviewed these task lists to determine which are appropriate for inclusion in the training programs and the appropriate method of training, i.e., classroom, OJT, or simulator. The efforts along these lines discussed in the preceding paragraph have been incorporated. Newton *et al.*, ff. Tr. 32,409, at 30-31, *as modified* at Tr. 32,407 (Newton).

131. Using the finalized task lists, determinations of what constitutes satisfactory performance will be made. Reviews will also be conducted to ensure that the knowledge necessary to support task performance, i.e., the knowledge necessary to perform sub-tasks (Tr. 32,456 (Newton)) is included in classroom training and is supported by the Operations Plant Manual and its learning objectives. The comparisons already conducted indicate fairly close uniformity between the classroom training and the task lists. Newton *et al.*, ff. Tr. 32,409, at 31. Results of this job/task analysis will be incorporated into revisions for the respective programs prior to their next scheduled convening dates. *Id.*

132. The validity of the TSD model is not in dispute. UCS agrees that its use puts Licensee on the right track. UCS Proposed Finding 246. UCS also believes that its witness, Dr. Regan, agrees that the TSD model would be useful. *Id.*, *citing* Regan, ff. Tr. 32,693, at 3-5, and Tr. 32,823. While we cannot for ourselves establish a point-by-point agreement between Dr. Regan's criteria for an effective training program and the TSD model, it is apparent that his testimony as a whole in one way or another captures all the ideas of the TSD model and the INPO elements. Regan, ff. Tr. 32,693, *passim*. Accordingly the Board agrees with UCS that the question facing the Board is not the criteria employed in the design of GPU Nuclear licensed-operator training program, but the implementation of the criteria. *See* UCS Proposed Finding 246.

133. UCS disparages Licensee's effort in meeting the first requirements of both the TSD model and the INPO elements, i.e., front-end analysis of the jobs to be performed. *See* UCS Proposed Findings 242-245. First UCS faults Licensee for relying upon informal "tabletop"

job/task analyses in light of the fact that NUREG/CR-1750 and INPO guidelines are generic in nature. UCS Proposed Finding 243. UCS, citing Mr. Leonard and Dr. Knief (ff. Tr. 33,364, at 6-7), has apparently overlooked the substantial later effort by Licensee to bring into the job/task analyses the details of its own jobs and systems, including the assistance of Data Design Laboratories. *Id.* at 9-11.

134. It is not clear from its proposed finding that UCS is aware that the job/task list has been completed and evaluated. In any event we read UCS' concern to be that the tasks have yet to be broken into sub-tasks and that the schedule for accomplishing that goal is impermissibly vague. UCS Proposed Finding 244. The Board does not share UCS' concern. The testimony by Mr. Newton cited by UCS is quite specific. The task analysis was to have been completed before the replacement operator program in April 1985. Tr. 32,547 (Newton). In making this finding the Board ignores the fact that INPO's accreditation must assume that the systematic analysis of the jobs to be performed is complete.

135. UCS is also concerned that Licensee has not brought the necessary expertise to the implementation of the TSD model. While acknowledging some expertise in Dr. Long and Dr. Knief, UCS believes that Dr. Long is too far removed from the scene and Dr. Knief's judgment is flawed by his view of how the TSD model should be implemented in an ongoing program. UCS Proposed Findings 246-247.

136. As we found above, Dr. Knief explained that it was not possible to shut down the operator training programs in order thoroughly to analyze, design, and develop them. Knief and Leonard, ff. Tr. 33,364, at 12-13. He believed that the development and implementation phases were already conducted effectively, but analysis, design, and evaluation could benefit from additional attention to assure proper focus on job performance. *Id.* at 6.

137. UCS and Dr. Regan argue that Dr. Knief's reasoning is wrong, that it is not possible to determine the adequacy of the TSD development and implementation phases without having completed the analysis, design, and evaluation phases. Regan, ff. Tr. 32,693, at 5; UCS Proposed Finding 247. While acknowledging that it is a practical necessity to continue the training program while redesigning it, UCS insists that the analysis and design phases must come first. UCS Proposed Finding 249.

138. In the Board's view, UCS and Dr. Regan have taken too narrow a view of Dr. Knief's explanation. First, they do not account for the fact that the determination that the development and implementation phases were already effective was made in 1980, but that the use of the TSD model was not formalized until 1983. Knief and Leonard, ff. Tr. 33,364,

at 6. Licensee witnesses have stressed throughout that they have used evaluation as a formative process which we understand to mean that all phases of the TSD model, including development and implementation, would adjust as the program progresses. We did not read Dr. Knief's testimony to mean that the development and implementation phases were fixed, never to be disturbed by subsequent lessons from design, analysis, and evaluation.

139. UCS made the point about Dr. Knief's judgment to stress that, without independent outside review of the adequacy of his and Dr. Long's work, there is no assurance of the successful implementation of the TSD model. UCS Proposed Finding 246. According to UCS, the OARP Review Committee work was too superficial to be of assistance. *Id.* We address the value of the Review Committee's work in § D, *infra*, but even assuming the accuracy of the UCS' characterization of the Committee's effort, UCS' suggestion that there has been no independent review is inaccurate. As Licensee points out, independent evaluations have also been made by, e.g., the NRC Staff, the Data Design Laboratories, INPO and Admiral Rickover. *See* Licensee Proposed Finding 118.

140. The Board concludes from the foregoing findings that the GPU Nuclear licensed-operator training program satisfies the first two of the INPO elements, i.e., job analysis and learning objectives. In later sections we address training design and implementation, evaluation of training mastery (testing), and evaluation and revisions of training based on job performance. As will be seen, the last of the INPO elements captures UCS' most severe and effective attacks on Licensee's training program.

3. Substance and Execution

a. Introduction

141. The operation and maintenance of TMI-1 is supported by an extensive and diversified training program, including formal classroom instruction, simulator exercises and on-the-job training (OJT) activities. Since the accident at TMI-2, Licensee has embarked upon a major training and retraining effort for licensed TMI-1 personnel. Training for operations staff is emphasized through continuous training and testing. The purpose of the training programs for licensed operations is twofold. The replacement programs provide a sound theoretical and practical background to ensure that personnel understand how and why they perform specific tasks, understand how their job impacts plant and public safety, and that they know how to respond properly to situations that they might encounter during normal and abnormal operation of the plant. The requalification training programs are intended to enhance nuclear

plant safety and reliability by maintaining a high level of skill and knowledge in licensed senior reactor operators (SROs) and licensed reactor operators (ROs). Newton *et al.*, ff. Tr. 32,409, at 2.

142. To ensure that requalification training fulfills its purpose, all TMI-1 Operations shift personnel are scheduled on a six-shift work cycle with one of the six shifts dedicated to training. In cases where identified training cannot be completed with the one shift week devoted to training, additional time is scheduled during the operating crews' relief week, or on overtime as necessary to complete required training. There is a training program for instructors, and there are three training programs that prepare candidates to perform reactor operator or senior reactor operator duties at TMI-1: the licensed-operator training program (for replacement or new reactor operators), the replacement senior reactor operator program, and the requalification program for licensed ROs and SROs. *Id.* at 3. These four training programs are discussed below.

b. Instructor Training

143. Instructor training at TMI encompasses several different areas, including (1) an instructor development program, (2) an instructor qualification procedure, and (3) an instructor evaluation procedure. Newton *et al.*, ff. Tr. 32,409, at 36-37. Licensed-operator instructors are required to attend the 1-week instructor development program, which is under the direction of Training and Education's Educational Development Section. UCS makes the point that not all current instructors have completed the instructor development program. Tr. 32,483 (Leonard). The only one who has not attended this program, however, is Mr. Maag, who presently has an interim certification, provided for by the procedure, to teach operators. *Id.*; see also Tr. 32,216 (Long). UCS has presented no evidence that puts into doubt Mr. Maag's teaching abilities, and the reason Mr. Maag has not taken this program as yet is because of his fairly recent assignment to training. Tr. 32,216 (Long); Tr. 31,891-92 (Gardner, Uhrig). The program includes an introduction to the Training Systems Development (TSD) approach, curriculum development, development of behavioral learning objectives, preparation of lesson outlines and lesson plan formats, utilization of audio-visual aids, instructing techniques, preparation of exams, evaluation techniques and counseling techniques. In addition to initial instructor development, and the training necessary to maintain any current license, each instructor attends continuing instructor development training. The advanced instructor development program provides the instructor with additional skills not pre-

sented in the initial course. Advanced training has been provided to instructors in examination development, criterion-referenced instruction, audio-visual aids, and implementation of the TSD model. *Id.* at 37.

144. Each instructor also must be qualified in accordance with Training Department procedures. Licensed-operator instructors are required to complete a qualification card related to their area of instruction. The qualification card specifies the proper level of technical knowledge necessary. Instructors for plant fundamentals are required to be licensed operators or have specific educational background and experience. An NRC SRO license or instructor certification is required to instruct in plant systems and transients, integrated plant response and to function as a simulator instructor. *Id.* at 38. Included in the instructor qualification card is a list of reading material that each instructor is required to read and discuss with his supervisor. The material includes the control of examination procedures, training program descriptions, 10 C.F.R. Part 55, and several documents describing the TMI-2 cheating incidents. Prior to certifying instructors, the Manager, Plant Training, discusses the cheating incidents with them, emphasizing lessons learned, and including the responsibilities that each instructor has in ensuring that the exam security process is maintained and taken seriously. *Id.* at 38.

145. A revision to the instructor career development path has resulted in precise specifications for each instructor position in the Training Department. The mode of progression for instructors now incorporates five separate promotional levels, whereas before there were only two available for licensed-operator instructors. The instructor levels are based on experience, education, and accountability. This provides a more structured career path for instructors and a viable career path for Operations personnel. The revision is intended to encourage movement back and forth between Operations and Training. *Id.* at 38-39.

146. The classroom performance of each instructor is evaluated on an ongoing basis. An instructor evaluation procedure provides for evaluations of each instructor by upper management and peers. Each instructor is scheduled to be regularly evaluated — up to eight times per year — when involved full time in classroom instruction activities. *Id.* at 39; *see also* Tr. 32,483-85 (Leonard, Newton). A detailed rating sheet has been developed that permits the evaluation of an instructor on a number of the important factors related to teaching, such as familiarity with technical information, adequate preparation and presentation of materials, establishment of sound learning objectives, selection of appropriate instructional methods, proper use of instructional aids, proper response to questions, classroom management, and instructor characteristics such as voice, diction, enthusiasm, and appearance. The evalua-

tions are reviewed by the instructor, his supervisor, and Training Department management and entered into the instructor's qualification folder. These evaluations are used to upgrade the individual Instructor's skills and identify and correct generic deficiencies. Newton *et al.*, ff. Tr. 32,409, at 39; *see also* Long and Coe, ff. Tr. 32,202, at 39-43, "The Criteria for and Development of TMI-1 Licensed Operator Instructors."

c. Replacement RO Training

147. Candidates for the replacement RO training are selected by the Manager, Plant Operations, either from the job market or from the cadre of TMI auxiliary operators (AOs). The prerequisites for candidacy are that the candidates must have:

- (1) a high school diploma or equivalency;
- (2) at the time of licensing, accumulated three years of power plant experience of which one year is at TMI-1. This one year of experience must include three months of performing the duties of a licensed operator while under instruction as an extra person in the control room;
- (3) satisfactorily completed the plant fundamentals training program unless written examination has verified that the knowledge and skill of the individual is comparable to that of individuals who have completed the training;
- (4) satisfactorily completed the plant system training programs; and
- (5) satisfactorily met the minimum medical requirements for licensed personnel as specified in 10 C.F.R. Part 55.

Newton *et al.*, ff. Tr. 32,409, at 3-4.

148. The training program is 9 months long and consists of two phases: phase one is primarily on-the-job training (OJT) and classroom training in plant fundamentals; phase two consists of OJT and classroom training in systems and integrated plant response. If newly hired candidates are from an outside source, with no auxiliary operator experience, they are required to complete sections of the auxiliary operator (AO) OJT program as well as to complete or validate the fundamentals training received by the AOs during their training program. The completion of AO OJT tasks serves to familiarize the candidates with key operating equipment and procedures while they complete the replacement operator training program.

149. Classroom training conducted for replacement operators includes coverage in the following topic areas:

- a. Systems;
- b. Heat Transfer, Fluid Flow, and Thermodynamics;
- c. Mechanical Fundamentals;
- d. Radiation Control and Safety;
- e. Reactor Instrumentation and Control;
- f. Reactor Theory;
- g. Primary and Secondary Chemistry and Chemistry Control;
- h. Emergency Plan;
- i. Security;
- j. Technical Specifications;
- k. Normal, Abnormal, and Emergency Operating Procedures;
- l. Recognition and Mitigation of Consequences of Accidents Resulting in Severe Core Damage; and
- m. Safety Analysis.

Id. at 4-5.

150. To illustrate the scope of the program, when systems are taught, training includes: (a) purposes of the system and emergency functions; (b) simplified diagram showing the flow paths including instrumentation, interconnections, interlocks, all major components and control-room-operated equipment; (c) automatic actuation signal setpoints, interlock setpoints, and the purpose and function of these signals; (d) alarms associated with the system including the purpose, setpoint, and required operator actions; (e) limits, precautions, Technical Specifications, and, where applicable, the basis (Technical Specifications or the FSAR); (f) brief description of system operation in all modes, including normal system parameters; (g) power supplies to major components; and (h) interrelations and interfaces with other systems. During classroom training, a licensed senior reactor operator (SRO) from the Operations Department is normally assigned to assist the Training Department in candidate training. This SRO provides an additional source of technical plant knowledge for the trainees and assists in counseling when required. *Id.* at 5.

151. The Operations Department is responsible for the conduct of the OJT programs for candidates. Routinely, training instructors conduct audits of candidate progress and knowledge level. Concerns resulting from these audits are forwarded to both Operations and Training. The

OJT training program encompasses the areas of (a) administrative procedures; (b) periodic surveillances; (c) normal, abnormal, and emergency operating procedures; (d) technical specifications; and (e) specific job-related tasks. The length of time of each training period is dependent upon the needs of the specific group of trainees, whose backgrounds are evaluated prior to program commencement. Two training regimens are utilized to provide the students with an intermixed classroom and OJT program. Prior to commencement of the training program, the schedule is reviewed with Operations management to provide concurrence that the training needs of each specific group of trainees is met. *Id.* at 6.

152. UCS elicited the fact that shift supervisors and foremen, who are not required to go through the instructor development program, normally conduct the OJT evaluations. *See* Tr. 32,473-75 (Jordan cross-examination of Leonard, Ross). As Mr. Ross stated, however, these supervisors and foremen have three major qualifications: (1) they have gone through the licensed-operator training program themselves; (2) they are licensed; and (3) they have many years both of exposure to the oral exam process and of hands-on operating experience in the plant. Tr. 32,474, 32,477 (Ross, Leonard). UCS did not identify any skills an OJT evaluator may lack because he has not participated in the instructor development program. TMIA also has addressed the OJT checkout procedure. *See* Tr. 32,639-54 (TMIA cross-examination of Leonard and Newton). TMIA did not identify any shortcomings of Licensee's approach. However, with the concurrence of Operations, Training plans to become more involved with OJT, with instructors assigned on shift to assist the supervisors and foremen in giving checkouts. Tr. 32,642 (Newton).

153. In phase two of the replacement reactor operator program, 3 weeks of simulator training are provided for each candidate at a B&W plant simulator in Lynchburg, Virginia. The training is contracted through Power Safety, Inc. (PSI). PSI is the current contractor for training services at the B&W plant simulator in Lynchburg, Virginia. This training is designed to reinforce classroom and OJT concepts, and to develop the operator's knowledge in integrated plant response. Simulator program content is determined prior to the initiation of the training. PSI has developed a standard 3-week control room operator program which it issues to its customers. Using this classroom and simulator program as a base, the Operator Training and Simulator Training sections of the TMI Training Department develop a more site-specific program. The Supervisor, Simulator Instruction, and Supervisor, Licensed-Operator Training, provide input to PSI regarding topic selection, plant evolutions

and drills, and instructors. Newton *et al.*, ff. Tr. 32,409, at 6-7. The concern of ALAB-772 about simulator training is thus moot.

154. Training conducted by PSI utilizes TMI-1 plant procedures. When candidates are sent to the simulator for training, a senior reactor operator is normally assigned to accompany them. This SRO is responsible for verifying TMI-specific input into the Lynchburg classroom and simulator training. In addition, he evaluates the operators and instructors on their performance. Any deficiencies in operator or instructor performance are discussed with PSI and TMI Operations and Training management. In addition, an operational exam is administered by the Manager, Plant Operations, or his designee at the completion of the 3-week simulator program. Drill scenarios are developed by the Manager, Plant Operations and provided to PSI at the time of each exam. The objective of the operational evaluation is to test each candidate's ability to safely operate the plant through an assessment of the candidate's knowledge of procedural requirements, systems, system response, plant operations fundamentals and integrated plant response. If a candidate fails the operational exam, the Manager, Plant Operations, and Operator Training Manager review the candidate's training and performance record and determine required corrective action.

155. Successful completion of the replacement RO program requires that the candidate:

- (a) satisfactorily complete written examinations with a grade of 80% or better;
- (b) satisfactorily complete OJT checkouts, including "Final Verification" checkouts;
- (c) pass simulator startup certification and an operational evaluation conducted by the Manager, Plant Operations, or his designee; and
- (d) pass a final comprehensive written and oral examination. For the written examination a grade of 80% overall and 70% on each section is required. A grade of "pass" must be achieved on the oral examination.

During classroom training, the status of the candidate is continuously evaluated through weekly written topical tests, on which a passing grade of 80% is required. Reexams are given within 2 weeks for all failures. Failure of a second written test requires the Manager, Plant Operations, and the Operator Training Manager to evaluate the student's performance and decide on the corrective action to be taken. *Id.* at 7-8.

156. Checkouts given during the OJT phase must be completed using established guidelines. Each candidate must complete all assigned tasks and receive oral checkouts by two levels of Operations personnel.

The first checkout received is on each task identified on the OJT task sheets. The second checkout, or Final Verification, is conducted by a senior reactor operator and encompasses several related OJT tasks. If a candidate fails to complete the second-level checkout, or Final Verification, the candidate's supervisor will review his performance and recommend corrective action for reexam. If an individual fails the reexam, the Manager, Plant Operations and the Operator Training Manager review the candidate's overall progress and performance and determine the corrective action to be taken. *Id.* at 8-9.

157. A comprehensive oral exam is administered at the completion of the program. The exam consists of an oral board on plant fundamentals and a plant walk-through. Personnel from Operations and Training are assigned to the oral board, which has two or more members. A licensed or certified senior reactor operator is assigned to conduct the plant walk-through. A comprehensive written examination is also administered at the completion of the program. The minimum passing grade for the examination is 80% overall and 70% in each category. If a candidate fails the comprehensive written examination, the Manager, Plant Operations, and Operator Training Manager review the candidate's training and performance record and determine required corrective action. Upon completion of the assigned training program, each candidate must be certified by the Director TMI-1 prior to participation in an NRC reactor operator license exam. *Id.* at 9.

d. Replacement SRO Training

158. The TMI-1 Manager, Plant Operations, TMI-1 shift supervisors and shift foremen and specified TMI-1 instructors participate in the senior reactor operator replacement program. The replacement program accommodates candidates promoted from the reactor operator position, as well as individuals directly seeking an SRO license (direct SRO training) without having been previously licensed as TMI-1 reactor operators. A majority of the candidates for the direct SRO program are Shift Technical Advisors and degreed training staff. This program also accommodates engineers involved in plant support. The SRO replacement programs are normally 6 months in length. *Id.* at 9-10.

159. Each candidate for the senior reactor operator program must satisfy the following qualification requirements:¹⁷

¹⁷ The prerequisites prefaced with an asterisk are for the direct SRO Program.

- *1. Have a high school diploma or equivalency;
- *2. Meet (or will meet prior to SRO license application) current Regulatory Guide 1.8 requirements for the minimum number of semester hours of college level education in designated technical subjects;
- 3. Meet the following experience requirements:
 - *a. Have 4 years of responsible power plant experience. Responsible power plant experience should be that obtained as a control room operator (fossil or nuclear) or as a power plant staff engineer involved in the day-to-day activities of the facility. A maximum of 2 years power plant experience may be fulfilled by academic or related technical training, on a one-for-one time basis. Two years shall be nuclear power plant experience.
 - *b. Three months of performing the duties of the senior reactor operator while under instruction as an extra person in the control room; and
 - c. Have at least 1 year of experience as a licensed operator at TMI-1;
 - d. Have at least an RO license or equivalent military experience at some other plant and at least 6 months at TMI-1, followed by a mock examination to determine capability of completing a TMI-1 SRO replacement program prior to entering the program; or
 - *e. Possess a degree in engineering or applicable sciences.
- *4. Satisfactorily meet the minimum medical requirements for licensed personnel as specified in 10 C.F.R. Part 55.

The Manager, Plant Operations, designates candidates for the SRO program, using the prerequisites outlined above as a minimum. *Id.* at 10-11.

160. The program content for both the replacement and the direct SRO programs is designed to provide classroom, simulator, and on-the-job training in the following areas:

- 1. supervisory course in decision analysis/supervisory development;
- 2. supervisory control room and plant operating experience, directed by specific task assignments and by licensed senior operators;
- 3. reactor theory;
- 4. plant design and operational characteristics;
- 5. plant control systems;
- 6. radiation control and safety;

7. plant transients; and
8. recognizing and mitigating core damage.

Classroom training is conducted in order to emphasize the SRO's role in plant control. Specific schedules are developed for each replacement class dependent on candidate experience. The Operations and Training Departments confer on training schedules prior to issuance to ensure that training needs for each class are met. *Id.* at 11-12.

161. As part of the classroom training, a 3-day training session on Decision Analysis is given to all SROs. Decision Analysis trains individuals (a) to handle complex situations for which written procedures do not exist; (b) to develop a technique to cope with uncertainty, stress, and conflicting information and to make decisions in the face of such circumstances; and (c) to make "good" decisions, i.e., to consider fully and understand the significance of alternatives, and to factor in the most important considerations. Decision Analysis training develops in control room supervisory personnel the tools and sensitivity to make the right decisions under highly adverse circumstances, and to do so in a systematic and thoughtful manner. In addition, each candidate attends six sessions of a special supervisory course. These sessions include instruction on giving recognition to employees, communicating effectively, listening, employee performance and delegation. *Id.* at 12.

162. The on-the-job (OJT) program for SRO candidates consists of day-to-day tasks that involve participation by the SRO candidate in shift-foreman-related activities designed to reinforce classroom study and maximize new learning experiences. The OJT program consists of tasks related to: (1) secondary systems; (2) primary systems; (3) administrative procedures; (4) normal, abnormal and emergency operating procedures; (5) technical specifications; and (6) shift foreman duties. The selection of OJT tasks for the direct SRO program is completed using input from the Operations and Training staffs. The program combines the OJT tasks from the replacement RO and SRO programs, as well as selected tasks from and checkouts on systems listed in the auxiliary (AO) program. Each candidate is examined on these tasks. Final verification checkouts are conducted by shift supervisors on groups of related tasks. This verification serves as a second check. *Id.* at 12-13.

163. As noted previously, simulator training for each SRO candidate is conducted by PSI at the B&W simulator facility in Lynchburg, Virginia. The program content for the simulator training is determined prior to training being conducted by PSI. PSI has developed a standard 2-week SRO program. As with the replacement RO program, the GPU Nuclear Operations and Training staffs use this program as a foundation for the

development of a TMI-1-specific program. The Supervisor, Simulator Instruction and Supervisor, Licensed-Operator Training, provide input to PSI regarding topic selection, planned evolutions and drills, and instructors. A section of the OJT qualification card is designated to be completed at the simulator. Trainees in the direct SRO Replacement Program receive additional simulator training beyond the 2 weeks normally conducted for replacement SRO candidates. The goal of this additional training is to provide training on control panel operation, expose the candidate to an increased number of normal and abnormal plant operations, and complete a startup certification. As in the RO program, a licensed senior reactor operator is normally assigned to accompany the SRO candidates to Lynchburg. This SRO is tasked with providing TMI-1-specific input into the simulator and classroom training conducted for the replacement class. In addition, he evaluates the operators and instructors on their performance during the program. Any deficiencies in operator or instructor performance are discussed with PSI and TMI Operations and Training management. *Id.* at 13-14.

164. At the completion of the program, an operational evaluation is conducted by the Manager, Plant Operations, or his designee. Successful completion of the SRO training program requires that each candidate

- (1) pass all quizzes given during the classroom phase with a grade of 80% or higher;
- (2) complete the OJT portion of the programs, including initial checkouts and Final Verification checkouts;
- (3) complete a comprehensive written and oral examination with a minimum 70% in each section and 80% overall;
- (4) pass a simulator evaluation administered by the Manager, Plant Operations, or his designee; and
- (5) pass a Startup Certification Exam (direct SRO).

As outlined in the RO program discussion, weekly quizzes, OJT checkouts and comprehensive examinations are conducted, and results of examinations and quizzes are utilized to evaluate the competency of the candidate. Upon satisfactory completion of the assigned replacement SRO program, the candidate must be certified by the Director, TMI-1 (Vice President H.D. Hukill) prior to participation in an NRC exam. *Id.* at 14.

e. Requalification Training

165. After having passed the NRC exam and having been licensed by the NRC, each operator is assigned to participate in an ongoing requalification program. The goal of the licensed operator requalification

program is to enhance nuclear plant reliability and safety by maintaining a high level of skill and knowledge in licensed ROs and SROs. The requalification program is implemented utilizing the following interrelated segments: preplanned lecture series; skills training and evaluation; operational review program; and annual examination and evaluation. The operator requalification program is conducted on a cyclic basis so that all program requirements are completed in a period not to exceed 2 years. *Id.* at 15. To ensure that requalification training fulfills its purpose, all operator shift personnel are scheduled on a six-shift work cycle with one of the six shifts dedicated to training. In cases where identified training cannot be completed within the one shift week devoted to training, additional time is scheduled during the operating crews' relief week, or on overtime as necessary to complete required training. *Id.* at 3.

(1) LECTURES

166. The Preplanned Lecture Series consists of two types of lecture programs, the Fundamentals Review Lectures and the Operational Proficiency Lectures. The Fundamentals Review training sessions cover areas in which the knowledge required of a licensed individual is relatively constant. The topics presented in the Fundamentals Review series reflect the results of the annual examinations and the performance of the licensed personnel as evaluated by the Manager, Plant Operations, and the Operations and Maintenance Director, TMI-1. The lecture topics are selected on an as-needed basis from the following list: Theory and Principles of Reactor Operation; Theory and Fundamentals of Heat Transfer, Fluid Flow and Thermodynamics; Features of Facility Design Including Plant Systems; Nuclear Plant Operating Characteristics Including Operating Experience; Plant Instrumentation and Control Systems; Plant Protection Systems; Engineered Safety Systems; Radiation Control and Safety and Plant Chemistry; Applicable Portions of Title 10, Chapter I, *Code of Federal Regulations*; and Fuel Handling. The depth of coverage in each topic addresses deficiencies identified by the annual examinations, as well as those identified by the Operations Training Coordinator, who is the direct liaison for training in the Operations Department. The Operational Proficiency lecture topics are selected to ensure coverage of essential plant operational guidelines and to ensure that operational changes and experiences are integrated into licensed individuals' training. The lecture topics are selected from the following list: Normal, Abnormal and Emergency Operating Procedures and changes thereto; Administrative Procedures, Conditions and Limitations and Technical Specifications and changes thereto; Major Operational Evolutions; Facility

Design and License Changes; Operating History and Problems; Related Nuclear Industry Operating Experience; and Mitigation of Accidents Involving a Degraded Core. The depth of coverage in each topic reflects the knowledge required of the licensed SRO, as does the material for the Fundamental Review training. *Id.* at 15-17.

167. The Preplanned Lecture Series is scheduled on an annual basis. The lecture series is held on a continuing basis with a weekly schedule of lectures designed to be repeated for each shift during its training week. It typically involves up to 240 contact hours of instruction divided among the program topics that are appropriately scheduled throughout the year. All licensed operators are required to attend the Preplanned Lecture Series. Absences are approved in advance by the Manager, Plant Operations, or the Operations and Maintenance Director, Unit 1, and are normally limited to 1 training week per year. Additional absences, unless approved by the Manager, Plant Operations, result in the individual's removal from licensed duties and placement in an accelerated requalification program until such time as the missed material is made up. For each training session of the lecture series, a lesson plan is prepared, reviewed, and approved in accordance with Training Department procedures. *Id.* at 17.

(2) SKILLS TRAINING

168. The Skills Training and Evaluation segment of requalification is conducted so that each licensed operator participates in frequent and varied plant evolutions in order to maintain an acceptable level of skill and familiarity with the nuclear plant systems, controls, and operational procedures. Each licensed individual must demonstrate operational proficiency by participating in reactivity manipulations and plant evolutions, nuclear plant simulator exercises, BPTS exercises, and the plant drill program. To provide proficiency training for normal plant evolutions, each individual participates in plant evolutions on an annual basis. Newton *et al.*, ff. Tr. 32,409, Attach. 4 (list of evolutions). Individual performance during these plant evolutions is monitored and deficiencies are corrected so that satisfactory proficiency is demonstrated. To provide proficiency training in abnormal/emergency plant evolutions, each individual, on an annual basis, participates in training exercises covering plant abnormal/emergency conditions. *See id.* Attach. 5 (list of annual conditions). These evolutions are conducted either at the simulator or during the plant drill program. On a 2-year cyclic basis, each licensed individual participates in training exercises covering additional plant abnormal/emergency conditions. *See id.* Attach. 6 (list of biennial conditions).

Plant drills are conducted in order that each licensed individual actively participates in drills covering abnormal/emergency plant evolutions that are not adequately covered in the nuclear plant simulator training program. They are structured to review or carry out actions required to respond to abnormal/emergency plant conditions. These drills are conducted with the approval of the Manager, Plant Operations, on an individual or team basis and usually involve: reviewing plant procedure steps; identifying actions required to establish stable plant conditions; identifying equipment control locations and functions; identifying expected plant instrumentation and alarm response; reviewing communications necessary to gather information or coordinate team actions; and identifying supplementary actions aimed at mitigating results or causes of plant abnormal/emergency conditions. To maintain these skills, licensed ROs must actually manipulate plant or simulator controls, while licensed SROs may either manipulate or actively supervise manipulation of controls. Reactivity manipulations, plant evolutions, and exercises that are considered in the simulator training program include normal plant evolutions, abnormal/emergency plant evolutions, verification of plant operating procedure adequacy, and demonstration of plant response to conditions identified from nuclear industry operating experiences. Exercises involve multiple failures and/or operator error, and utilization of applicable plant procedures and technical specifications. Individual and operational team performance during the abnormal/emergency training exercises is monitored. *Id.* at 18-21.

169. Each licensed individual completes nuclear plant simulator training sessions involving a minimum of 20 hours of direct interaction with the simulator nuclear plant control panel on an annual basis. Since 1982, lectures by PSI (at B&W, Lynchburg) have contained TMI-specific information, e.g., TMI heatup and cooldown curves, fuel mechanical performance, fuel-in-compression curves, core power peaking, integrated control system failures/operation, emergency feedwater effectiveness, RCP operations guidelines, ATOG and OTSG tube rupture. The content of these lectures is directly under the control of the Operator Training section, which is a significant improvement from the pre-1982 lectures that were provided by PSI as generic topics. *Id.* at 19-20. In developing the simulator training program, the Operations Department works with the Training Department to establish a list of topics for classroom training as well as an outline for simulator drills. At the start of each training cycle, a group of TMI-1 operator instructors and non-shift licensed operators from Operations participates in a prototype simulator training program. The Operator Training section develops

lesson plans and objectives for the classroom program, and the Simulator Development section develops drill sequences and drill guides. The two Training sections work together to ensure that the classroom and simulator sessions provide continuity within the training program. The simulator training program is approved by Operations and Training and sent to Power Safety, Inc., for review prior to its commencement. During the 1983 training cycle, simulator training for licensed operators was expanded to include an additional week of ATOG training and 3 days of steam generator tube rupture training. During the 1984 cycle, there have been 3 additional days of operator proficiency training. In addition to meeting the requirements for skills training participation noted above, off-shift licensed personnel assigned to the Operations Department actively participate in control room operation a minimum of one shift per month. Licensed instructors from the Training Department staff and other onsite licensed personnel actively participate in control room operation a minimum of two shifts per month. During this period, these licensed personnel must assume (actual or under instruction) and perform the duties of the on-shift licensed operator. Failure to meet this requirement on a quarterly basis results in placement in an upgrade program. *Id.* at 20-22.

170. Mr. Ross has an active role in the evaluation of operator performance on the PSI (B&W) simulator. He gives the majority of the simulator examinations for requalifying crews and replacement operators. Tr. 32,619-20 (Ross). Mr. Ross selects the scenarios (which he keeps confidential until the moment of the exam). He then makes the judgment on the overall grade, with input from the PSI instructors. Tr. 32,620 (Ross).

(3) OPERATIONAL REVIEW

171. The Operational Review Program provides a system for on-shift review of selected operational experiences and changes to existing operating guidance or equipment. The program enables continuous updating for on-shift personnel by establishing a means of rapidly disseminating (and acting upon) new or changing information rapidly. Newton *et al.*, ff. Tr. 32,409, at 22. An ongoing system exists to ensure that licensed individuals review documented plant design changes, equipment modifications, procedure changes, and technical specification changes. Selected changes and modifications are analyzed and information pertinent to the basis for the changes and their operational implications is collected and formally transmitted to all licensed individuals

with acknowledgment of review required. Changes to emergency procedures and technical specifications require review by licensed operators. To ensure that operators are kept informed on plant procedure changes, each oncoming shift of licensed operators is required to review a revision book. This process ensures that significant procedure changes are pointed out promptly to the operating crews. *Id.* at 22-23, 64.

172. Training is conducted to incorporate operating experience review from TMI-1 and the industry. Selected operational events and reportable occurrences at the facility are analyzed and information pertinent to the event is collected. Selected operational information from the nuclear industry is analyzed using Licensee Event Reports, audit, evaluation and inspection reports, publications and periodicals covering nuclear industry information, and Nuclear Safety Analysis Center/Institute of Nuclear Power Operation Significant Event Reports. Technical Functions personnel assigned to assess plant operating experience and the Training Department specify operating experience to be analyzed for training purposes. Selected nuclear plant accidents/transients from industry operating experience are analyzed and, where applicable, integrated into the simulator exercises, the plant drill program, or classroom training. The Training Department sets aside between 1 and 2 hours during every 6-week requalification training cycle to cover relevant industry events that have occurred since the previous cycle. Tr. 32,936 (Newton). Additionally, information can also be formally transmitted to all licensed individuals with required acknowledgment of review. Operators are kept abreast of plant modifications first by training handouts generated by Operations management, and later by formal classroom training on these plant changes. This approach immediately informs operators in the field when a system change takes place so they can be aware of its proper operation. Later in their normal requalification training, this material may be presented in a formal classroom atmosphere. *Id.* at 23, 63.

(4) ANNUAL EXAMINATIONS

173. To determine each licensed individual's knowledge of topics covered in the requalification program and provide a basis for determining areas in which retraining is needed, an annual examination is given to all licensed individuals prior to the completion of each annual requalification program cycle. It consists of a written examination and an oral examination. The written examination contains questions covering the topics addressed in the Fundamentals Review Lecture Series and the Operational Proficiency Lecture Series. The examination is structured so that the level of questioning is consistent with the individual's license

level (RO or SRO). Each licensed individual receiving a grade of less than 70% in any examination category or an overall grade of less than 80% is relieved of his license duties and placed in an accelerated requalification program. An oral examination is also administered to licensed individuals. The oral examination contains questions covering many of the following areas: licensed duties and responsibilities of the operating position corresponding to the individual's license level; actions in the event of abnormal conditions; actions in the event of emergency conditions; interpretation of instrumentation responses; plant transient and accident response; plant modifications; procedure changes; technical specifications; emergency plan; plant operating history and problems; and related nuclear industry operating experiences. Oral examinations are conducted by a licensed SRO or an individual who has successfully completed education and training programs required for an SRO license. Each oral examination is structured so that the oral examination is at least 2 hours long; normally, it is considerably longer. The oral examination involves sessions conducted in the plant control room and in plant areas normally entered by individuals whose actions are directed by the licensed operator. A failing overall oral examination grade requires the licensed individual to be removed from his licensed duties and to be placed in an accelerated requalification program. The content of an accelerated requalification or special retraining program is specifically structured to upgrade knowledge and skills identified as deficient. *Id.* at 23-25.

f. Special Training Programs

174. In addition to the regular training program content, certain circumstances call for implementation of special training programs. For example, major changes in plant procedures encompassing Once Through Steam Generator (OTSG) Tube Rupture were implemented in conjunction with the repairs done to the OTSGs at TMI-1. These procedures reflected conclusions and recommendations contained in technical documents that were issued in conjunction with the repairs and that had an impact on the conduct of operations in the event of OTSG Tube Rupture conditions. The significance of these changes and the necessity that each operator be able to operate the plant safely under these conditions dictated that specific training be conducted. A joint effort between Operations, Training and Technical Functions (the technical support organization in Parsippany) produced a training program that was conducted on the B&W simulator by PSI over a 3-day period during the Summer of 1983. The lesson plans, training objectives, and simulator drill guides were developed by Licensee personnel. Each licensed operator received

3 days of simulator and classroom training. A written and operational test was administered at the end of each training program. *Id.* at 33; Tr. 32,855-56 (Ross).

175. The decision by Licensee to develop procedures based on B&W's Abnormal Transient Operating Guidelines (ATOG) resulted in an additional and substantial effort by the company to incorporate the guidelines into the present procedural structure. Extensive man-hours were expended to revise plant procedures, and a special training program was developed to enhance licensed-operator knowledge and skills in support of the procedure change. Since ATOG emphasizes "symptom-oriented" rather than "event-oriented" response, the program was designed to include instruction in this area. The procedural revisions were submitted by a committee consisting of representatives from Operations, Technical Functions and Training. As changes were made, the committee identified topics that would require training. The Training Department used these topics and the revised procedures to develop a training program. A 1-week training program for each crew was conducted by PSI in the first quarter of 1984, which consisted of classroom and simulator training. The lesson plans and drill guides for the training program were developed by Licensee personnel and forwarded to PSI for their use. At the completion of each week of training, each licensed operator took a written test and the crews had an operational exam. Most of the currently licensed operators have satisfactorily completed this special ATOG program; four new licensed operators and one recently SRO-licensed Shift Technical Adviser have completed similar training (although not this specific program). Newton *et al.*, ff. Tr. 32,409, at 33-34, *as modified* at Tr. 32,407-08 (Newton).

176. The licensed-operator training program effectively provides timely training requested by the Operations Department designed to resolve industry problems that are applicable to TMI. An example of this would be a fulfilled Training request for lectures on recovery from mispositioned control rods, which was a recent published industry problem. This responsiveness to current issues is of importance to the operators. Newton *et al.*, ff. Tr. 32,409, at 65. In addition to development of training programs requiring new knowledge and skills, Licensee has made provisions to address the general area of skill deterioration that can result from a prolonged shutdown. To support training needs in this area, two separate programs were initiated. *Id.* at 34.

177. A restart qualification card, developed in 1983, has been designed to be utilized during hot functional testing, zero power testing, and the power escalation test program. The qualification card contains both individual and crew tasks that are to be completed, and is designed

to provide each operator with exposure to specific operational situations. Furthermore, the power escalation test program was designed with hold time periods at 40% and 75% power levels to allow all crews the opportunity to participate in hands-on performance of items identified on the restart qualification card. *Id.* at 34-35.

178. Additionally, based on management's observation of crews during the 1984 ATOG simulator training, Licensee considered it beneficial for the crews to receive additional training on routine evolutions associated with operation at power. A special program was designed to incorporate lessons on startup, power operations and licensee event reports. The lesson plans and drill guides developed by Licensee for these programs were used during a 3-day simulator program in May and June of 1984. Each licensed operator was required to attend. At the end of the training period, a written and operational test was administered. *Id.* at 35.

g. Technical Quality

179. The method for control of the quality of the technical information available to Operations and Training personnel has undergone changes. All lesson plans used by the Operator Training section must be reviewed by Technical Functions to ensure that the information and scope of material being presented to the operators are technically correct. *Id.* at 35-36. A standard reference source document has been created for use by Operations and Training personnel as a teaching and study aid. *Id.* at 36; Committee, ff. Tr. 31,749, at 18; Tr. 32,911-12 (Newton). The Operations Plant Manual (OPM) incorporates technical information from sources such as previous lesson plans, technical manuals, system design descriptions and operating characteristics, into one standard controlled document. The OPM was drafted by GPU Nuclear personnel and reviewed by designated members of Operations, Training and Technical Functions. This nine-volume manual contains 121 sections, only a few of which were still in the review process at the time of the hearings, and addresses areas such as primary and secondary systems, support systems and plant fundamentals. Learning objectives, included in each section, have been written for ROs and SROs. Periodic reviews are scheduled for each section and an owner is assigned to each section to ensure that it is updated to reflect plant conditions. *See* Tr. 33,080-82, 33,422-26, *passim* (Leonard, Ross). Every time an operating procedure is changed, consideration is given to changing the OPM as well and, as applicable, vice versa. Tr. 32,923-26 (Ross, Leonard). Because content of the OPM is controlled, it serves as a current source of technical information for

licensed operators, licensed-operator candidates and training staff. See Tr. 32,908-11, *passim* (Leonard, Newton).

h. Examination Administration

(1) INTRODUCTION

180. As was evident in the discussion of the replacement and requalification training programs, Licensee evaluates its trainees' mastery of training in three ways: written, oral, and simulator exams. The substance of these examination processes was discussed in their respective sections above. The purpose of this section is to address UCS' criticism of the examination construction and delivery methods. Exam security is a separate issue discussed under § III.B.5, *supra*.

181. UCS makes the important point that a variety of tests serves a separate purpose of each type of test validating the other. UCS Proposed Finding 201, *citing* Review Committee at Tr. 31,862-63. Since UCS' major criticism of the training program is that there is no job performance validation of training and testing, any failure of the tests to cross-validate each other would assume major significance. UCS argues that, because there are important weaknesses in the written and oral testing of the licensed-operator training, they can neither validate the respective training nor serve to cross-validate.

(2) WRITTEN EXAMINATIONS

182. Detailed guidelines are now used in constructing comprehensive written examinations conducted at the completion of replacement and annual requalification training. The examinations are based upon behavioral learning objectives. Both informal job and task analyses done by the GPU Nuclear staff and a set of generic B&W task analyses constructed by INPO have been used, with a TMI-1-specific format analysis in progress. Newton *et al.*, ff. Tr. 32,409, at 30-31, 40. The behavioral learning objectives for each specific lesson are developed by subject-matter experts. The subject-matter expert, in this case the instructor, conducts an informal job analysis to determine which knowledge and/or skills are required of the operator in the subject area being taught. *Id.* at 44. In this manner, there is a direct link from the job to the material taught to the examinations administered to the operators. Additionally, the objectives for requalification training are approved by the Manager, Plant Operations, while those for initial programs are derived from those in the Operations Plant Manual which has been reviewed by Operations, Training, and Technical Functions. From this, the instructor formulates

training objectives upon which the lesson plan and examination questions can be developed, if not already done. Approval of the examination includes a review to ensure that the questions reflect objectives presented for the lesson. Review by the Manager, Plant Operations, of the annual requalification examination and comprehensive examinations provides an additional validation process for these examinations. *Id.* at 44-45.

183. The guidelines for examination construction outline responsibilities in exam assembly, exam question coding, exam review and approval, and exam grading. Individuals are designated to fulfill responsibilities as exam writers, exam coordinators, and technical reviewers. Each has specific responsibilities to ensure that the examination reflects the behavioral learning objectives for the material being examined, contains technically correct information, and meets the specification required for the exam. *Id.* at 40-41.

184. A test specification is issued for each comprehensive examination prior to its construction. The specification details the breakdown of points among topic areas to be addressed in the examination, and the breakdown of point values to be addressed in each of the five skill/ability areas for each topic area. The five skill/ability areas that are used to code each question are (1) recall, (2) comprehension, (3) application of rules and principle, (4) analysis, and (5) synthesis. The test specification is determined by the Operator Training Manager, with input from the Supervisor, Licensed-Operator Training. In determining the specification, the objectives used during the training program are utilized, thereby ensuring that the examinations contain the correct coverage in each topic area (e.g., system or fundamental area) and the appropriate skills/abilities. *Id.* at 41.

185. After the exam writer completes his work, the examination is reviewed by the exam coordinator, whose responsibilities are primarily administrative. He assures that questions are submitted in time, that they are typed, and that they are distributed up the chain for review. The exam coordinator is responsible for assuring that the questions have been coded for skill or ability, but he is not responsible for assuring that exam questions are coded correctly. He also performs a quality assurance check. The point of that check is not to assure the accuracy of answers to the exam questions, but simply to assure that the type of answer given by the exam writer is the type of answer called for by the question. Thus, if a question calls for a one-line drawing of a system, the exam coordinator looks to see whether such a drawing is provided, but he does not check the accuracy of the drawing. Similarly, the exam coordinator must determine whether the exam writer has assigned points to

the questions, but he does not review whether the points are correct or incorrect. Tr. 32,498-501 (Leonard).

186. Following the exam coordinator, a technical reviewer is responsible for assuring that the questions are properly worded and technically correct. The final review of the examination is conducted by Mr. Leonard. Tr. 32,502-04 (Leonard).

187. As part of the exam construction process, exam writers may rely upon an exam bank which contains questions from previous examinations. The propriety of using these old questions is determined through the process of exam construction discussed in the preceding paragraphs. Tr. 32,504-06 (Leonard).

188. UCS raises the concern that there is no provision for assuring that questions retrieved from the question bank are currently valid. UCS Proposed Finding 205. Licensee addresses this argument squarely. Licensee Proposed Finding at 140 n.60. The Training Department has a number of means of ensuring that the instructor or reviewer has up-to-date information about the system in order competently to critique extractions from the exam bank: (1) the instructor or reviewer has the responsibility of referring to the Operations Plant Manual, which, as discussed *supra* under Technical Quality, § III.C.3.g, is continuously updated for current information; (2) the licensed instructors stand two shifts a month in the plant to maintain proficiency; (3) the Operations engineering staff circulate summaries of new modifications to all crews, who then receive a briefing from their shift supervisor; and (4) the Training Department places a copy of these summaries into a required reading file for instructors and into a lesson plan folder used for revising future curricula. Tr. 32,908-09 (Leonard, Newton).

189. UCS observes that the Licensee does not code its exam questions for difficulty and argues that, since questions that are either too easy or too difficult cannot validate training, the exam construction process is deficient. UCS Proposed Finding 209. In responding to this charge, Licensee squirms uneasily, and concedes that the exam construction QA process had not functioned perfectly in the example of an easy question presented by UCS' counsel. But then Licensee makes an attempt to recover by urging that the cited example may be useful in reinforcing definitions. Licensee Proposed Finding 187.

190. The Board finds no problem with the absence of formal difficulty-coding. If it should turn out that the question is too easy or difficult, the evaluation process will identify those questions and serve as a feedback to training. But there is another issue not argued by the parties. If a particular point covered in training is simple and easily understood, but

if it covered an important safety matter, somewhere in the testing process it is essential that the trainers determine that the trainees have learned the respective lesson, notwithstanding its simplicity.

191. UCS' next criticism of the examination construction process is its perception that Mr. Leonard resists employing open-ended questions which, instead of eliciting a particular response, would require the trainee to "conceptualize broadly enough to address emergencies for which they have no specific procedures or precedents." UCS Proposed Finding 210, *citing* Tr. 32,506-13 (Leonard, Newton).¹⁸

192. The Board did not find the colloquy cited by UCS to be particularly instructive. UCS' thesis was tested by examples, and clearly Mr. Leonard had trouble with the examples. *Id.* Mr. Newton provided a well-reasoned response: The open-ended question testing a broad conceptualization of various possibilities can be better pursued orally. Tr. 32,513 (Newton). We agree.

193. UCS questions the competence of Mr. Leonard to be the final reviewer of the adequacy of the written examinations. While recognizing some competence in the area of test construction, UCS suggests that Mr. Leonard's subject-matter competence is wanting because of his answer to a sample question in his testimony. UCS Proposed Findings 211-213. However, UCS concedes that the matter is a "relatively minor point," and we agree that it is. The examination questions do not depend solely on Mr. Leonard for their technical accuracy. As we noted above, the Manager of Plant Operations, the Operations Plant Manual, and the Technical Functions Division all have an influence on the subject matter of the questions. UCS' criticism of Mr. Leonard's ability to construct questions depends upon some perceived differences between Mr. Leonard's depositions and his testimony, but we believe that the argument tends to be over-analysis of very little information. UCS Proposed Finding 213.

194. Finally UCS returns to the theme pervading its case that there is no correlation of the results on the examinations with operator competence on the job. *E.g.*, UCS Proposed Finding 215. With the exception of that criticism, which we discuss under Program Evaluation and Feedback, below, the Board finds that the method of preparing the training program written examinations is well thought out and implemented.

¹⁸ In replying to UCS' proposal, counsel for Licensee charges that UCS has mischaracterized Mr. Leonard's criticism of open-ended questions by suggesting that UCS imputes to Mr. Leonard testimony that he wants questions that suggest the correct answer. Licensee Reply Findings Appendix. It is Licensee, not UCS, who has mischaracterized. UCS criticizes only the narrowness of the traditional written examination question.

(3) ORAL EXAMINATIONS

195. Licensee uses oral examinations in both replacement programs and the requalification program. The tests are administered within a complex protocol. For that reason and because of the variety of terms used, the Board found it difficult to follow the testimony.

196. As we have reconstructed the scheme,¹⁹ the first oral examinations are administered during on-the-job training. There the candidate must be examined on his knowledge of each of the OJT tasks at the time he completes those tasks. A reactor operator (RO) candidate may be examined by a licensed RO but a senior reactor operator (SRO) candidate is examined on a particular task only by a licensed SRO. OJT task outlines are used in both instances.

197. The comprehensive final oral examination at the end of replacement training and the OJT program consists of two parts. The first is by a board of two or three examiners and is on reactor fundamentals. The other part is a so-called "one on one" and consists of a "walk-around" or "walk-through" (sometimes also referred to as a "checkout") of the control room and other parts of the plant where licensed operators have responsibilities. The one-on-one walk-through is by a single examiner and covers plant systems operating procedures. Both parts are administered by SROs who are shift supervisors, shift foremen or members of the Training Department. The examiner could also be SRO-eligible and certified but not yet licensed — in which case he is probably a shift foreman. In addition, Mr. Ross, Manager of Operations, usually administers his own walk-through oral examination not required by the guidelines.

198. The requalification orals are also comprehensive but dispose of the board exam by merging the reactor fundamentals part into the one-on-one walk-through. The examiners must be SRO-licensed or SRO-eligible and certified. A pyramid system is used on requalification. Mr. Ross administers the requalification orals to the shift supervisors, who, in turn, administer the exams to the shift foremen. Both supervisors and foremen administer to the ROs on respectively different shifts. Apparently Training Department personnel, even though SRO-licensed, are not permitted to administer requalification oral examinations, as we infer from the pyramid scheme described by Mr. Ross. However, the list of topics to be covered on the requalification orals is made up jointly by Training and Operations. Candidates are scored as "pass," "fail," or "marginal." "Marginal" is a "pass" where improvement is thought to

¹⁹ The source of this reconstruction is, e.g., Newton *et al.*, ff. Tr. 32,409, at 45-46. Tr. 32,532-40 (Newton, Ross, Leonard); Tr. 32,601-18 (Ross); UCS Exh. 30.

be needed. The results are forwarded to the Supervisor of Licensed-Operator Training for review and modification. The results are also used as a feedback for training. However, there is no formal evaluation of job performance compared to oral examination performance.

199. UCS has a lengthy laundry list of criticism of the oral aspects of the licensed-operator testing program. The oral test-givers probably have no training in administering oral examinations. The entire process of oral examinations is riddled with excessive subjectivity according to UCS. The questions themselves, the asking of them, the personality of the test-taker, the relationship between test-giver and test-taker, and the imprecise pass/fail/marginal scoring method all permit too much subjectivity, thus too little reliability in oral examinations. In fact, UCS and its expert witness, Dr. Regan, seem to suggest that oral examinations have no place in the licensed-operator trainee evaluation process. *See* UCS Proposed Findings 221-229; Tr. 32,796 (Regan).

200. Each of UCS' points have some validity. But each point is one side of a coin which, when viewed from the other side, demonstrates very positive benefits from oral examinations. Each weakness in oral examinations has its tradeoff in benefit, and on balance the Board believes that the oral examination process employed by GPU Nuclear is sound.

201. This issue is very important. At the heart of the issue is the purpose of the oral examination. A dichotomy between Mr. Ross, TMI-1 Manager of Operations, and Dr. Regan demonstrates that the two approached the subject with sharply differing premises. Mr. Ross, deeply steeped in subject-matter expertise and very much involved in the TMI examination process, explained:

I think [the oral examination] gives you a unique opportunity, first of all, to do some things that can't be done any place else. It is to go into the plant and see if he truly has an understanding of the equipment.

It also gives you an opportunity not afforded you on a written exam nor applicable when you are in a simulator upset condition to explore avenues where you feel he has a weakness. He has said something that leads you to believe that he doesn't know what he is talking about and on a written exam it may get by. You will say well show me how that is done, or something like that. I think it affords you a unique opportunity to really interrogate the guy and determine the level of his performance as it is applicable to the job.

Tr. 33,067-68 (Ross).

202. Dr. Regan, who has unquestioned qualifications in the area of large-scale training programs, and who openly acknowledges that he knows little about the TMI training program, apparently believes oral examinations in any program have little value. He reasons that they

cannot be very predictive unless they are very specific and standardized, in which event some of the presumed benefits would be lost. Regan, ff. Tr. 33,532, at 16; *see generally* Tr. 33,792-97 (Regan). He recognizes that the structuring of the TMI oral examinations tends to remove some of the problems he sees in orals, but, in the final analysis, he would probably eliminate orals as he explained on cross-examination by counsel for the NRC Staff:

Q If you look at the oral exam at TMI, and in the context of one of three exams; written examination and a simulator examination, does that have any bearing at all on its predictive value, either increasing or decreasing its predictive value, in your opinion?

A No, I wouldn't think so. I guess the question I would be more likely to ask is whether I thought its inclusion in the battery of examinations would increase the battery's predictive value.

And that I think is an important question. If, in fact, it correlates very highly with the outcome of the other two examinations, you have to wonder why it is included at all, because if that were true, it doesn't increase the predictive value of the battery.

On the other hand, if it is quite disparate — in other words, if the outcome of that exam does not correlate with the outcome of the other two components of the exam, it becomes quite interesting for different reasons, because it suggests that the exam is tapping skills and competencies untouched in the other two examination areas, and it becomes an important part of the battery if those skills are relevant to the job, but it generates a whole different set of questions.

Tr. 32,796.

203. In sum we understand Dr. Regan to say that, if the oral exam correlates to written and simulator exams it isn't needed, and if it doesn't correlate, something is wrong with the other two.

204. The Board's view is that UCS' approach to the oral examinations is too mechanical, and in some respects inconsistent with its own arguments respecting written examinations.

205. Mr. Ross' testimony, cited above, demonstrates how the oral examination can be applied to satisfy UCS' demand for open-ended testing — a void perceived by UCS in the written examinations, as we discussed above. Oral examinations permit a logical progression of questions based upon each answer.²⁰ Perhaps a weakness would be suggested

²⁰ The same phenomenon can be observed in this very litigation. No careful litigant such as UCS would be content to rely solely upon written discovery and testimony in a complex hearing. UCS, as much as any party, effectively uses oral depositions and cross-examination to logically build a record. UCS orally pursues permutations and nuances of thought where the same would be virtually impossible in writing.

to the examiner by nothing more than a tentative tone of voice in a logically correct answer — an impossibility in written examinations.

206. Certainly there are weaknesses in oral examinations. We agree with UCS that an articulate test-taker with a congenial personality might fare better than others with equal knowledge. There may be problems of subjectivity arising from the face-to-face contact between test-taker and test-giver. Yet subjectivity has strengths. For example, we appreciate UCS' concern that the pass/fail/marginal method of scoring orals might erode the confidence of outside observers in the objectivity and precision of the oral examinations. But when the oral test-givers are faced with so many variations in the significance in the test items, a great deal of judgmental latitude is necessary. As UCS' Exhibit 30 (a lengthy checklist of oral test topics) illustrates, it would be very difficult to assign standardized weightings to such diverse examples as control room phones and log entries on one end; progressing through modes of heat transfer and power dopplers; then to long-term exposure effects.

207. In the testimony cited above by Mr. Ross, he was explaining why he believes that oral examinations are "useful" in predicting operators' performance. Tr. 33,067. "Useful" is the correct word. Standing alone we would not expect oral examinations to be a sufficient predictor of operator competence and we believe that it has reliable predictive value only as one of the three-part battery of tests. Its most important use is that of a final check on the written and simulator tests.²¹

208. The Board has a high regard for Dr. Regan's opinions and expertise. It was unfortunate that he did not know more about the GPU Nuclear training program (nor would we expect him to). To the extent that his training program principles can be transferred to small but sophisticated programs like the licensed-operator program run by GPU Nuclear, he has thought-provoking ideas. Licensee uses oral examinations as a cross-validator in a battery of tests, and, in effect, as a final filter against incompetence. In contrast, Dr. Regan has little regard for an examination that does not independently predict on-the-job competence. The matter was not explored in depth, however, and we suspect that Dr. Regan would have approved the process by which the Training Department analyzes the results of the oral examinations to improve its written examinations (and, we surmise, the simulator tests). By that process, each of the three tests will become better predictors, and will be

²¹ A good example can be found in a matter of concern to UCS — the treatment of Mr. Olive, a TMI-1 shift foreman. See UCS Proposed Finding 289, *et seq.* In the 1984 requalification training, Mr. Olive passed the comprehensive written examinations, but failed his orals. As a consequence, areas of weakness were identified and a remedial program was established. UCS Exh. 16.

needed less for cross-validation, thereby moving toward Dr. Regan's ideal.

209. In the meantime, however, the Board finds that the TMI oral examination process is well structured and logically executed. We agree with UCS that objectivity is desirable. However, since the oral examination is the best opportunity for close and progressive communication between trainee and the test-giver, we would not want excessively standardized and objective testing procedures to interfere with the probing inquiries by the best subject-matter experts. This is important even to the point of preserving the opportunity to pursue areas of intuitive inquiry.

210. Finally, there is a point overlooked by the parties and their witnesses, i.e., the oral examination is another safeguard against cheating on the written exams.

(4) SIMULATOR EXAMINATIONS

211. The use of simulator training in all phases of Licensee's operator training programs has been described in many of the foregoing discussions in this section. None of the parties challenges the propriety of this training. However, in its Proposed Findings 232-235, UCS questions the adequacy of the simulator examination process largely because it involves primarily Operations (rather than Training) personnel who may not have had formal training in exam administration, and because UCS does not have sufficient information to critique the extent to which simulator examinations can contribute to validating the examination process as a whole. UCS Proposed Finding 235.

212. Unlike UCS, we find strength rather than weakness in the heavy participation of Operations personnel in the administration of simulator examinations. For it is the assessment by Operations of the strengths and weaknesses of persons being qualified or requalified with respect to operator fitness that provides confidence as to those persons' abilities to run the plant properly and safely, an assessment better made by operators than by instructors.

213. While we can agree with UCS that Licensee could have provided more detailed evidence about the administration (and grading) of simulator examinations, we note that UCS did not pursue this matter during cross-examination and did not allege any substantive inadequacies. To the contrary, UCS found that, except for the shortcoming mentioned above, the simulator examinations may provide some job performance benchmark. UCS Proposed Finding 240.

i. Trainee Evaluation — Three Case Histories

(1) INTRODUCTION

214. Three licensed employees, Mr. Olive, a Senior Reactor Operator (SRO) shift foreman, and Messrs. Moore and Walsh, both Reactor Operators (ROs), had difficulties in training but Licensee kept them in the program anyway. UCS argues that Licensee's decision to keep them indicates a tendency to err in favor of economic interests (in order to preserve the investment in employees) and to give undue weight to their personal interests rather than to safety. Because of the excessively subjective nature of the training program, the treatment of these individuals is, in UCS' view, intolerable. UCS Proposed Finding 281.

(2) CASE NO. 1: MR. OLIVE

215. Mr. Olive is today a licensed SRO shift foreman. Early in 1982 he had failed in an attempt to obtain an SRO license but by October 1982 he was rated as having a good background and had the ability to do a foreman's job "right." He was noted as needing improvement in interpersonal relationships and in the allocation of his time. UCS Exh. 11. In 1983, he had improved his relationships with the crew and his technical knowledge was rated as good even though he had failed a weekly quiz. UCS Exh. 12.

216. By 1984, Mr. Olive had received his SRO license but we don't know when. In March 1984, he passed his Cycle 10 requalification written exam. However, he failed his Cycle 10 oral exam. Tr. 32,963 (Leonard); UCS Training Exh. 16. In accordance with the requalification procedure, Mr. Olive was immediately removed from licensed-operator duties and placed in a specially designed self-study upgrade program. Tr. 32,964 (Leonard).

217. Mr. Olive followed the program, but in April 1984, he again failed his oral examination before a board. After reviewing the oral reexam results, the Training Department designed for Mr. Olive a more detailed and structured program consisting of requalification training lectures, checkouts on shift from SROs, practice oral examinations, attendance at emergency director training, and a final oral board, which he was required to pass. Tr. 32,965 (Leonard). The situation had become so serious that TMI-1 Vice President Mr. Hukill warned Mr. Olive that it was essential that Mr. Olive pass this exam or he might lose his SRO license. UCS Training Exh. 9. Mr. Ross assigned a supervisor to personally oversee Mr. Olive's training. Personnel from Training also monitored the program. Mr. Olive passed his second oral reexam and was re-

turned to licensed duties. Tr. 32,965-66 (Leonard). However, specific weaknesses revealed on the board exam and during requalification training required further upgrading. The Training Department therefore developed an additional 6-month upgrade program, including checkouts on systems and procedures. Tr. 32,966 (Leonard). The Board regards this as a marginal pass.

218. Meanwhile Mr. Olive has been performing his shift foreman duties and completing his Cycle 84 requalification requirements. His recent grades on his Cycle 84 weekly tests — 96.7, 86.7, 95.49, 97.5, 89.9, and 91.8 — indicate that Mr. Olive has performed well on his requalification and upgrade program. Tr. 32,967-68 (Leonard).

219. Mr. Ross has no hesitation about keeping Mr. Olive on as a member of his Operations Department. Tr. 32,968 (Ross). He testified that Mr. Olive had 8 years of Navy nuclear power experience before joining GPU Nuclear as an auxiliary operator. In the Navy, he served a full 3-year term as a prototype instructor. Tr. 32,450-51 (Ross).

220. Mr. Ross, who served on both of Mr. Olive's reexam boards, suggests that one reason for Mr. Olive's difficulties on his oral exams was that he was off shift and therefore away from the control room and daily shift duties. Also, Mr. Olive apparently had serious family-related concerns at the time of his oral exam difficulties. Tr. 32,968 (Ross).

221. When asked to justify keeping Mr. Olive on the operating staff, Mr. Ross explained:

I think any time you have an employee, besides having the responsibility to provide qualified operators and safe operators, we also have a responsibility to the employee.

This particular employee had an extensive background in proven operation, and proven supervision. We felt he had some personal problems that perhaps intervened at this time, and we felt he rated another chance.

We have an investment in an employee that is very hard to replace. So, we would like to keep an employee long term. We like to keep a guy in the operations staff for fifteen years.

Tr. 32,449 (Ross).

222. Licensee points to the first portion of Mr. Ross' testimony for the proposition that retaining Mr. Olive was a sound decision. UCS argues from the final paragraph that the decision was "strongly influenced by the desire to minimize costs and maximize convenience for the company." UCS Proposed Finding 276. UCS also believes that there was excessive concern for Mr. Olive's personal problems and that training resources should not have been expended on him. In effect, according to UCS, there was no justification for keeping Mr. Olive. UCS Proposed Finding 275.

(3) CASE NO. 2: MR. WALSH

223. In January 1983, Mr. Walsh failed the company-administered mock NRC exam required by Licensee (but not by the NRC) prior to certification. Tr. 32,624-27 (Ross, Leonard); UCS Exh. 21. However, he subsequently passed that exam in May, and passed his NRC RO license exam on the first try. UCS Exh. 22; Tr. 32,627, 32,659 (Leonard). Mr. Walsh also failed one of four sections of his March 1984 requalification exam. UCS Exh. 23; Tr. 32,625-27 (Ross). Licensee's procedure required that Mr. Walsh be immediately removed from licensed duties and placed into an accelerated upgrade program. Tr. 32,627 (Leonard). Mr. Walsh then passed a reexamination. *Id.*

224. UCS argues that the case of Mr. Walsh raises a concern similar to the concern in the case of Mr. Olive. UCS Proposed Finding 278. Presumably therefore UCS would have eliminated Mr. Walsh from licensed duties although that argument is not specifically made. *Id.*

(4) CASE NO. 3: MR. MOORE

225. Mr. Moore failed a mock NRC exam in January 1983 (UCS Exh. 24), another early in February 1983 (UCS Exh. 25), but passed one later that month (UCS Exh. 26). The case of Mr. Moore would be no different than that of Mr. Walsh except that UCS urges the Board to delve into the underlying reasons for Mr. Moore's two failures. UCS Proposed Finding 279.

226. Mr. Ross testified that Mr. Moore's problem with written examinations was that he read the questions carelessly. By contrast, during oral questioning, with an opportunity to interact, the test-giver could stop him from misunderstanding the question and Mr. Moore could then provide the correct answer. He had no knowledge deficit. Tr. 32,631-32 (Ross). Mr. Ross later explained that Mr. Moore, a very intelligent person, sometimes reads into questions more than is intended by the question, and goes off into tangents. Even so, he possesses the knowledge to go onto tangents. He follows instructions quite well. Tr. 32,963 (Ross).

227. UCS argues that, while it cannot be determined whether the problem is so serious that Mr. Moore should be dismissed as a reactor operator, it is troubling to have someone in the control room who has difficulty in understanding written procedures. UCS Proposed Finding 280. Licensee counters by pointing to Mr. Moore's successful performance during the last two requalification programs where his grade average was roughly 90%. Tr. 32,961 (Leonard).

(5) CONCLUSIONS

228. It will be seen below that the Board disagrees with UCS on almost every point about these case histories. The Board agrees most wholeheartedly with Mr. Ross, in the testimony cited above, that keeping Mr. Olive in the training program as a matter of fairness to Mr. Olive was an appropriate consideration. Moreover, even from a purely financial viewpoint, it is appropriate and rational for Licensee to try to preserve its investment in employees. Most importantly, we believe that the company goal of trying to keep operating staff for a long time — 15 years according to Mr. Ross — is a very sound management objective, and is altogether consistent with safety. It is worth a strong effort.

229. UCS has argued that it was a waste of training resources to keep Mr. Olive in the program given his exam failures. The record cannot tell us everything about the potential value of Mr. Olive to the operating staff, but given the fact that he ultimately became a competent SRO shift foreman, UCS' argument loses much of its force. Of course, management did not know that Mr. Olive would succeed when the decision was made to keep him in the program, and in fact, a very substantial amount of resources was expended on that gamble.

230. We do not know how long Mr. Olive has worked for Licensee. As noted above he had 8 years experience in the nuclear Navy and, by 1982 was already SRO-eligible at TMI. Therefore, assuming a normal tenure as auxiliary operator and RO before 1982, Mr. Olive probably had at the beginning of 1984 some 12 to 14 years nuclear experience, perhaps more. That is a valuable asset to safety that is not easily replaced. The decision to keep Mr. Olive in the program was, in the Board's view, good practice from every perspective.

231. The case of Mr. Walsh should not have been brought up. He failed two NRC mock exams — so what. One of the most important purposes of those exams is to cause failure in order to identify areas of required improvement. If no one failed training exams unless he were in fact incompetent, the examinations could not be an effective formative evaluator for training improvement and personnel development.

232. Another theme running through UCS' arguments seems to be that *marginal* trainees, such as Mr. Olive, are in fact *falling* employees and should be removed. This reasoning ignores the very purpose of having a margin — to permit something more than a crude pass/fail evaluation. There is always a margin of course. To follow the argument to absurdity, if each marginal trainee were deemed a failure, then the margin would move up the scale until the most competent fail.

233. The case of Mr. Moore is very similar to Mr. Walsh's case — two failures, then success. But we agree with UCS that Mr. Ross' de-

scription of Mr. Moore's propensity to read "black" where "white" is written and to go off onto tangents is somewhat disconcerting. Yet, within our own experience, it is not unusual for persons, especially "very intelligent" people, as Mr. Moore is said to be, to impute to the exam writer greater thought content than was intended. We have no more information than that provided by Mr. Ross about the seriousness of the problem, but given the fact that Mr. Moore has been able to score consistently well on requalification examinations since his failures, we may assume that either he has come to realize the nature of the questions or that the problem was not disabling in the first instance.

234. In analyzing the three case histories offered by UCS, we have made no attempt to determine by direct evaluation of test results that the involved individuals are in fact competent. Our conclusion is simply that the TMI training and operating staff handled the matters appropriately. Since this remand is about the effectiveness of training, and not on operations, the debate about keeping Messrs. Olive, Walsh, and Moore on the Operations staff was somewhat of a digression. As a training consideration, the Board accepts the finding proposed by Licensee's counsel:

[C]onsistent performance by a superb student probably says more about the student than the program, but improved performance by a student who began with difficulties reflects highly on the efforts of the Training and Operations Departments.

Licensee Proposed Finding 152.

4. Program Evaluation and Feedback

a. Introduction

235. The fifth INPO element for training programs would require evaluation and revision of the training based upon the performance of the trained personnel in the job setting. Licensee does not use periodic, formal on-the-job operator performance evaluations for training revision or for any other purpose after initial on-the-job training. This fact has been the basis for the most intensely disputed aspect of Licensee's training program, especially by UCS. The Board believed that the record was inadequate on the issue and called for additional information from the parties.²²

²² See Tr. 33,540-67, transcript of telephone conference with the parties, March 13, 1985, where the Board invited supplemental responses to UCS Proposed Findings 283-287. In response the parties
(Continued)

236. Below we find that UCS has prevailed on this issue. The Board will require a license condition correcting the void in Licensee's training program.

b. Discussion

237. We begin by returning to the fundamental point of the entire training program. Correctly or incorrectly, there is an assumption that operator performance and training need to be improved or at least validated. This premise is inherent in Licensee's initial approach to developing its training program. It begins with an analysis of *required* operator performance, not actual operator performance. In other words, the training program seeks to train personnel according to how they should operate the plant, not according to how it is operated.

238. The Board had no difficulty in recognizing the logic of the five INPO elements for qualifying nuclear power plant personnel.²³ Although they are new to NRC policy, they are familiar concepts and are not limited to training programs. They would be useful in almost every undertaking requiring more than the most simple planning. These concepts may be applied subconsciously, perhaps, and one or more of the steps may sometimes be unnecessary. But, by and large, the concepts are essential to complex developmental endeavors.

239. Whether one is building machines, organizations, or training personnel, the sequence is about the same. The performance requirements are identified, a corresponding design is created, the building process is implemented according to the design, followed often by interim and final inspections. At the end of the process, one would almost always want empirical demonstration that the product performs as designed and as required, i.e., to see if it runs right. This step, or its equivalent, is desirable to determine whether the job has been completed

filed: Licensee's Supplemental Proposed Findings of Fact in Response to the Proposed Findings of UCS (¶¶ 283-287), March 15, 1985; Commonwealth of Pennsylvania's Supplemental Brief in Response to the Proposed Findings of UCS (¶¶ 283-287), March 22, 1985; NRC Staff's Supplemental Proposed Findings of Fact in Response to UCS' Proposed Findings ¶¶ 283-287, March 22, 1985; UCS' Reply to Licensee's Supplemental Proposed Findings of Fact in Response to the Proposed Findings of UCS (¶¶ 283-287), March 22, 1985. *See also* Licensee's Proposed Findings 195-208.

²³ To keep the five INPO elements fresh in mind, they are repeated here:

- systematic analysis of the jobs to be performed
- learning objectives derived from the analysis which describe desired performance after training
- training design and implementation based on the learning objectives
- evaluation of trainee mastery of the objectives during training
- evaluation and revision of the training based on the performance of trained personnel in the job setting.

March 14, 1985 Policy Statement at 3-4.

and if the design, implementation and inspection processes need adjusting.

240. The Board approached the performance feedback issue with almost an intuitive feeling that there should be some type of systematic, empirical process at the end of the training program to determine how well the operators actually perform — as compared to how well they are predicted to perform by examinations and simulator exercises. Yet, if all of the other steps have been effective, there is no need for a final performance evaluation. To impose a requirement simply because it is traditional, or because it is comforting, would be counterproductive, and in any event, beyond our authority. Licensee maintains that there are adequate performance evaluations and equivalencies. We have examined them very carefully.

(1) TRAINING ASSESSED AGAINST REQUIRED PERFORMANCE

241. Required performance is the beginning and end of the GPU Nuclear training program development cycle. It is defined by Licensee roughly as the ability to respond individually and as a team to a wide variety and range of scenarios and events both recognizable and unanticipated. Licensee's Supplement at 2-4. The training program is "performance-based" because it is designed to required performance. Actual performance is said by Licensee to be routine daily (or even monthly and yearly) on-the-job performance. It tells too little about training. Therefore one cannot simply compare actual performance against required performance as the sole training validator.

242. As we have seen in earlier sections, required performance is analyzed into jobs, tasks, and sub-tasks. Behavioral learning objectives are derived from that analysis. In turn, the training and examination processes are designed from the learning objectives. *See, e.g.*, Licensee's Supplement at 6.

243. In resisting the argument for actual job performance evaluations, Licensee depends most heavily on the validity of the entire training structure, beginning with the assumption that required performance has been correctly identified. Since this remand concerns operator training, not operator performance, that assumption is a fair one. However, greater illumination might have been cast on the training issue if there had been a better understanding of how required performance is identified for training purposes. Much of it necessarily depends upon pure technical analysis, i.e., how to run the plant machinery according to its design. Other aspects of required performance, we know, have been observed from industry and TMI operational experience. To the extent

that the latter is the case; there has already been a certain amount of general operation feedback into the training program — very valuable feedback at that.

244. While the Board agrees with Licensee that it has developed a sound training program based upon its required performance-based methodology, we believe that Licensee has seriously begged the question when it repeatedly points to the various features and cross-validations in its training and examination programs. *E.g.*, Licensee's Supplement at 11-12. All of it depends upon the adequacy of each building block: accurate identification of required performance, correct identification of jobs, tasks and sub-tasks, correct development of behavioral learning objectives and so on through final examinations. While the record is as complete as it should have been, we cannot find from it beyond doubt that each step in the development and implementation of the training program has been flawless. Therefore, if formal evaluation of operator performance in the job setting would be instructive, that option should not be rejected.

245. However, we must first consider the actual, informal observations of operator performance on the job and the feedback of those observations into the training program to determine whether additional, formal evaluations are needed or would be worthwhile.

(2) TRAINING ASSESSED AGAINST ACTUAL PERFORMANCE

246. Though not formal, there are several methods by which the actual performance of operators may be considered in developing the training program. Operations personnel are very heavily involved in the training functions. Their collective experiences in observing actual operator performance in the job setting are thereby brought into the training program. For example, Operations management approves training programs, schedules, and program content, including, most importantly, the behavioral learning objectives, prior to requalification training. *Newton et al.*, ff. Tr. 32,409, at 36.

247. The Operations Plant Manual is the basic document for operations and for the behavioral learning objectives. It was developed in part and maintained primarily by Operations personnel. As one might expect, the Technical Functions Division has a large role in identifying analyzed required performance objectives, but Operations has important responsibilities for assuring that observed performance requirements are represented in the Manual. Each Manual procedure has an "owner" in the Operations Department, which "owner" is responsible for the re-

spective actual procedure. Tr. 32,924-25 (Ross); Tr. 33,422-26 (Leonard).

248. At the end of each week of requalification training, the shift foreman or supervisor meets with supervisory personnel from the next shift and with Training Department managers to comment on the past week's training and to suggest improvements. Review Committee, ff. Tr. 31,749, at 23. As the Board noted in the section on Requalification Training, the Operational Review Program with the participation of Operations Department provides for the dissemination through training of new or changing information both from TMI and the industry. See § III.C.3.e, *supra*.

249. Each year a team made up of operations and training personnel, reporting to their respective managers, conducts an audit of the RO, SRO and Requalification Training program. Newton *et al.*, ff. Tr. 32,409, at 48-49. Also, we have observed the very close cooperation between the Operations Department and Training Department in the cases involving the training needs of Messrs. Olive, Moore and Walsh. See § III.C.3.i, *supra*. Licensed personnel from the Training Department must serve a minimum of two shifts per month in control room operation. Newton *et al.*, ff. Tr. 32,409, at 22.

250. The foregoing examples of cross-fertilization between training and operational programs demonstrate that there are very significant opportunities for the actual job performance of operators to be evaluated and for the training program to be revised accordingly. The Board would expect that Licensee's Training and Operations personnel take full advantage of their opportunities informally to evaluate on-the-job performance and actually do so.²⁴ Further, we surmise that they do in fact modify the training program as a consequence. That is one reason why they function as they do.

251. There are several things we do not know about the arrangement, however. We do not know to what extent the Operations management actually informally observes operators' performance on the job. Much of the information employed by the Operations Department is analyzed operational requirements relying upon the technical analyses of the Technical Functions Division and plant engineers. Therefore the

²⁴ We are not entirely free of doubt on that score, however. TMI-1 Operations Manager, Mr. Ross, testified that evaluations are an area of sensitivity with the union. If the union perceived that an evaluation of operators was an intimidation process, it would resist or stop the evaluation. To avoid antagonizing the union, and because of the availability of other evaluation methods, Mr. Ross clearly does not favor formal on-the-job performance evaluations. Tr. 33,420-21. This is an unfortunate state of affairs. The nuances of the problem are beyond our ken. We would expect, however, that an NRC-imposed performance evaluation requirement could not be perceived as intimidation, and that this decision and the Commission's Policy Statement should clear the air on the matter. See also note 26, *infra*.

quantity of observed on-the-job operator performance evaluation is unknown. Even accepting the reasonable assumption that there is a substantial amount of informal on-the-job operator performance evaluation underlying the feedback into the training program, we do not know how reliable or how complete the evaluation is. In discussing Licensee's reliance on oral examinations, we supported the idea that even intuitive probing of trainees had its important value. Similarly we believe that the informal subjective and judgmental evaluations of on-the-job operator performance by Operations management is very useful for training revision. But we are not faced with choosing between judgmental, informal operator evaluations, and formal periodic on-the-job performance evaluations. We can have both, and both should be employed if useful.²⁵

(3) USEFULNESS OF OPERATOR PERFORMANCE FEEDBACK

252. As noted, Licensee's principal argument against formal operator evaluation is that there is a disparity between the mundane, monitoring responsibilities of the operator's routine performance and the job for which he or she is trained, which is to react to a large range of scenarios and events. In Licensee's view, routine on-the-job performance evaluations would not provide a meaningful measure of the effectiveness of training. *E.g.*, Licensee's Supplement at 4.

253. There are several responses to this argument. First, no one proposed that routine on-the-job performance evaluation be a substitute for other training validators. Second, as noted by the NRC Staff, operators must be trained in routine operations so that their control of the plant does not lead to abnormal situations, and, therefore, evaluations of routine activities should be a part of the process. Staff Supplement at 9. Third, UCS questions whether even normal operation of a nuclear power plant is the mundane, monitoring type of activity characterized by Licensee. UCS Supplement at 6-7.

254. Other than the summary characterization of routine operation by Mr. Ross in this proceeding, there is no evidence concerning the routine requirements of normal reactor operation. UCS cites information, not in the record, to the effect that there is an average of about 5 to 6.5 scrams per year for each U.S. light water reactor. UCS also points out that there would be one or two planned shutdowns and startups per reactor per year. UCS Supplement, n.2. The Board need not find that UCS'

²⁵ Licensed personnel holding supervisory positions are formally evaluated annually and any problems are reviewed on a 6-month basis. Tr. 32,589-90 (Ross). It is not clear, however, that the evaluations are suitable as a training validator.

data are complete or entirely accurate to conclude that, even in routine operation, there are frequent occasions to move from normal to abnormal operation.²⁶

255. A curious aspect of the dispute among the parties concerning the usefulness of performance evaluations is that it has focused almost entirely on the utility of evaluations during *normal* operations. The Board's first impression as we initially approached this issue was that, perhaps routine operation of a nuclear plant would not provide useful training information, but that there should be a formal preplanned procedure in place for methodically evaluating the performance of individuals and teams during abnormal events. If training is directed to abnormal operation, as Licensee contends, the opportunity to validate that training by evaluating performance during abnormal operation should not be neglected.

256. As a consequence of the lessons learned from the TMI-2 accident, and in obedience to a condition imposed by this Board (LBP-82-56, *supra*, 16 NRC at 581-82), Licensee maintains in its Technical Functions Division a system to incorporate operating experience review from TMI-1 and the industry. Selected operational events and reportable occurrences at the facility are analyzed and information pertinent to the event collected. Technical Functions personnel assigned to assess plant operating experience and the Training Department specify operating experience to be analyzed for training purposes. Newton *et al.*, ff. Tr. 32,409, at 23; Tr. 32,934-36 (Newton).

257. It is possible that any operational event analyzed at TMI and in the NSAC/INPO LER²⁷ program which involves significant operator action would include an evaluation of the respective operator performance. Perhaps there is no need for any additional, formal operator performance evaluations in abnormal operation, but the record is not complete on this score. Since one of the purposes of the NSAC/INPO LER evaluation program is to identify and modify required operational performance, a comparison of *actual* operational performance against preexisting and proposed *required* operational performance is a logical step to complete the process, if in fact the process is not now complete.

²⁶ The Commonwealth of Pennsylvania makes the additional argument that evaluation of routine operator performance would be useful to properly supervise operators' conduct, citing, for example, the TMI-2 leak-rate testing episodes. Commonwealth Supplement at 2. This may be true, but it is a matter beyond the scope of the remanded hearing and beyond our jurisdiction. The Board, however, believes that it is important to report that the union contract with the TMI operators prohibits job evaluations for the purpose of job actions. Tr. 33,420 (Ross). Performance evaluations for training revision are not prohibited. Licensee Supplement, n.13; *see* note 24, *supra*.

²⁷ Nuclear Safety Analysis Center/Institute of Nuclear Power Operations License Event Reports.

c. *Conclusion*

258. The Board concludes that the TMI licensed-operator training program needs improvement because it does not provide for the evaluation of its trained personnel in the job setting for the purpose of validating and revising its training program. The Board will impose a license condition that formal, written on-the-job evaluations of operator performance both during normal and abnormal operation be conducted.

259. The Board, however, is uncertain about the manner in which this requirement should be imposed. The requirement should be effective but the license should not be laden with any unnecessary detail. The matter has been litigated by UCS and the Commonwealth in terms of finding the training program inadequate, and not in terms of correcting it. Yet UCS' identification of the program void was an important factor in imposing the requirement. The Staff, viewing the matter as a remedy item, simply recommended that the Board impose a license condition requiring "written, on-the-job performance evaluations for the job of control-room operator." Staff Supplement at 11. Apparently the Staff is prepared to fashion and impose an appropriate license condition.

260. The notice of hearing in this proceeding delegates to the Director of Nuclear Reactor Regulation the determination of satisfactory completion of the actions required as a result of the adjudication. However, the Licensing Board is authorized to approve or disapprove of the adequacy of those measures. CLI-79-8, *supra*, 10 NRC at 148.

261. It is a close question whether the matter should be left to the Staff for implementation or whether the Board should approve the adequacy of any license condition to be imposed as a consequence of this order. In view of the fact that this is a novel situation and because it was a contested issue, we have decided to retain jurisdiction for the sole purpose of approving or disapproving the terms of the license condition as set out below in our Order, § V, *infra*.

262. The Board previously reported to the Commission that any order imposing an operator evaluation condition would be considered a long-term requirement within the meaning of the notice of hearing (CLI-79-8, *supra*, 10 NRC at 148). *See* Licensing Board Response to CLI-85-2, LBP-85-10, April 11, 1985. After a thorough review of the matter, we reaffirm that determination. Licensee should begin preparing for the evaluation but implementation need not precede restart.

5. INPO Accreditation — Commission Policy Statement

a. Introduction

263. At the time of the hearing Licensee was seeking accreditation of its licensed-operator training program and other training programs from the Institute of Nuclear Power Operations (INPO). After the close of the record, INPO, on February 28, 1985, accredited the program for licensed operators.²⁸

264. The purpose of the INPO accreditation process is to assist member utilities in developing training programs that will provide well-qualified, competent personnel. To obtain accreditation, a utility must demonstrate that its training meets the INPO accreditation criteria. Newton *et al.*, ff. Tr. 32,409, at 65-66. The INPO accreditation process consists of three major parts: (1) accreditation self-evaluation conducted by the utility and resulting in a self-evaluation report submitted to INPO in a prescribed format;²⁹ (2) accreditation team evaluation conducted by peer evaluators from INPO and other utilities and resulting in an accreditation team report;³⁰ and (3) accreditation decision by the INPO Accrediting Board.³¹ The accreditation is for a period of 4 years, requiring an interim 2-year review and update. Licensee intends to maintain the accreditation. Long and Coe, ff. Tr. 32,202, at 43.

265. INPO criteria for training addresses the program (content and trainee evaluation and qualification methods), the process (organization and administration, resources and facilities, and program development

²⁸ See letter from Ms. Bauser to the Board, March 4, 1985, attaching letter from INPO President dated February 28, 1985. Licensee has requested the Board to take official notice of the INPO accreditation pursuant to 10 C.F.R. § 2.743(i)(1). The parties were notified of Licensee's request by Licensee's Comments dated March 28, 1985. No party objected to taking official notice of the *fact* of the INPO accreditation, which fact is not in dispute. It is the *effect* of the accreditation which remains in issue. Accordingly the Board officially notices the facts set out in the February 28, 1985 letter from INPO President Zack Pate informing GPU Nuclear that the INPO Accrediting Board has awarded accreditation for four training programs including the licensed-operator program.

²⁹ The self-evaluation is conducted based on the INPO accreditation criteria and a comparison of the utility's training programs to training and qualification guidelines issued by INPO for these specific programs. Newton *et al.*, ff. Tr. 32,409, at 66.

³⁰ The accreditation team is composed of a group of peers with collective expertise in nuclear power plant operations, nuclear utility training, instructional processes, and training evaluation. During the visit, the team interviews training and other personnel; observes training activities, examines facilities, equipment, and training materials; reviews instructor qualification procedures; and examines training program content and training records. It reviews the conclusions of the Self-Evaluation Report and provides an independent check on its thoroughness, and evaluates how well the training programs meet the related INPO accreditation criteria and compare against the state of the art. The team then prepares a report. The utility submits a written response to the report providing clarification and describing any corrective actions taken, if required. The accreditation team report and the utility's response are submitted in a joint report to the INPO Accrediting Board. *Id.* at 67.

³¹ The Accrediting Board consists of five members: two persons from INPO member utilities, one person from a nonnuclear industrial training organization, one person from the post-secondary education community, and one person recommended by the NRC. *Id.*

and implementation), and the training staff (size and workload, qualification, and development and evaluation). Newton *et al.*, ff. Tr. 32,409, at 66.

266. On March 14, 1985, the Commission issued its Policy Statement on Training and Qualification of Nuclear Power Plant Personnel. 50 Fed. Reg. 11,147 (Mar. 29, 1985). The Policy Statement endorses the INPO-managed training accreditation program and, in particular, endorses the five elements of the accreditation program as essential to acceptable training programs. Slip Statement at 1, 3-4. The Policy Statement states, however, that "it remains the continuing responsibility of the NRC to independently evaluate . . . implementation of improvement programs to ensure that desired results are achieved." *Id.* at 1.

267. On March 20, 1985, the Licensing Board issued a Memorandum which forwarded the Policy Statement to the parties and which provided to the parties an opportunity to comment on the effect the Policy Statement should have on the Board's partial initial decision on the training issue. The Board particularly invited the parties to comment on the five elements of the INPO accreditation program. Each of the parties filed comments.

268. Licensee commented that the INPO accreditation ought to constitute *prima facie* evidence of an adequate training program, thus shifting the burden to the parties to establish program inadequacies.³² UCS commented that the Policy Statement should not affect the remanded proceeding for any purpose.³³ UCS would not even have the Board rely on the five INPO elements for training programs even though, as UCS acknowledges, the fifth element favors UCS' position in this case. Comments at 2-3 n.1. As to Licensee's "*prima facie*" argument, UCS responds that UCS had no way of knowing that the INPO accreditation and the Policy Statement would have been advanced as dispositive of the issues (UCS Reply at 11 n.6) and, even if the accreditation were to be accepted as *prima facie* evidence of program adequacy, that evidence is refuted by other evidence. *E.g.*, UCS Reply at 13.

269. The NRC Staff commented that the Board may look to the Policy Statement for guidance as to what an acceptable training program should contain, but that the INPO accreditation does not automatically establish that the training program is acceptable.³⁴

270. The Commonwealth of Pennsylvania commented that the INPO accreditation may not be a *prima facie* showing because there was

³² Licensee Comments dated March 28, 1985, at 4.

³³ UCS Comments dated March 28, 1985, and UCS Reply to Licensee's Comments dated April 5, 1985.

³⁴ Staff Comments dated April 5, 1985, at 4, 5.

no notice and litigation of the accreditation. The Commonwealth did not accept the Board's invitation to comment on the effect of the five elements of the INPO program although it refers to them.³⁵

271. In contrast to UCS' position, Intervenor TMIA believes that the five INPO elements are helpful guidelines for the Board, but that they are minimum requirements, which Licensee does not satisfy, and that the Board may not rely on the INPO accreditation.³⁶

b. Discussion

272. Having decided in § III.C.2, above, that Licensee's operator training program, when considered on its merits, would be adequate when corrected, our ultimate conclusion with respect to training will not turn on the INPO accreditation. Nevertheless, because it is our responsibility to produce a complete and reviewable decision as well as a correct one, we have addressed this issue on the facts and law. Moreover, having found, above, that Licensee's training program needs improvement to satisfy the fifth INPO element, we must now reconcile that finding with the fact that INPO has approved the program and that the Policy Statement endorsed the INPO accreditation program.

273. Licensee, Staff and UCS agree that the effect of policy statements on agency determinations has been stated in *Pacific Gas and Electric Co. v. FPC*, 506 F.2d 33 (D.C. Cir. 1974) where the court explained:

An Administrative agency has available two methods for formulating policy that will have the force of law. An agency may establish binding policy through rulemaking procedures by which it promulgates substantive rules, or through adjudications which constitute binding precedents. A general statement of policy is the outcome of neither a rulemaking nor an adjudication; it is neither a rule nor a precedent but is merely an announcement to the public of the policy which the agency hopes to implement in future rulemakings or adjudications.

Id. at 38 (footnote omitted).

274. Licensee suggests, however, that even if the Commission cannot predicate its determinations on general policy statements, its adjudicative boards are bound to do that. Licensee Comments at 2, *citing, e.g., Tennessee Valley Authority* (Yellow Creek Nuclear Plant, Units 1 and 2), ALAB-515, 8 NRC 702, 714 (1978) (application of NRC policy on implementation of § 511 of Federal Water Pollution Control Act).

275. UCS counters Licensee's argument that adjudicative boards may depend on policy statements by citing *Minnesota v. NRC*, 602 F.2d

³⁵ Commonwealth Comments dated April 4, 1985.

³⁶ TMIA Comments and Response, dated April 5, 1985.

412 (D.C. Cir. 1979). There the court held that the NRC's Appeal Board erred in relying on a Commission general policy declaring a presumption that spent fuel repositories will be available when needed. *Id.* at 415-16.

276. We were persuaded by UCS' argument that policy statements that are interpretations of legal authority (as was the case in *Yellow Creek, supra*) and that can, therefore, be independently reviewed by a court, are appropriate for agency determinations. UCS Comments at 5, citing *Guardian Federal Savings and Loan Association v. FSLIC*, 589 F.2d 658, 664 (D.C. Cir. 1978). Those that are factual determinations, as in *Minnesota v. NRC, supra*, may not be the bases of agency adjudication. The Policy Statement on Nuclear Power Plant Personnel Training is principally a factual statement — it is part regulatory guide and part announcement of future enforcement and rulemaking intentions. Therefore the Board concludes that, as a matter of law, the Policy Statement does not have the force of a binding *regulation* on NRC's adjudicating boards.³⁷

277. It would be somewhat unsettling to be seen by the Commission as ignoring its express, albeit generic, guidance policy on an issue clearly within the scope of the policy, as is the case with the Training Program Policy Statement. And, as it turns out, we can leave that honor to others, because in this proceeding we do not ignore the Policy Statement despite our dutiful discussion of normal licensing law above.

278. In discussing the effect of the Policy Statement on this proceeding, the parties have overlooked the fact that this is an enforcement proceeding, not an initial licensing proceeding. The Commission has already provided guidance to this Board on how to proceed under circumstances similar to that presented by the INPO accreditation and the Policy Statement. In CLI-81-3, 13 NRC 291 (1981), the Commission directed this Board, for the purposes of this proceeding, to group TMI-1 with other operating reactors rather than with reactors with pending operating license applications. There the Commission discussed the pending action items set out in NUREG-0737, "Clarification of TMI Action Plan Requirements," November 1980.

279. Implicit in the Commission's instructions to the Board was the premise that TMI-1 should be treated respecting TMI action items, in timing and in substance, the same as other operating reactors throughout the industry unless the record dictates a contrary result. CLI-81-3, *supra*, 13 NRC at 295-96. As the Policy Statement itself makes clear, the

³⁷ *But see* note 38, *infra*.

need to upgrade training in nuclear plants was emphasized following the accident at TMI-2 and was set out in the TMI-1 Action Plan, NUREG-0660, 1980. Slip Statement at 2. NUREG-0737 is a clarification of that plan. Training improvement is included under Item I.A.2.1.

280. Accordingly, while we find that the Policy Statement does not have the force of a regulation promulgated under rulemaking procedures, the Commission has *adjudicatively determined in this proceeding* that, with respect to TMI Action Plan items, the Board may look to the Commission enforcement policies (e.g., NUREG-0660, NUREG-0737) for direction as to the reasonableness of the actions specified in the Notice of Hearing, CLI-79-8, *supra*.³⁸ The Policy Statement is a specification of one of the TMI action items and comes within the direction to the Board in CLI-81-3.

281. But as we noted above, CLI-81-3 requires us to examine the record for contrary indications (13 NRC at 295-96), and the Policy Statement states that the NRC has the continuing responsibility to independently evaluate the training improvement programs (Slip Statement at 1).

282. In view of CLI-81-3, the NRC Staff's comments were close to the mark: "INPO accreditation could be viewed as some evidence of the acceptability of Licensee's training program under the Policy Statement but INPO accreditation certainly establishes no irrebuttable presumption in this regard." Staff Comments at 4. We could even have accepted Licensee's "*prima facie*" argument, but for the point made by UCS and the Commonwealth. There was no opportunity to refute any *prima facie* case during the hearing. There was no notice that the Licensee would hold out INPO accreditation as an independently sufficient basis for proving the adequacy of its training program. As a matter of simple fairness, we cannot accept the INPO accreditation after the close of the record as shifting the burden to the other parties without reopening the record, which would be pointless.³⁹ Licensee Comments at 4.

283. But what about the five INPO elements endorsed in the Policy Statement? May we hold Licensee to those standards after the close of the record? Here, it seems, we must force victory on UCS by overcoming its refusal to acknowledge the relevance of those elements to the litigation at hand. We have already found that the elements are intrinsically

³⁸ See also *Statement of Policy: Further Commission Guidance for Power Reactor Operating Licenses*, CLI-80-42, 12 NRC 654 (1980). There the Commission endorsed the various TMI action plans, e.g., NUREG-0737, as the principal basis for considering TMI-related issues in adjudications on applications for new operating licenses. The Commission pointed out that many of the action items were policy-interpretive matters and many items imposed requirements beyond those required by existing regulation. *Id.* at 660.

³⁹ In fairness to Licensee, it was the Board who initiated the consideration. Licensee simply commented in response to our memorandum.

logical and are consistent with the expert testimony. We do not need the Policy Statement to apply them. Our conclusion, however, is reinforced by the facts that the Commission endorsed the INPO elements in the Policy Statement. For better or for worse, Licensee has accepted them.

c. Conclusion

284. Our conclusion is that, as a matter of due process, we may not give *prima facie* effect to the INPO accreditation as evidence of the adequacy of the licensed-operator training program. The five INPO elements are valuable guidance.

285. Finally, however, to complete the analysis, even if we were to give *prima facie* effect to the INPO accreditation, other evidence of record refutes that case. The fifth INPO element has not been met.⁴⁰ Attached to Licensee's letter forwarding the INPO accreditation announcement, was a document, "INPO Criteria, the Accreditation of Training in the Nuclear Power Industry," INPO-85-002, January 1985. There we find that the INPO accreditation program requires, as one of its objectives (No. 12), "[a] systematic evaluation of training effectiveness and its relation to on-the-job performance is used to ensure that the training program conveys all skills and knowledges." *Id.* at A-27.

286. Criterion 12.4 for Objective 12 specifies: "Feedback from trainee performance, after the trainee has assumed the duties for which he was trained, is used to evaluate and refine the training program." *Id.* The Board does not believe that criterion 12.4 has been satisfied in accord with its most probable meaning.⁴¹ Therefore we also conclude that the INPO Accreditation Board failed to comply with its own criteria and the accreditation was, therefore, inaccurate.

D. The Reconstituted OARP Review Committee's Assessment

1. Introduction — The Review Committee

287. The original OARP Review Committee issued a report in 1980 that reviewed the Operator Accelerated Retraining Program (OARP) conducted at TMI in 1979-1980. The OARP was a onetime intensive

⁴⁰ Fifth element: "evaluation and revision of the training program based on the performance of trained personnel in the job setting." Slip Statement at 4. See § III.C.4, Program Evaluation and Feedback, *supra*.

⁴¹ We have considered and rejected the possibility that the phrase "after the trainee has assumed duties" may be a specification of time not function; e.g., additional simulator evaluation *after* the trainee has assumed the duties as compared to feedback *from* the performance of duties.

program designed to significantly improve licensed-operator performance. See LBP-81-32, *supra*, 14 NRC at 451-53. The Committee was composed of five members who were experts in their respective fields. After the issuance of ALAB-772, in May 1984, the OARP Review Committee was reconstituted. Four of the original Committee's five members served on the reconstituted Committee. Dr. Robert E. Uhrig, Vice President, Advanced Systems & Technology for Florida Power & Light Company, Miami, Florida, with 28 years of utility and engineering education experience, continued to serve as Chairman of the reconstituted Committee. The three other members continuing to serve were: (a) Dr. Julien M. Christensen, Chief Scientist, Human Factors and Logistics for Universal Energy Systems, Dayton, Ohio, representing human factors engineering; (b) Dr. Eric F. Gardner, Professor Emeritus of Education and Psychology, Syracuse University, Syracuse, New York, representing educational psychology; and (c) Dr. William R. Kimel, Dean of the College of Engineering and Professor of Nuclear Engineering at the University of Missouri, Columbia, representing nuclear engineering education. Mr. Frank Kelly, President of PQS Corporation, and former Chief, AEC Operator Licensing Branch (1967-1969), representing licensed-operator testing, replaced Mr. Richard J. Marzek who was unavailable to serve. See Committee, ff. Tr. 31,749, Resumes and at 3.

In the following paragraphs the Board discusses the informal methodology employed by the Review Committee in responding to ALAB-772 and contrasts it with the very formal methodology proposed by UCS and its witness, Dr. Regan. We also compare the Review Committee's methodology with a rather similar methodology that the NRC Staff would recommend for use in a situation such as the task at hand. Finally, the Board discusses the Committee's opinion concerning the phenomenon of cheating, as requested by the Appeal Board in ALAB-772; the Committee's substantive findings and conclusions; and the effect given to the Committee's work by the Board.

2. The Committee's Methodology

a. Committee's Initial Review (May-June 1984)

288. On May 24, 1984, Dr. Uhrig, as chairman of the original Committee, was contacted by the Licensee to review the training program in light of ALAB-772. He was asked to reconvene the Committee in order to review some of the issues and to submit a report in a timely manner because the Nuclear Regulatory Commission had scheduled a meeting on June 27th to consider the restart of TMI-1. Four members of the

reconstituted Committee met May 30, 1984, through June 1, 1984, first at TMI-1 and then at the corporate offices at Parsippany, New Jersey. Dr. Kimel was not present on May 30th and Dr. Uhrig was not present on June 1st. Committee, ff. Tr. 31,749, at 4; Tr. 31,788-92. The reconstituted Committee expected that the report had to be finished by June 12, 1984. Tr. 31,808 (Uhrig).

289. During that 3-day period, the Committee extensively discussed the ALAB-772 decision. Tr. 31,793 (Uhrig). It did not believe that, in seeking the Committee's opinion, the Appeal Board intended the Committee to "validate" or perform a quality assurance check on the licensed-operator training program. The Committee's impression was that the Appeal Board sought the collective judgment of the Committee's expert members. The Committee did not believe that the Appeal Board intended that it should perform an accreditation of the licensed-operator training program, and the Committee did not do so. Committee Rebuttal, ff. Tr. 33,320, at 9, 10. The Board agrees with the Committee's assessment of the Appeal Board's intent.

290. Also during that 3-day period, the Committee toured the facilities at TMI-1, including the control room and the training center. It was briefed, for example, by GPU Nuclear's training and education staff about the establishment of procedures to keep the replica simulator up to date with future plant changes, about GPU Nuclear's efforts regarding the Institute of Nuclear Power Operation's (INPO) accreditation of the TMI-1 training program, and about the development of TMI-specific job/task analyses based upon the INPO job/task analyses. Approximately one-third to one-half of the Committee's time was spent in being briefed by GPU Nuclear personnel upon the licensed-operator training program. Tr. 31,793 (Uhrig); Tr. 33,277 (Christensen); Tr. 32,044-45 (Gardner); Tr. 33,324-25 (Christensen); Tr. 31,794 (Uhrig); Special Report, ff. Tr. 31,749, Table A-1. The Committee also received and reviewed certain documentary material relating to the various aspects of the training program and the remanded training issues. Special Report, ff. Tr. 31,749, Table A-2.

291. During this period, the Committee determined which issues or questions it should focus upon and defined the tasks each member was to perform. Tr. 31,797 (Gardner). The Committee then recessed until it met at Parsippany on June 6th after having reviewed the material and information provided earlier. Tr. 31,798-99 (Uhrig). Between June 6th and 8th, the members engaged in discussions, separately prepared various sections of the report and met again several times a day to discuss the drafts. Tr. 31,801; 31,803-04 (Uhrig). Because the Nuclear Regulatory Commission's meeting had been set back, the Committee learned

on June 8th that it had approximately 2 more weeks within which to prepare the Special Report. After the other members had left, by the morning of June 9th, Dr. Uhrig had collated the various writings into the first draft which was sent to the other members. Tr. 31,805-06 (Uhrig). Between June 10th and June 28th, when the finalized Special Report was transmitted to the NRC, via phone calls to and because of revisions proposed by the members of the Committee, Dr. Uhrig transmitted three or four additional revised drafts to his associates. Tr. 31,808-09, 31,811 (Uhrig).

292. At page 3 of its eighty-seven-page Special Report, the reconstituted Committee stated that:

In our initial meeting, the reconstituted Committee saw two roles that it could serve in contributing to the record of the TMI-1 restart hearings. First, the Committee could provide a "quick response" that would be available in time to contribute to the NRC meeting at which the Commission has indicated it will formally consider the issue of restarting TMI-1. Second, the Committee could undertake a more definitive study of the issues raised by the ALAB and provide a report on this study in a time frame consistent with the ASLB hearings. This report has been prepared specifically for the impending Nuclear Regulatory Commission meeting. Because of the limitations of time, there was not an opportunity to undertake an in-depth study of the type that was undertaken by the OARP Review Committee in 1979-80. Whether or not the Committee undertakes the more definitive study is a matter for GPU Nuclear to decide at a later date.

Special Report, ff. Tr. 31,749, at 3.

293. After once again stating that its Special Report was merely a "quick response" study of the issues raised in ALAB-772, the Committee concluded *inter alia* that: (1) the management of the training program is well qualified and the specific management hierarchy is appropriate; (2) the examination development, control, and security procedures are more extensive than any that the Committee has seen in the industry or academia; (3) the commitment to the use of task analysis as a basis for the establishment of learning objectives in the development of course and examination content is an example of the extra effort being committed to relate training to on-the-job performance and to increase the safety of plant operations; (4) the management of the training program recognizes its responsibility associated with the cheating incident and has taken specific steps to correct this situation and is dedicated to assuring that it never happens again; and (5) that the "bottom line" is that the GPU Nuclear training program produces qualified operators and is adequate to support the restart of TMI-1. Special Report, ff. Tr. 31,749, at 82-83.

294. The reconstituted Committee's written direct testimony, which addressed the period between May 24 and June 28, 1984, and the Committee's Special Report (attached to the testimony) were incorporated into the record on the first day of the hearing (December 19, 1984) upon the licensed-operator training program issue. Ff. Tr. 31,749.

295. UCS lays a long powder train leading up to its conclusion that the Special Report was grossly inadequate. It alleges that the reconstituted Committee had insufficient time within which to perform an exhaustive review of the Licensee's training program.⁴² UCS also criticizes the Committee's methodology in preparing the Special Report in that the Committee, for example, did not review actual training, did not interview any trainees or operators who were not part of Licensee's management personnel, did not evaluate licensed-operator training instructors, and did not observe the administration of any examinations. See UCS Proposed Findings 25-26, 30-113. To a lesser extent, TMIA tracks the position of UCS. See TMIA Proposed Findings 1-10, 49, 52.

296. We need not reach and decide whether the Special Report was inadequate on the alleged grounds that the reconstituted Committee had only a limited time within which to conduct an investigation and prepare the report, and that the Committee's methodology was faulty. UCS concedes that, having been contacted by the Licensee in mid-August 1984 to prepare testimony for presentation to this Board, the Committee "began to do many of the things that it should have done before it issued the Special Report." UCS Proposed Findings 115-116. Moreover, we reject any idea that the Committee blinded itself to the inadequacies of the Special Report and/or that it attempted to hoodwink the Nuclear Regulatory Commission into believing that the Special Report was a thorough, exhaustive study of the issues raised in ALAB-772. The Committee forthrightly stated in the Special Report that it was merely a "quick response" specifically prepared to contribute to the impending NRC meeting, that because of time limitations it had been unable to prepare an in-depth study like the one undertaken by the original Committee in 1979-1980, and that whether or not the Committee would undertake a more definitive study was a matter for GPU Nuclear to decide at a later date.

⁴² As an example of a misleading oversight occasioned by time strictures, UCS notes that the Special Report reflects that Edward J. Frederick, then Supervisor of Licensed-Operator Training at TMI had completed courses to qualify him as a certified TMI-1 senior reactor operator instructor. Special Report, ff. Tr. 31,749, at 17. Mr. Frederick, however, had failed the SRO examination for TMI-1 in April 1984 and was reassigned. Long and Coe, ff. Tr. 32,202, at 14, 15. While Licensee's Dr. Coe testified that he had so informed the reconstituted Committee on May 31, 1984, none of the Committee members could recall having been told. Tr. 32,354 (Coe); Tr. 31,751 (Uhrig).

b. Committee's Subsequent Assessment (August-November 1984)

297. At the Licensee's request the Committee reassembled at TMI on August 13-15, 1984. On the first day the Licensee asked the Committee to spend as much time as was available to make a more in-depth investigation prior to the hearing in order that it could prepare testimony in confirmation or refutation of the conclusions arrived at in the Special Report. The Committee members recognized that, since the Special Report had been based to a large extent on material provided by GPU Nuclear management and on orientation discussions with management, they had to meet individually with operators and instructors and audit the classes. Tr. 31,963, 31,972, 32,103-04 (Uhrig). During that 3-day period, again in September and October prior to the filing of the Committee's written direct testimony on November 1, and prior to the filing of the Committee's written rebuttal testimony on November 28, 1984, the Committee proceeded with its ongoing investigation and review.

298. We received detailed testimony from the Committee members regarding their evaluation of training procedures and materials. Mr. Kelly reviewed emergency procedures, including the abnormal transient operator guidelines (ATOG) training summary and the walk-through program and procedures. Dr. Kimel also reviewed the ATOG training summary and walk-through program. Dr. Kimel, Dr. Gardner and Mr. Kelly reviewed the RO and SRO replacement and requalification training program descriptions. Dr. Gardner and Mr. Kelly reviewed the GPU Nuclear Instructor Development Program, the Instructor Indoctrination/Qualification Training Program, the Instructor Evaluation Procedure, the so-called Leonard Memo (January 1984) on Exam Construction, the procedures on exam control and recent RO and SRO examinations. Dr. Uhrig and Dr. Christensen were briefed on the procedures to ensure that the training program reflects the current design of the plant when they were briefed on the procedures for keeping the Operations Plant Manual (OPM) up to date with plant modifications. The Committee familiarized itself with the work of the Training and Education Advisory Council. The Committee also read the testimony of Licensee's witnesses, which described the licensed-operator training program and related issues, as well as the depositions of Licensee's witnesses and Licensee's interrogatory responses on this issue. Committee Rebuttal, ff. Tr. 33,320, at 3; Tr. 31,948 (Kelly); Tr. 33,276 (Uhrig).

UCS and TMIA assert that the Committee failed to evaluate the instructor lesson plans utilized in the training department to determine whether they accurately reflected the current plant design. UCS Proposed Finding 137; TMIA Proposed Finding 15. Our review of the record leads us to conclude that Mr. Kelly did review the lesson plans to

assure their technical content was up to date. Tr. 31,946. Because of his previous experience, he was aware of the type of equipment or material utilized in the plant; however, if he needed backup support, he referred to the Operations Plant Manual to find out if the lesson plans did reflect up-to-date material. This was an ongoing review process through November 1984. Tr. 31,947-48. The Operations Plant Manual is a controlled document, which ensures that it is kept up to date. Tr. 32,908 (Leonard); Tr. 32,923-24 (Ross). Both Dr. Uhrig and Dr. Christensen were briefed that, on an ongoing basis, the training program was being updated to reflect the actual plant design. Tr. 33,276-77.

299. The Committee conducted a number of interviews with GPU Nuclear licensed operators for the purpose of gaining firsthand impressions of the quality of the Training and Education personnel involved in the licensed-operator training program and to get their views about and attitude toward the training. *See, e.g.*, Tr. 32,062-63 (Uhrig); Tr. 32,063 (Kimel); Tr. 32,067 (Christensen). The Committee's classroom observations involved the visitation of a cross-section of classes given to TMI-1 licensed operators or given by TMI-1 licensed-operator instructors. Committee Rebuttal, ff. Tr. 33,320, at 4. Mr. Kelly observed eight classes. Tr. 31,910 (Kelly). Dr. Gardner observed seven classes. Tr. 31,894 (Gardner). Dr. Kimel observed eight licensed-operator training classes. Tr. 31,906-09 (Kimel). And Dr. Christensen observed four to six classes. Tr. 31,898 (Christensen). Dr. Gardner, Dr. Kimel and Mr. Kelly observed the TMI-1 control board mockup while it was being used as a training device. Committee Rebuttal, ff. Tr. 33,320, at 5. Dr. Gardner also observed instructors using an overhead projector and various handout materials. Tr. 32,158-59 (Gardner).

Dr. Uhrig asked operators about such things as their responsibilities, their present attitudes about the cheating and Licensee's response thereto, and their attitudes toward training. Tr. 32,062-63 (Uhrig). Additionally, Dr. Kimel asked these operators about their feelings regarding the quality of training instructors. Tr. 32,064-65 (Kimel). Dr. Gardner and Dr. Christensen preferred to interview operators together so that one of them would be free to follow up on weak responses thereby making it difficult for an interviewee to stand on an incomplete or evasive response. Tr. 32,067, 32,155, 33,279 (Gardner). Mr. Kelly testified that his interviews of licensed operators after the issuance of the Special Report had addressed operator attitudes toward training and areas of improvement, and that his later interviews in November 1984 also included questions related to the Rohrer, Hibler and Replogle (RHR) Report. Tr. 31,843-44, 31,848, 31,855 (Kelly).

Mr. Kelly also interviewed operators with respect to their opinions of the quality of the training instructors and their opinions of the instructors' attitude toward them. Tr. 32,068-69 (Kelly). TMIA contends that there was no structure to Mr. Kelly's conduct of the interviews. TMIA Proposed Finding 14. However, Mr. Kelly testified that he covered the same information in interviews with the operator instructors. Tr. 32,070 (Kelly). Mr. Kelly also conducted less formal discussions with several operators and instructors concerning debriefings undertaken to prevent negative transfer from the B&W simulator to the TMI-1 control room. Tr. 32,074 (Kelly). The Committee finally noted that although the operators interviewed were usually designated as available by the shift supervisor on duty, it had no reason to believe that any operators were either preselected or prevented from being interviewed. Tr. 31,859-60 (Gardner, Christensen); Tr. 33,278 (Gardner, Kelly, Christensen, Uhrig, Kimel).

Citing the testimony of its expert witness, Dr. Regan, that it is particularly important that those who administer oral examinations are adequately trained to do so and they must be more than simply subject-matter experts, UCS asserts that the Committee did not review the qualifications of the supervisory personnel who administered oral examinations to determine their expertise in the subject matter. UCS Proposed Finding 129. However, we deem that, by virtue of their experience and because their administration of oral examinations was monitored by the training department, the operations personnel were qualified to administer the oral examinations. Tr. 31,869-71 (Kelly).

Further, alluding to the Staff's and Dr. Regan's testimony that the actual presentation of the training and the quality of the instructors are crucial matters which must be reviewed, UCS and TMIA assert that the Committee's review was inadequate in that over time the Committee did not observe several instructors and their several subject areas. UCS Proposed Finding 140; TMIA Proposed Finding 13. However, over time, between August and November 1984, Dr. Gardner, Dr. Christensen, Dr. Kimel and Mr. Kelly did visit a number of licensed-operator training classes and discussed training with a number of the operators and among themselves. Committee, ff. Tr. 31,749, at 26; Tr. 31,893-910. Dr. Gardner and Mr. Kelly evaluated the instructors. Tr. 31,911. UCS asserts that, while Mr. Kelly utilized the Licensee's operator instructor evaluation sheet to evaluate the instructors, he did not review the Licensee's use of its instructor evaluations. UCS Proposed Finding 139. However, UCS does not tell us why we should and thus we draw no adverse conclusion from the fact that Mr. Kelly did not review the Licensee's use of its instructor evaluations. UCS and TMIA assert

that Mr. Kelly did not fill out the Licensee's operator instructor evaluation sheet. See UCS Proposed Finding 139 and TMIA Proposed Finding 13. However, neither Intervenor tells us why we should and thus we do not draw any adverse conclusion. Again, after recognizing that Dr. Gardner actually had reviewed the Licensee's evaluations of its instructors, UCS does not tell us why we should draw adverse conclusions from the facts that he did not compare them to the performances he had observed, that he did not attempt to determine their accuracy, and that he did not review these documents until November 1984. See UCS Proposed Finding 139.

Finally, citing Dr. Regan's testimony that it is better to evaluate the competence of students after instruction than to observe instructor performance which is unreliable, UCS alleges that the Committee did not evaluate the post-training competence of the licensed operators. UCS Proposed Finding 140. Dr. Regan did not testify that failing to evaluate post-instruction competence of licensed operators would render defective the entire training program — he merely testified that he "would feel most comfortable with looking at the outcomes of instruction . . . where that would be possible as a method of evaluating instructors." Tr. 32,826 (Regan).

300. All five Committee members have had significant interaction with the Vice President of Nuclear Assurance, Dr. Long, the Director of Training and Education, Dr. Coe, the Manager of Plant Training, TMI, Mr. Newton and the Operator Training Manager, Mr. Leonard. Mr. Kelly and Dr. Uhrig spent time with the new Supervisor, Licensed-Operator Training, Mr. Maag, discussing training issues with him. Committee Rebuttal, ff. Tr. 33,320, at 4. The Committee met as a group with Mr. Hukill, Licensee's Vice President, TMI-1. *Id.* Moreover, Dr. Uhrig and Dr. Kimel met separately with Mr. Clark, President, GPU Nuclear, and with Mr. Hukill. *Id.* During his discussions with Dr. Kimel and Dr. Uhrig, Mr. Clark addressed the selection of training managers, the appointment of Dr. Long to Vice President, Nuclear Assurance, GPU Nuclear's disposition of Mr. Hukill, and the priorities assigned to the training program as manifested by the resources devoted thereto. Tr. 31,928, 31,941, 32,162-63, 33,282-83 (Uhrig, Kimel).

Mr. Kelly, Dr. Gardner, Dr. Christensen and Dr. Kimel reviewed simulator training with Mr. Irizarry, former Simulator Training Manager, and with Mr. Boltz, Supervisor of Simulator Training (who has now replaced Mr. Irizarry) at TMI. Committee Rebuttal, ff. Tr. 33,320, at 4. The Committee further testified that it met with Mr. Ross and Mr. Hukill. At these meetings, Messrs. Hukill and Ross explained the reasons for their satisfaction with the training program and the licensed-

operators' ability to transfer the knowledge gained therefrom to job performance in the plant. Tr. 32,138-39 (Uhrig). As part of this review, Mr. Ross gave all five Committee members a tour of the plant and explained the impact of various aspects of the licensed-operators' training. Tr. 32,138-39 (Uhrig).

301. With regard to the Committee's supplemental review of simulator instruction, Dr. Christensen went to the B&W simulator in order to observe implementation of the TMI simulator program and, particularly, the quality of the instruction given in the classroom and at the simulator to TMI-1 operators. Committee Rebuttal, ff. Tr. 33,320, at 5. Mr. Kelly also visited Lynchburg for this purpose. *Id.* While there on one occasion, Mr. Kelly observed B&W instructors perform casualty drills for Crystal River operators as part of his assessment of the instructors' qualifications. Tr. 33,280 (Kelly). This review was considered relevant because TMI operators undergo similar drills with the same instructors. *Id.*

All five Committee members were briefed on and observed the use of the Basic Principles Training Simulator (BPTS). Committee Rebuttal, ff. Tr. 33,320, at 5. In addition, Mr. Kelly observed 4 hours of BPTS training and 4 hours of demonstration of specific B&W PWR operating characteristics. *Id.* During this visit, Mr. Kelly was able to review a demonstration of how the BPTS causes an operator to use his problemsolving skills. Tr. 32,080 (Kelly).

Dr. Christensen was briefed on GPU Nuclear's plans to keep the replica simulator current with plant design modifications and their plans to avoid negative transfer. Committee Rebuttal, ff. Tr. 33,320, at 5; Tr. 32,078-79, 32,124-25 (Christensen). Mr. Kelly also discussed with several operators Licensee's measures to avoid negative transfer. Tr. 32,074 (Kelly). Through these discussions he learned that: (1) trainees are briefed regarding the differences between the TMI-1 control room and the B&W simulator; (2) instructors use TMI procedures; (3) instructors address differences between the TMI control room and the simulator during the training session; (4) trainees are formally debriefed after the simulator session; and (5) trainees informally discuss the differences between the simulator training and the TMI control panel and procedures. Tr. 31,875-76 (Kelly); *see also* Tr. 32,068 (Kelly).

302. Mr. Kelly, Dr. Christensen, and Dr. Gardner observed the administration of several exams and verified compliance with the control of examination procedures by following a GPU Nuclear checkoff list of exam administration procedures. Committee Rebuttal, ff. Tr. 33,320, at 5; Tr. 32,081-82 (Gardner, Kelly, Christensen). Dr. Gardner discussed exam administration with several instructors. Tr. 32,083 (Gardner). In

addition, the Committee further assured itself that exam security procedures are effectively implemented through briefings and document review. Tr. 32,081 (Uhrig).

303. Dr. Gardner and Mr. Kelly also conducted a substantive review of Licensee's examination process. Mr. Kelly and Dr. Gardner reviewed all of the RO and SRO 1982 (cycle 9) and 1983 (cycle 10) written requalification examinations. Tr. 31,882-84 (Kelly). Mr. Kelly reviewed these examinations to assure himself that their scope and content addressed the material taught in the requalification program. Tr. 31,883 (Kelly). He also reviewed the answers to ascertain whether these exams contained a proper balance of theoretical and procedural questions. *Id.* Dr. Gardner and Mr. Kelly utilized the GPU Nuclear exam construction matrices, which are designed to ensure that all exams cover the proper subject material and test appropriate mental processes, when they reviewed the requalification exams to assess the level of memorization required and the technical content of the exam questions. Tr. 33,280-81, 33,283 (Gardner, Kelly). Mr. Kelly's assessment also included a review of the process employed to update the questions in the exam bank. *See* Tr. 31,888-90 (Kelly). Mr. Kelly reviewed the failure rate for cycles 9 and 10 in order to assure himself that those individuals who failed were properly requalified and retested.⁴³ Tr. 32,172 (Kelly). Mr. Kelly also reviewed the results of Licensee's oral and simulator exams. Tr. 31,864 (Kelly). In addition, Mr. Kelly reviewed the licensed-operators' NRC exam passage rate; however, the Committee did not rely on this information when it formed its opinion regarding the adequacy of the licensed-operator training program. Tr. 32,085-87 (Kelly); Tr. 31,967 (Kelly, Kimel, Gardner, Uhrig, Christensen).

UCS asserts that the Committee's methodology was seriously inadequate because it did not evaluate or observe any oral examinations or simulator examinations. UCS Proposed Finding 128. However, while the Committee did not observe such examinations, it did evaluate the results of these examinations. Tr. 31,864 (Kelly). UCS speculates that, in using the word "results," the witness must have meant that he merely looked at checklists of the subjects addressed. However, in failing to ask the witness to explain what he meant by the term "results," UCS cannot now either speculate that he merely looked at checklists of the

⁴³ Mr. Kelly testified that the failure rate for the 1982 and 1983 requalification exams was considerably lower at TMI than at some other facilities because the TMI training program is very well established, and well implemented by qualified Training and Education management and staff. Tr. 32,173-74 (Kelly). He also stated that the lower failure rate was attributable to the operators' motivation to do well on exams. Tr. 32,174 (Kelly).

subjects addressed, or allege that the Committee's methodology was inadequate.

Since the Committee concluded in the Special Report and again in its written direct testimony filed on November 1, 1984, that the scope and content of the Licensee's 1982 and 1983 written requalification examinations were adequate, UCS argues that it is clear that Dr. Gardner and Mr. Kelly were impelled not to make any contradictory conclusions with respect to the 1984 written requalification examinations which they reviewed after November 1, 1984. UCS Proposed Finding 130. UCS cannot be heard to barrenly challenge the credibility of these two witnesses. Further, it cannot complain that "no details were provided on how the November review was conducted" inasmuch as UCS failed to pursue this matter on cross-examination. *Id.*

UCS asserts that the Committee did not check to see if the grading and the answers were correct with respect to the 1984 written requalification examinations. UCS Proposed Finding 131. UCS errs — Mr. Kelly at Tr. 31,883-85 was addressing the 1982-1983 examinations.

Finally, UCS asserts that neither Mr. Kelly nor other members of the Committee knew whether the examination bank from which questions are often drawn was updated other than on an *ad hoc* basis. UCS Proposed Finding 134. UCS errs — Mr. Kelly at Tr. 31,889 testified that he was told that the GPU Nuclear exam question bank was continuously updated to reflect changes in the plant, changes in procedures, and changes as reflected by events in the industry.

304. The Committee's initial assessment of communications mechanisms consisted of discussions with Training and Education management and the review of documents evidencing communications channels and management's encouragement thereof. The Committee testified that its subsequent assessment also included a review of the numerous corporate memoranda addressing the importance of strong communications channels. More importantly, however, the Committee's subsequent assessment included interviews with licensed operators and instructors during which their attitude regarding the communications mechanisms in place were addressed, in addition to corresponding discussions with Messrs. Clark, Hukill, Long, Coe, Newton, Leonard and Ross. *See* Committee Rebuttal, ff. Tr. 33,320, at 6. However, as the NRC Staff pointed out, these interviews were not structured. Staff, ff. Tr. 33,148, at 32-33; Tr. 33,140 (Persensky).

305. Members of the Committee reviewed documents describing the instructor development program, Licensee training instructor criteria and procedures for instructor evaluation. Instructors were evaluated in

particular by Dr. Gardner (education specialist) and Mr. Kelly (subject-matter expert). Dr. Gardner reviewed the performance evaluations for each of the TMI-1 licensed-operator instructors for 1983 and 1984. Dr. Gardner and Mr. Kelly also attended portions of the most recent instructor development program and observed firsthand its structure, content and execution. During this time, Dr. Gardner and Mr. Kelly had the opportunity to obtain several instructors' views of the instructor development program. Dr. Christensen, Dr. Kimel and Mr. Kelly also observed the training of two instructors on the use of the BPTS as an instructional device. Committee Rebuttal, ff. Tr. 33,320, at 6; Tr. 31,907-08 (Kimel).

306. Dr. Gardner and Mr. Kelly reviewed licensed-operator instructor resumes, audited classes utilizing Licensee's operator instructor evaluation sheet, reviewed instructor performance evaluations and interviewed instructors in order to assess their qualifications, professionalism, pride, enthusiasm and the quality of their instruction. Tr. 31,911-14 (Kelly, Gardner); Tr. 32,069 (Kelly); Tr. 32,076-77, 32,084-85 (Gardner); Committee Rebuttal, ff. Tr. 33,320, at 8.

307. The Committee's subsequent assessment also included the review of certain documents that the NRC Staff's witnesses suggested were germane to an evaluation of the TMI-1 licensed-operator training program, especially with regard to operator attitude. Specifically, the Committee reviewed the RHR Report and its supporting TMI raw data and NUREG-0680, Supp. 4.⁴⁴ However, the Committee testified that it did not rely on these documents in formulating its views because it felt that its firsthand observations were more pertinent. Neither did the Committee structure interview questions in such a way that data on operator attitudes, reflected in those reports, would be compared to information that was being compiled by the Committee. The Committee further testified that Mr. Kelly and Dr. Gardner had reviewed the notes of the Staff's industrial psychologist, Ms. Dolores Morisseau, which we understand form the basis for the conclusions about operator attitude in NUREG-0680, Supp. 4, and reviewed Ms. Morisseau's deposition, in which these notes were discussed. The Committee also reviewed and placed reliance on Licensee's memorandum responding to the RHR Report. Committee Rebuttal, ff. Tr. 33,320, at 7; Tr. 31,851 (Gardner, Kelly); Tr. 31,855 (Kelly); Tr. 33,297-98 (Gardner); Tr. 33,322-23

⁴⁴ NUREG-0680, Supp. 4, entitled "TMI-1 Restart, An Evaluation of the RHR, BETA, and Draft INPO Reports as They Affect Restart Issues at Three Mile Island Nuclear Station Unit 1 Docket 50-289" (October 1983), documents the Staff's review of portions of the organization, management, training programs and operational practices at TMI-1 and the related findings of the RHR and BETA reports.

(Gardner, Kelly); Staff, ff. Tr. 33,148, at 32-33; Tr. 33,140 (Persensky); *see* Tr. 33,226 (Morisseau).

308. The Committee was aware of but did not review the job/task analyses for TMI-1 licensed operators to assure their accuracy or adequacy or compare these specific tasks to procedures, to on-the-job training, or to the behavioral learning objectives utilized by the training department. Committee Rebuttal, ff. Tr. 33,320, at 10. Nor did it compare the job/task analyses to the training curriculum. Tr. 31,948-50 (Kelly and Gardner). UCS and TMIA assert that the Committee's methodology was seriously inadequate in that the Committee failed to review the job/task analyses to ensure their accuracy or adequacy and failed to compare the analyses to the training curriculum. UCS Proposed Finding 136; TMIA Proposed Finding 15.

However, the Committee members were briefed by Licensee on its implementation of job/task analyses in the licensed-operator training program. *See* Committee Rebuttal, ff. Tr. 33,320, at 10. Dr. Christensen was briefed on the job/task analysis process by Licensee who at that time explained that GPU Nuclear was in the process of modifying the INPO generic job/task analyses to make them TMI-specific. Tr. 33,324-25 (Christensen). Dr. Christensen was also briefed on the process of correlating job/task analyses with behavioral learning objectives in terms of the development, implementation and practical applications of behavioral learning objectives. *See* Tr. 33,331-32 (Christensen). Dr. Gardner looked at the process of correlating job/task analysis data with behavioral learning objectives by reviewing operator duties, behavioral learning objectives in the Operations Plant Manual and INPO's generic job/task analyses. Tr. 33,330-31 (Gardner). The Committee was apprised of and noted the existence and use of performance-based behavioral learning objectives, the Operations Plant Manual, the TMI-1 Self-Evaluation Report submitted to INPO, tabletop task analysis (general determination of tasks required to perform a job), plant walk-throughs, on-the-job training and simulator training, all of which are based upon or related to job/task analyses. Committee Rebuttal, ff. Tr. 33,320, at 10-11; Tr. 33,324-30 (Kimmel, Christensen). Moreover, the Committee testified that it reviewed the process for translating job/task analysis data into behavioral learning objectives. Tr. 33,330-32 (Gardner, Christensen). Dr. Kimmel reviewed behavioral learning objectives, the Operations Plant Manual, plant-specific task lists and the generic INPO job/task analyses to assure himself that the licensed-operator training program is performance-based. Tr. 33,325-27 (Kimmel). In addition, Dr. Christensen was told that Licensee had done a tabletop analysis and he observed plant walk-throughs. Tr. 33,327-28 (Christensen). The Committee also

evaluated the process for translating job/task analysis data into exam questions. Dr. Christensen was briefed on the process whereby tasks identified from the job/task analyses will be evaluated to assess the best method to teach the task (e.g., classroom, simulator, using a teaching-aid, etc.). Tr. 33,332 (Christensen). Moreover, Mr. Kelly and Dr. Gardner reviewed the exams to determine whether they corresponded with the behavioral learning objectives. Tr. 33,333 (Gardner, Kelly).

309. The Committee did not review any evaluation of on-the-job training. Tr. 33,340 (Committee). UCS asserts that the Committee's methodology therefore was seriously inadequate. UCS Proposed Finding 128. However, Mr. Kelly discussed on-the-job training with TMI-1 training management personnel. He also interviewed operators to ascertain how they received their on-the-job training. Mr. Kelly inquired into licensed-operator performance during operations, such as heatups and cooldowns. He also reviewed checklists and qualification cards used in conjunction with on-the-job training. Tr. 33,339-40 (Kelly).

310. Finally, the Committee received and familiarized itself with the Data Design Laboratories (DDL) report, NUREG-0680, Supp. 5, the SALP⁴⁵ report and NRC Inspection Report 84-05 (operator readiness evaluation). The Committee testified, however, that it did not rely on these independent assessments, nor did it attempt to emulate them; rather, it relied on the backgrounds and experiences of its members to assess the TMI-1 licensed-operator training program. Committee Rebuttal, ff. Tr. 33,320, at 10.

311. The Committee testified that, after completing its investigation and review in the period of August-November 1984, it affirmed the conclusion reached in its Special Report, *viz.*, that the licensed-operator training program is adequate to support the restart of TMI-1. Committee Rebuttal, ff. Tr. 33,320, at 18.

3. Dr. Regan's Proposed Methodology

312. UCS presented the testimony of Dr. James J. Regan on the issue of the methodology necessary to evaluate the TMI-1 licensed-operator training program. *See generally* Regan, ff. Tr. 33,532. Neither UCS nor Dr. Regan insists that Dr. Regan's methodology is the only one appropriate to the situation. UCS Proposed Finding 39. In essence,

⁴⁵ U.S. Nuclear Regulatory Commission, Region I: "Systematic Assessment of Licensee Performance, GPU Nuclear Corporation, Three Mile Island Nuclear Station, Unit 1" (April 2, 1984).

Dr. Regan speaks to the type of information necessary to support an evaluation and the various means of obtaining the information. *Id.*

313. Dr. Regan is trained as an industrial psychologist with approximately 31 years of experience as a researcher in the area of training and education. He spent most of that time as a civilian employee of the United States Navy involved with its extensive and complex training requirements. In particular, he served from 1973 to 1982 as the founding Technical Director of the Navy Personnel Research and Development Center. His experience includes extensive research in the area of technical training, as well as the initial implementation of Navy training programs on an experimental basis. He freely acknowledges that he is not extensively familiar with the design of nuclear reactors or with the training of nuclear reactor operators. Tr. 32,733-38 (Regan).⁴⁶

314. To evaluate a training program, Dr. Regan would use a team of personnel with both training and nuclear expertise. Their first task would be to gather basic information and develop a plan of action. This initial information would come from the company's managerial personnel through briefings and documents. In addition, such a team would review primary materials such as examinations and program documents, and it would conduct interviews with appropriate personnel. *Id.* at 18.

315. In his surrebuttal testimony, Dr. Regan elaborated on the need to develop a plan of action for this case:

In order to undertake a reliable review of this training program, one should at least develop a model of how to go about such a review and then tailor the model to the program. Otherwise, the program itself tends to direct the review and to bias conclusions in favor of what is already in the program, as opposed to what should be in the program.

Regan, ff. Tr. 32,693, at 7.

316. Dr. Regan's fundamental and most emphasized premise is that "the training program must be assessed against operational performance of individuals and systems." He considers this measurement to be the only reliable means of measuring the effectiveness of training. *Id.* at 9. His methodology is intended to develop the best possible information concerning the relationship between training and job performance.

⁴⁶ However, we note that Dr. Regan has twice been invited to advise the Commission concerning the training of nuclear reactor operators. In 1981-1982, Dr. Regan was the chairman of a national advisory committee to the NRC that was asked to advise the Commission concerning whether reactor operators and senior reactor operators should be required to have college degrees. In 1983, Dr. Regan was a member of a similar committee that advised the Commission on the question of whether each nuclear power plant should have a site-specific simulator. Regan, ff. Tr. 33,532, at 4.

317. According to Dr. Regan, there are essentially three questions that must be addressed by such a methodology. First, what measures of job performance apply to the job in question? Second, what are the standards by which an operator's performance is judged? Third, what are the actual performance levels of those who receive the training? *Id.* at 11.

318. Dr. Regan identified various measures that may be used as indicators of performance including examinations, fine tuning training through a process of constant development and evaluation known as "formative evaluation," comparing instruction methods to the state of the art, and measurement of trainee attitudes to determine trends over time. *Id.* at 13-14.

319. Dr. Regan would diagnose the skills and knowledge of incoming students in order to tailor training to their needs. He would also include thorough job/task analyses, including the type and frequency of the behavior and the conditions under which the incumbent must act. *Id.* at 5-9.

320. Dr. Regan emphasized that a sound training program must include objective measures of performance at each point at which performance is to be assessed, and that there must also be reasonably objective measures of job performance. These are necessary in order to allow an objective correlation between performance in training and performance on the job. *Id.* at 10. Dr. Regan also noted that performance measures must also be properly constructed, administered, and validated in order to assure that they are measuring what they purport to measure. *Id.* at 11.

321. Dr. Regan also identified specific actions that he believes should be taken in any evaluation of a training program. *Id.* at 18-21. The Board has discussed these actions in the context of UCS' criticisms of the Review Committee's methodology above, and in connection with our findings on Program Evaluation and Feedback (§ III.C.2), and Operator Attitudes (§ III.B.4).

322. Based upon his limited knowledge of the TMI-1 licensed-operator training program, Dr. Regan estimated that it would take a team of five qualified people 3 months to complete the effort that he believes necessary to respond to ALAB-772 and to reach conclusions such as those presented by the Reconstituted OARP Committee. This estimate does not include the time necessary to draft any report that the team might produce.

323. UCS argues that the Review Committee did not employ the correct methodology, it did not take the necessary actions under a correct methodology, and didn't even spend enough time in its review to do the job correctly.

324. There does not seem to be many important functional differences between the informal approach employed by the Review Committee and the highly structured approach favored by Dr. Regan (and, as we discuss in the following section, the Staff's approach). Both methods progress in about the same way. The differences turn on emphasis. Dr. Regan's approach reflects his background as a research scientist and a participant in large and complex Navy training programs. He seems to place very little reliance upon expertise and judgment and he absolutely abhors subjectivity. He insists upon objectivity in every step. We do not question the prudence underlying Dr. Regan's methodology for a generic approach to the review of training programs where virtually none of the variables are known — particularly the skill of the evaluators.

325. But where would a literal application of Dr. Regan's methodology take us in this proceeding? For example, we have already seen that Dr. Regan disfavors oral examinations because of their subjectivity. See § III.C.h, *supra*. While Dr. Regan would see no harm from a carefully structured oral examination that is not used as a predictor of job performance, he would prefer to use simulators. In fact, given an acceptable simulator program, Dr. Regan would be comfortable in eliminating oral, walk-through demonstrations of plant familiarity. Tr. 32,834-40 (Regan). We would not be, however.⁴⁷

326. Another example is Dr. Regan's insistence on adherence to an evaluation model once that model had been tailored to the evaluation program under review. However, that stricture on the experts serving on the Review Committee would impede the very formative-evaluation process that Dr. Regan favors; that is, the evaluation process could not be tuned as the Committee's experts learn more about the program they are evaluating. In any event, the Board believes that there is scant chance the experts of the Review Committee would permit the training program to incorrectly influence their evaluation given the extraordinary breadth and depth of their experience and training.

327. While the Board strongly agrees with Dr. Regan's emphasis on job performance feedback to training, we would, most likely, disagree with his concept of how to implement that principle. Even on the subject of job performance evaluations, he seems to distrust judgmental evaluations. He would use simple performance measurements "such as the number of radios completed in a day." Regan, ff. Tr. 32,532, at 9. His

⁴⁷ Unfortunately we never learned from Dr. Regan why he can accept the subjective judgment involved in simulator programming and performance criteria. We note NRC regulations, for its examinations, permit a simulated substitution for an actual operating test only prior to initial criticality and on a demonstration of need and experience. 10 C.F.R. § 55.24.

other methods of job performance measurements are indirect, such as simulator exercises. *Id.* Licensed operators in a nuclear power plant cannot, of course, be accurately or completely measured on the job by the quantity of tasks performed.

328. In sum, we believe that Dr. Regan has described a good methodology for an ideal world. The evaluation process should move in the direction of more objectivity with less subjectivity and judgment. However, given the training program at issue here, the Board places a very high value on the expert judgments of the Review Committee. Those judgments go far to fill the voids perceived by Dr. Regan in the Committee's methodology.

4. *Staff's Proposed Methodology*

329. The Staff⁴⁸ presented what it considers to be an appropriate methodological approach to assessing the licensed-operator training program in light of the remanded issues. The Staff presented its evaluation of the Committee's methodology by comparing its recommended methodology (consisting of 110 steps) to that utilized by the Committee. Staff, ff. Tr. 33,148, at 3.

330. The Staff would approach its assessment of the training program in accordance with the three topical categories that it derived from the remanded training issues. These categories are: (1) management/communications/attitudes; (2) training systems/programs; and (3) GPU Nuclear examinations. *Id.* at 10.

331. In the Staff's opinion, an appropriate assessment of its first category (management/communications/attitudes) would essentially consist of a series of interviews with training management, instructors and operators, as well as an extensive review of relevant documents. *Id.*

⁴⁸ The three Staff witnesses were Dr. Julius J. Persensky, Ms. Dolores S. Morisseau and Mr. Joseph J. Buzy. Dr. Persensky is Section Leader of the Personnel Qualifications Section, Licensee Qualifications Branch, in the NRC's Division of Human Factors Safety. He holds a B.A. in Psychology, an M.A. in Experimental Psychology, and a Ph.D. in Applied Experimental Psychology. Ms. Morisseau is a Training and Assessment Specialist, Licensee Qualifications Branch, Division of Human Factors Safety. She holds a B.A. in Psychology and an M.A. in Industrial Psychology. Mr. Buzy, the Staff's subject-matter expert in this case, is a Systems Engineer (Training and Assessment), Personnel Qualifications Branch, Division of Human Factors Safety. Mr. Buzy holds a B.S. in Marine Engineering in addition to his vast experience in the nuclear power field over the past 20 years. Staff, ff. Tr. 33,148, attached qualification statements.

In its testimony, the Staff acknowledges that it does not conduct its own reviews of licensee programs using the methodology it proposes. The Board notes, as the Staff explained, that the Staff is constrained by law in what it can review. Tr. 33,175-76 (Persensky). Moreover, its ongoing inspection program provides the Staff with regular input on the status of training at licensee facilities. Staff, ff. Tr. 33,148, at 38. The Board sees no inherent inconsistency between the fact that the Staff does not use the methodology it proposes and the fact that it believes the Committee should use it in its one-time review.

at 11-19. The Staff's methodology would also include classroom observations by a subject-matter expert and an instructional technologist to review the quality of instruction, instructor attitude, operator attitude and course content. The Staff also recommends that an evaluating group (consisting of a subject-matter expert and an instructional technologist) review: documents to determine the structure of the training program, documents concerning Training Department staff qualifications and job specifications, documents related to the cheating incidents to investigate the involvement of individuals named in ALAB-772, and documents describing the instructor criteria and instructor evaluation procedures and records of instructor attendance. *Id.*

332. The Staff's recommended approach to the evaluation of its second category (training systems/programs) is dedicated in large part to ensuring that the licensed-operator training program is performance-based. The Staff's methodology involves the review of the job/task analyses and the procedures for linking job/task analysis data to learning objectives. The Staff's methodology further recommends the review of learning objectives. The evaluating party should observe on-the-job training, and review or observe classes, lesson plans, handout material and simulator training to ensure that these items are consistent with program descriptions. Also, the reviewing group should review simulator training to determine whether it is centered on problemsolving and symptom-based analyses. The Staff further believes that an appropriate review would include reviewing the performance evaluations of the operators who have gone through the training program.⁴⁹ Staff, ff. Tr. 33,148, at 19-20.

333. The Staff would inquire into the Appeal Board's question of whether deficiencies in testing were symptomatic of more extensive failures (*id.* at 21) and whether the training program enhances knowledge rather than encouraging memorization (*id.* at 22-23).

334. With respect to the Staff's recommended methodology for assessing its third category (GPU Nuclear examinations), the Staff witnesses testified that exam development procedures, security procedures, content, format and administration should be reviewed by direct inspection of the exams and by observation of the administration of exams. *Id.*

335. The Staff's approach is similar to that ultimately taken by the Committee after the submission of its Special Report, when the Committee conducted its more detailed assessment of the TMI-1 licensed-operator training program in contemplation of this hearing. By the time of the hearing, the Committee had reviewed or observed the majority of

⁴⁹ GPU Nuclear does not have a formal on-the-job evaluation of licensed operators.

the items identified by the Staff. The Staff did not attempt to characterize the Committee's efforts in terms of a percentage of the recommended items, because the numerous items of review cannot be quantified. Some items, such as efforts to correlate job/task analysis data with behavioral learning objectives, are more important to a review than other items, such as an examination of attendance records as part of an effort to determine operator attitudes. While the Staff concludes that the Committee's methodology was appropriate for some issues, the Staff identified a number of instances where the Committee's methodology did not appear to be complete enough to fully answer the questions or issues addressed. Tr. 33,139-46 (Persensky).

336. For example, the Staff recommended interviews of operators, instructors, and Training and Education management to address: operator and instructor attitudes; communications mechanisms; training staff and operator morale; operators' perception of instructors, the training program, the integrity of the exam process, the cheating incidents, and the Company response thereto. The Committee interviewed a nonrepresentative sample of twenty-seven ROs and SROs, and met with a number of corporate, Training and Education and Operations managers. During these interviews, the Committee addressed all of the aforementioned issues. *Id.* However, in addressing the issue of employee attitudes and morale, the Committee did not structure its interviews to allow comparison to the findings of the RHR Report or Supplement 4 to NUREG-0680. Tr. 33,140 (Persensky). The Staff believes that, without structured interviews, no meaningful comparison can be made between the results of the Committee's interviews and the results of the RHR and NUREG-0680 Supplement 4 interviews. Tr. 33,190 (Persensky).

337. As noted above, the Committee's assessment did not include the review of the job/task analysis for licensed operators at TMI-1, as did the Staff's methodology. However, as also noted, the Committee was briefed on procedures for translating job/task analyses to learning objectives and exam questions, as the Staff's methodology also proposed. *Id.* The Staff believes that failure to review the job/task analyses reflects negatively on the weight to be given to the Committee's conclusions in this area.

338. The Committee did not observe on-the-job training. The Committee did not review all training materials to determine the degree of memorization required (with the exception of requalification exam questions), nor did it review or observe simulator or oral examinations regarding this issue.

339. Perhaps the most important difference between the Staff and the Review Committee is the Review Committee's failure to assess

GPU Nuclear's practice not to evaluate on-the-job performance for feedback to training. After the hearing, the NRC Staff proposed that a license condition be imposed requiring written on-the-job performance evaluations to be used in assessing the effectiveness of training. See Staff's Supplemental Proposed Findings, March 22, 1985.

340. The Staff testified that the Committee had indeed performed a number of the tasks that the Staff had recommended. The Staff, therefore, testified that it was satisfied that the Committee's assessment properly included: (1) a quality assurance check on the Training and Education department management presentation regarding communications mechanisms, and a documentary review of the communications mechanisms in place (Tr. 33,141 (Persensky); see Tr. 33,530-31 (Wagner)); (2) observation of Power Safety Incorporated (B&W) simulator and BPTS training to determine whether problemsolving skills are integrated into those programs (Tr. 33,142 (Persensky)); (3) a review of the budget allocated to training and a corroborative tour of the training center to observe its utilization (e.g., proper use of training aids) to assure itself of the adequacy of the training facilities (Tr. 33,144-45 (Persensky)); and (4) the review of documents describing the procedures for examination security and control and observation of the administration of exams in conformance with these procedures, Tr. 33,146 (Persensky).

341. Despite the various shortcomings seen by the Staff in the Review Committee's methodology, the Staff's conclusion was favorable to the Committee's findings:

The Board should accept the findings of the Committee, but weigh those findings in light of the methodological limitations identified. The Board should recognize that the Committee is appropriately constituted and composed of highly qualified professionals who are familiar with the TMI-1 training programs and are individually respected in their field of expertise. The Licensing Board recognized the value of this Committee's original review in LBP-81-32 and the Appeal Board reaffirmed that opinion in ALAB-772.

Staff, ff. Tr. 33,148, at 36.

5. *The Reconstituted Review Committee's Findings*

a. Implications of Cheating

342. The Appeal Board faulted this Board for failing to deal with the larger implications of cheating on the training and testing program and remanded the matter to us to seek the further testimony of the OARP

Review Committee. The Appeal Board stated: "The cheating and related incidents called into question the adequacy and integrity of licensee's entire training and testing program." ALAB-772, *supra*, 19 NRC at 1279.

343. The Committee dutifully addressed the matter and reported that it could not resolve the issue. The members of the Committee are as confused as others about the underlying causes of cheating; they possess no clairvoyance in that regard, and they preferred to address the matter as a question of prevention rather than cause. See Special Report, ff. Tr. 31,749, at 65-66.

344. In the Committee's view:

Cheating is an issue of personal morality, and is not an easy issue for educators or professionals to grapple with. Cheating is complex in its derivation, highly situational and individual. Management must take the utmost precautions to prevent it. The Committee of course recognized that the cheating incidents which occurred in April 1981 as well as the other incidents of cheating discussed by the Licensing Board in its July 1982 decision were extremely serious and reflected unfavorably on the organizations as well as the individuals involved. The Committee concluded, however, that this behavior on the part of a very few individuals did not negate the Herculean efforts of so many — trainers and trainees — during the past five years.

Review Committee, ff. Tr. 31,749, at 5.

345. Essentially, the Committee response to ALAB-772 was to evaluate the training and testing program to determine whether there were needs and opportunities to cheat. They did not anguish over the root causes of cheating. For this the Committee and the Licensee are roundly condemned by the Intervenors and the Commonwealth.

346. UCS states that the Committee's failure to address one of the fundamental issues of the case undercuts the Committee's conclusion that the training program did not contribute to the cheating and that their conclusions about the adequacy of the program are weakened. UCS Proposed Findings 117-125.

347. The Commonwealth questions whether the cheating at TMI was "highly situational" as the Review Committee assumed. The Licensee, according to the Commonwealth, did not possess the expertise and experience necessary to determine the cause of cheating and in fact did not probe deeply into the root causes. Also according to the Commonwealth, the failure of the Committee and the Licensee to establish the root cause of cheating is a default in the remand. Commonwealth Proposed Findings, *passim*, particularly 27 and Conclusion at 12.

348. Similarly, TMIA argues that the failure to identify the root cause of cheating forecloses assurance that it will not recur. TMIA Proposed Finding 19.

349. Various witnesses speculated as to some of the motivations for cheating. Perhaps there was a resentment of the need to be reexamined. Tr. 32,289 (Long). Perhaps the cheaters weren't prepared for the examination. Tr. 33,481 (Leonard). Dr. Regan comes straight to the point: people might cheat if they don't know the answers. Tr. 32,771. Also, he believes that they might cheat if they do not believe the test is relevant to the job. *Id.*

350. Several witnesses recounted examples of cheaters in their experience who, in view of their command of the subject matter, did not need to cheat. The Board can speculate, too. Perhaps perfectionists wish to upgrade a passing score. Perhaps knowledgeable but insecure persons cheat because they lack confidence. Perhaps they cheat and copy the wrong answer overriding their correct judgment. Perhaps they cheat for the thrill of it, or in resentment, or to get along with peers. Perhaps the training program is excellent but the trainee is too lazy or too stupid to learn. Perhaps the cheater is morally corrupt and cheats routinely in all areas of life. Perhaps the cheater is usually ethical, but cheats because he is desperate, fears losing his job, and has a family to support. Perhaps there are combinations of causes.

351. We agree with the Committee. There was no value to be gained from dwelling on the anatomy of cheating. The Commonwealth and Intervenors were free to produce expert testimony if in fact there are helpful experts on the subject.

352. In measuring the Licensee's response to cheating, we assumed that some persons cheat when they perceive a benefit from cheating and when there is an opportunity. This is a workable premise. The correct response to cheating is adequate communication, training and examination safeguards. Whatever the various root causes of cheating might be, the problem must be bounded.

b. The Committee's Substantive Findings

353. In addition to explaining its methodology, and its particular reaction to the cheating phenomenon, discussed in the preceding sections, the Committee made many substantive findings on Licensee's efforts to improve the licensed-operator training program and the results. *See generally* Committee Testimony, ff. Tr. 31,749, and Special Report attached thereto; Committee Rebuttal Testimony, ff. Tr. 33,320. We have referred to these findings throughout this Decision. By way of review, the Committee's substantive findings covered four major areas:

- (1) The Committee evaluated the resources devoted to training, including the physical plant and equipment, the management

and staff of the Training Department and programs for training the trainers. Committee Testimony at 7-11.

- (2) The Committee reviewed Licensee's response to the recommendations made by the Committee in 1980. Chapter III of the Special Report (ff. Tr. 31,749) summarizes each 1980 OARP Review Committee recommendation and GPU Nuclear response. All of the Committee's recommendations have been seriously studied, and all but one recommendation, which the Licensee reviewed but did not implement, have been adopted and have been or are being implemented.
- (3) Independently of the 1980 recommendations the Committee made many substantive findings on the training program as it exists today, particularly regarding curricula, simulator testing and training, written and oral examinations and examination security. Committee Testimony, ff. Tr. 31,749.
- (4) The Committee evaluated management's communication with personnel and the attitudes of the licensed operators. Special Report at 22-23; Committee Testimony, ff. Tr. 31,749, at 31.

354. The Board has considered and discussed all of the Committee's major findings and conclusions in the context of the Board's own analyses of the training program in preceding § C. We have viewed the Committee's substantive findings as expert testimony to be considered along with all other evidence on the respective issues and have not restated those findings separately here. It is sufficient here to note again that, after all of its analyses and a consideration of the issues, the Review Committee concluded that the licensed-operator training program at TMI-1 is effective and will continue to qualify individuals to operate TMI-1. Committee Testimony, ff. Tr. 31,749, at 31.

6. Board Conclusion — OARP Review Committee

355. The Board must decide what effect to give to the Review Committee's testimony, findings and conclusions. We came late to realize that the issue of the adequacy of the Review Committee's work was never satisfactorily joined. The Committee stated that it was not their assigned responsibility to validate the program, to serve as an accreditation group, or to perform a quality assurance check on the program. Despite this disavowal, the Committee and Licensee hold out the Committee's findings as independently sufficient grounds for concluding that the

TMI-1 licensed-operator training program is adequate.⁵⁰ In fact, Licensee and UCS litigated the value of the Committee's work as if it were held out to be a complete accreditation of the training program.

356. The Board agreed with the Staff that ALAB-772 did not remand this matter to litigate again the entire licensed-operator training program. Licensee and UCS, having elected a complete litigation, the Board followed them, because a complete case tended to bound the concerns of ALAB-772. UCS approached the issue appropriately by presenting the testimony of Dr. Regan as to the methodological model he would use and against which the Review Committee's methodology should be measured for a complete program evaluation. As it turned out, we could not see large practical differences in Dr. Regan's approach and the approaches of the Staff and the Committee.

357. Very roughly speaking, the Board would characterize the three approaches to training program evaluation as follows: (1) UCS believes that if an action step for evaluation can be taken, it should be taken. (2) The Staff believes that its lengthy list of action steps for program evaluation might be useful but that, given the expertise of the panel, not all of those steps are necessary. The Review Committee, relying heavily upon judgment, took those action steps it deemed necessary to satisfy itself of the program's adequacy. In our view, there was no magic amount of action to be taken. Certainly more could have been done, but perhaps even less effort by the Committee would have been sufficient. In the final analysis, the adequacy of the Committee's methodology depends upon its application.

358. With that in mind the Board had some difficulty with the Review Committee's approach to the remand. While we agreed with the Committee that its assignment was limited, its ultimate conclusion that the program was adequate to produce individuals competent to operate TMI-1 might seem to be an unjustified product of such a limited assignment. Yet considering its original 1980 evaluation, the logical methodology of its later review, the large effort expended, and most importantly,

⁵⁰ However, the Board may be overstating the Licensee's position on this point. Licensee Proposed Findings are ambiguous as to the ultimate effect to be given to the Committee's findings. Licensee states:

[T]he Committee did not attempt to conduct, nor should it have conducted, an accreditation of the training program; instead it embarked on an extensive review of the training program to allow it to address the Appeal Board's remanded issues. This review was a followup to the baseline 1980 assessment done by the OARP Review Committee. . . . [T]he Committee's review met and exceeded that threshold level of review. . . . [T]he Committee's methodology used to assess the TMI-1 licensed-operator training program is adequate to support its findings concerning that program. Moreover, the Committee's findings, which are very favorable, are fully consistent with the evidence presented in this proceeding on licensed-operator training at TMI-1.

Licensee Proposed Finding 323.

the Committee's cumulative expertise, we do not criticize the Committee for its broad finding that the program is adequate. Moreover we do not find that it was incorrect in that result. But neither can we find that it was correct.

359. We recognized three essential components to the Committee's contribution to the record: expertise; methodology, including implementation; and product in the form of findings and conclusions. Before we can assess the adequacy of the methodology, we must first evaluate the use to which its product is put. That task is very difficult.

360. It is easy enough to find that the Committee satisfied the remand order in ALAB-772. It provided its very carefully constructed and well-founded opinions on the basic issue and various subsidiary evidentiary questions just as the Appeal Board requested.

361. But, with respect to both ALAB-772 and the overall adequacy of the training program, the evidence offered by and through the Review Committee was only a part of the proceeding on remand. On virtually every important issue, Licensee presented evidence in addition to the Review Committee's evidence. In fact, quantitatively, the Review Committee's evidence was a relatively small part of the proceeding on training. For this Board to find, as Licensee requests, that the Review Committee's findings independently support a conclusion that the training program is adequate, would require that we somehow examine all of those issues and determine whether the Review Committee's evidence standing alone would have been sufficient to resolve them in Licensee's favor. This is impossible. The evidence is inseparably comingled. Frequently Licensee's employees testified directly about matters on which the Committee made findings, and, in fact, employee testimony replicated the foundation for the Committee's findings. Any attempt at separating the Committee's findings and testimony from other evidence would be a waste of time.

362. The only way the Board could find from the Review Committee's work alone that the program is adequate to train qualified licensed operators is to go from expertise and methodology to conclusion, skipping the Committee's findings. We decline to do this.

363. Accordingly, the Board's conclusions as to the effect assigned the Review Committee's efforts is as follows:

- (1) As we have frequently noted, we valued the members' opinions very highly.⁵¹ The Committee's findings played an important role on almost every issue.
- (2) We cannot find that its findings standing alone would have satisfied all of the concerns expressed in ALAB-772 or would have established independently the adequacy of the licensed-operator training program.
- (3) Licensee could not have prevailed on the ALAB-772 issues without the Review Committee because the Appeal Board expressly called for the opinions of its members.
- (4) The Review Committee and its members responded appropriately to the questions put to them in ALAB-772.
- (5) Whether Licensee could have prevailed on the issue of the overall adequacy of the training program without the Review Committee would depend upon an analysis that we need not and have not made.

IV. CONCLUSIONS OF LAW

A. Licensee has responded appropriately to the cheating incidents identified in the partial initial decision of July 27, 1982, LBP-82-56, 16 NRC 281.

1. Employees of Licensee who failed to prevent the cheating have acknowledged their failures and their responsibility to prevent cheating.
2. Licensee has improved channels of communication among its management, its reactor operators and its training employees for the purpose of restoring integrity to its training program. As measured analytically, and as measured by employee attitudes, Licensee's communications methods are effective.

⁵¹ UCS questions in particular the objectivity of Dr. Uhrig because, as a member of the Atomic Industrial Forum Committee on Three Mile Island Two Recovery, he joined in two letters which urged that the Commission lift the orders that direct TMI-1 to remain in cold shutdown; and because his name appears on the list of AIF Committee members that accompanied a third such letter to the Commission. UCS Proposed Finding 111. However, Dr. Uhrig is a full-time employee of Florida Power & Light, his activities on the AIF Committee are paid for by that utility and his work on the OARP Committee was done while he was on vacation from FP&L. We deem that Dr. Uhrig worked on the OARP Committee and appeared before us as an independent consultant hired by GPU Nuclear. See Licensee's and UCS' Stipulation dated February 15, 1985. *A fortiori*, he could freely express his opinions outside the hearing room and freely join organizations of his choice. The Board recognizes that the views of Dr. Uhrig, as well as most of his colleagues on the Committee, may be influenced by their backgrounds. We would not have it otherwise. Active involvement in their respective disciplines is a necessary ingredient of their expertise.

3. Licensee has established adequate security measures to prevent cheating on examinations.

4. Licensee has improved its licensed-operator training program.

B. The licensed-operator training program for TMI-1 is adequate to train reactor operators and senior reactor operators to operate the unit safely, provided that Licensee institute a procedure for evaluating after training the performance of its trained operators in the job setting for revision of the training program as ordered below.

C. Licensee's TMI-1 licensed-operator training program has been accredited by the Institute of Nuclear Power Operations (INPO). The Commission's Policy Statement on Training and Qualification of Nuclear Power Plant Personnel (50 Fed. Reg. 11,147 (Mar. 20, 1985)) endorses the INPO accreditation program as an acceptable method for implementing performance-based licensed-operator training programs. Nevertheless, Licensee is entitled to no credit for the INPO accreditation because: (1) as a matter of due process the parties adverse to Licensee had no opportunity to address the effect of the INPO accreditation and the Policy Statement, and (2) the INPO Accreditation Board failed to apply its own criteria when awarding accreditation to the TMI-1 licensed-operator training program.

D. The reconstituted Operator Accelerated Retraining Program (OARP) Review Committee has, by appropriate methodology, reviewed the TMI-1 licensed-operator training program with respect to the concerns stated by the Appeal Board in ALAB-772, 19 NRC 1193 (1984). However, the Board does not adopt, independent of all other evidence, the conclusion of the Review Committee that the TMI-1 licensed-operator training program is adequate to train operators to operate the unit safely.

E. Licensee has responded appropriately to the Appeal Board order of May 24, 1984 (ALAB-772) remanding this proceeding for further hearings on the implications of cheating on the TMI-1 licensed-operator training program. Subject to the condition imposed below, Licensee has prevailed in the proceeding mandated by ALAB-772.

F. To provide assurance in the long term that TMI-1 can be operated without endangering the health and safety of the public, it is necessary that Licensee implement a plan to evaluate the performance of trained reactor operators and senior reactor operators in the job setting for revision of its TMI-1 licensed-operator training program. Licensee will have demonstrated reasonable progress toward the completion of this requirement if it begins immediately to satisfy this requirement as provided in the order below. *See* CLI-79-8, 10 NRC 141, 148-49 (1979).

V. ORDER

The Licensee shall implement a plan for the evaluation, after training, of the performance of its trained reactor operators and senior reactor operators in the job setting, under both normal and abnormal operation, for revision of the TMI-1 licensed-operator training program in accordance with the Board's findings and conclusions, particularly § III.C.4, *supra*.

The Board retains jurisdiction solely for the purpose of approving the plan for job performance evaluation. Licensee shall, within 30 days of the date of this Decision, present to the NRC Staff and other participants in this remanded proceeding its proposal for an evaluation plan, and seek their approval, particularly the approval of the NRC Staff and the Union of Concerned Scientists. The plan with the parties' approval or with the parties' disapproving comments shall be submitted to the Licensing Board within 45 days of the date of this Decision.

VI. APPEALS

Any party may take an appeal from this Decision by filing a Notice of Appeal within 10 days after service of this Partial Initial Decision. Each appellant must file a brief supporting its position on appeal within 30 days after filing its Notice of Appeal (40 days if the Staff is the appellant). Within 30 days after the period has expired for the filing and service of the briefs of all appellants (40 days in the case of the Staff), a party who is not an appellant may file a brief in support of or in opposition to the appeal of any other party. A responding party shall file a

single, responsive brief *only* regardless of the number of appellants' briefs filed. See 10 C.F.R. § 2.762.

**THE ATOMIC SAFETY AND
LICENSING BOARD**

**Sheldon J. Wolfe
ADMINISTRATIVE JUDGE**

**Gustave A. Linenberger, Jr.
ADMINISTRATIVE JUDGE**

**Ivan W. Smith, Chairman
ADMINISTRATIVE LAW JUDGE**

Bethesda, Maryland
May 3, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

**Peter B. Bloch, Chairman
Dr. Kenneth A. McCollom
Dr. Walter H. Jordan**

In the Matter of

**Docket Nos. 50-445-OL&OL-2
50-446-OL&OL-2
(ASLBP No. 79-430-06-OL)**

**TEXAS UTILITIES ELECTRIC
COMPANY, *et al.*
(Comanche Peak Steam Electric
Station, Units 1 and 2)**

May 24, 1985

The Licensing Board requires Applicants to file a statement of Current Management Views as to the status of the plant, including an assessment of the adequacy of the record Applicants have created in this case. Applicants also are required to file a Case Management Plan that sets forth the issues in the case, their alleged disposition, whether they are moot, and a suggested order of litigation. In addition, the Board schedules a prehearing conference to resolve outstanding discovery requests.

RULES OF PRACTICE: ADEQUACY OF THE RECORD

Under circumstances where Staff documents have raised a variety of questions about plant design and construction, the Board may order Applicants to set forth their current view of the adequacy of management, including the adequacy of individual officials continuing to serve in management.

RULES OF PRACTICE: MANAGEMENT PLAN

Applicants may be required to file a comprehensive plan for the management of the case, covering each of the issues, including how they have been or may be disposed of.

MEMORANDUM AND ORDER

Memorandum (Case Management Plan)

After reviewing Applicants' Proposed Case Management Plan¹ and the responsive filings, we have concluded that the Plan requires further elaboration so that subsequent filings will not be overly simplistic, in light of the current condition of the plant and of the record in this case. Furthermore, the Board requires a current assessment by management of the status of the plant and of the extent to which management bears responsibility for adverse plant conditions or wishes to correct or clarify portions of our hearing record.

The SSERs and Board Notices containing transcripts of meetings of the Staff of the Nuclear Regulatory Commission (Staff) raise two kinds of questions: (1) what is the safety of the plant in light of the Staff findings, and (2) to what extent do adverse findings reflect unfavorably on the competence of Applicants' management? Related to these questions are concerns about whether Applicants now know that portions of our record require correction or that the credibility of some of Applicants' witnesses is subject to substantial doubt for reasons not previously known to the Board. Also of obvious concern is the extent to which Applicants may have failed to demonstrate the adequacy of their design process pursuant to the Plan submitted in January 1984 and approved by the Board.²

¹ Filed April 26, 1985, by Texas Utilities Electric Co., *et al.*

² The parties should address the implications of the Board's previous view that,

[w]e anticipate that the next round of hearings should be the last. At some point, prolongation of hearings would represent a denial of due process to one or more of the parties. We encourage the parties to present their evidence and to prepare their required Proposed Findings with care, being sure to present a reasoned basis for the decision sought from the Board.

LBP-84-10, 19 NRC 509, 531 (1984). Note that we referred to "hearings" in that decision but that the Applicants' summary disposition motions, filed pursuant to its Plan, were given the status of Written Filings, from which the Board was authorized to reach a determination without any formal hearings, unless the Board, in its discretion, chose to hold hearings. LBP-84-25, 19 NRC 1589, 1591 (1984).

Mootness

Applicants' Case Management Plan refers to mootness, arguing that some issues may be eligible to be deleted from the case because there is no current controversy about them. What Applicants say about mootness is correct, for no one wishes to litigate matters that are truly moot. On the other hand, Applicants should demonstrate mootness with respect to all the questions discussed in the previous paragraph. In the alternative, Applicants may seek stipulations that specific issues are moot, subject to approval by this Board.

Case Management

The Board also requires more from Applicants than their proposed Plan offers. The large number of pending issues requires Applicants to advise us of the issues, including which issues are open or are allegedly closed either by decision of this Board or by stipulation. Applicants also should suggest the order in which the issues may be resolved, considering the scarcity of Citizens Association for Sound Energy's (CASE's) resources and the repetitious pattern of litigation that has characterized this case. Then, Applicants' statement of open items may be responded to by others, who may have a different perception or may wish a different order of litigation.

Current Management Views

To assist the Board in assessing the adequacy of Applicants' current management team, the Board requires that by June 15, 1985, Applicants file a statement of their current view of the status of the plant, including their assessment of the adequacy of the record that Applicants have created in this case. This view should delineate the responsibility of individual plant and company officials and executives and assess their performance and, if they are continuing with the company, whether they are competent to continue to perform their current functions. We expect this filing to be a frank, honest assessment. To the extent that there are important current uncertainties, Applicants should describe and explain those uncertainties. Management's ability to understand and willingness to disclose its understanding of the plant condition and of prior management actions could powerfully influence our subsequent decisions.

Time Schedule

There is sufficient uncertainty about the scope and content of the filing that we are requiring of Applicants that we will not indulge in the apparently fruitless exercise of blindly setting a schedule for responses. CASE will not be subjected to unrealistic time schedules. We will consider as relevant to the scheduling the reasonableness of Applicants' responses to discovery requests.

Discovery

Applicants should respond to CASE's requests for background information about Applicant's officials and consultants. The issue is not likely to self-destruct. With respect to other discovery problems and requests for information, the Board will hold a prehearing conference of 1 or 2 days' duration beginning June 3, 1985, unless the parties enter into a stipulation making the conference unnecessary.

Responses

We will require CASE and the Staff of the Nuclear Regulatory Commission to respond to the Case Management Plan that Applicants will file in response to this Memorandum and Order. The responses are expected to be helpful to the Board in defining and resolving issues.

Judge Grossman

Hon. Herbert Grossman, who serves on the Licensing Board for the intimidation portion of this docket, is informed of and concurs in this Memorandum and Order.

Order

For all the foregoing reasons and based on consideration of the entire record in this matter, it is, this 24th day of May 1985,

ORDERED:

1. Texas Utilities Electric Company, *et al.* (Applicants) shall file by June 15, 1985, a statement of Current Management Views that complies with the discussion in the accompanying memorandum.
2. Applicants shall file, with reasonable promptness after relevant Staff documents have been made available to them, a Management Plan that complies with the discussion in the accompanying memorandum.

3. Applicants shall respond in a prompt fashion to outstanding discovery requests concerning qualifications of officials and consultants.

4. The Board will convene a prehearing conference at 9 a.m. on June 3, 1985, at a location to be announced in Fort Worth, Texas, to consider the status of pending information and discovery requests, unless the parties reach prior stipulations on all outstanding requests.

5. This is an interlocutory decree.

**FOR THE ATOMIC SAFETY AND
LICENSING BOARD**

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

**Walter H. Jordan (by PBB)
ADMINISTRATIVE JUDGE**

**Kenneth A. McCollom (by PBB)
ADMINISTRATIVE JUDGE**

Bethesda, Maryland

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

**Peter B. Bloch, Chairman
Dr. Kenneth A. McCollom
Dr. Walter H. Jordan**

In the Matter of

**Docket Nos. 50-445-OL&OL-2
50-446-OL&OL-2
(ASLBP No. 79-430-06-OL)**

**TEXAS UTILITIES ELECTRIC
COMPANY, *et al.*
(Comanche Peak Steam Electric
Station, Units 1 and 2)**

May 30, 1985

**MEMORANDUM
(Clarification of LBP-85-16)**

Yesterday the parties asked us the following stipulated question, which was intended to clarify LBP-85-16 and to which we were asked to answer "Yes" or "No":

Did the Board intend in its May 24 Order to withdraw the [February 15, 1985] protective order governing discovery in the -1 docket?

The Board's answer to this question was:

No, we did not intend to withdraw the protective order. However, we do supersede the protective order in part. Applicants should respond to discovery requests that are likely to survive regardless of what the Staff does. The purpose of the rule we

are now applying is to balance the cost of Applicants' responding now against the avoidance of delay because they do respond now. This is a practical test.

**FOR THE ATOMIC SAFETY AND
LICENSING BOARD**

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

Bethesda, Maryland

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

James M. Taylor, Director

In the Matter of

Docket No. 50-309
(10 C.F.R. § 2.206)MAINE YANKEE ATOMIC POWER
COMPANY
(Maine Yankee Atomic Power
Plant)

May 13, 1985

The Director of the Office of Inspection and Enforcement denies the remaining portion of a Petition under 10 C.F.R. § 2.206 which requested that the Nuclear Regulatory Commission take action to remedy alleged serious deficiencies in the offsite emergency response plans for the Maine Yankee Atomic Power Station. On September 30, 1983, an "Interim Director's Decision Under 10 C.F.R. § 2.206," DD-83-15, 18 NRC 738, was issued examining a number of issues raised by the Petition and granting in part and denying in part Petitioner's request with respect to those issues. However, Petitioner's concern regarding the adequacy of State Route 27 was noted to be still under consideration. The remaining issue was referred to the Federal Emergency Management Agency (FEMA) for evaluation. Based on FEMA's evaluation that State and local radiological emergency plans and preparedness are not adversely affected by the alleged limitations for evacuation purposes of State Route 27, the Director denies the remainder of the Petition.

LOW POPULATION ZONE: EVACUATION

Evacuation planning, including the use of State Route 27 as an evacuation route for peak summer populations, is adequate for the Maine Yankee facility.

FINAL DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

BACKGROUND

In his "Request for Issuance of Order to Show Cause" (Petition) dated April 8, 1983, David Santee Miller, on behalf of Eleanor S. Miller, Stanley R. Tupper, Judy Flanagan and Sensible Maine Power (hereinafter referred to as Petitioners) requested that the Director of the Office of Inspection and Enforcement initiate a proceeding pursuant to 10 C.F.R. § 2.206 of the Commission's regulations to modify, suspend or revoke the license of the Maine Yankee Atomic Power Company (the Licensee) to operate the Maine Yankee Atomic Power Station. The Petitioners based their request upon the Federal Emergency Management Agency's (FEMA) evaluation of the Joint State and Local Radiological Emergency Response Exercise held for the Maine Yankee facility on December 11, 1982, which Petitioners claimed identified several significant deficiencies in emergency preparedness at the Maine Yankee facility. In addition, the Petitioners expressed a concern over the state of emergency preparedness in the Boothbay Harbor area regarding alleged limitations for evacuation purposes of State Route 27. The paramount issue of their concern appeared to be evacuation of a peak summertime population of approximately 100,000 people in the Boothbay Harbor Region.

On September 30, 1983, an "Interim Director's Decision Under 10 C.F.R. § 2.206" was issued examining a number of issues raised by the Petition and granting in part and denying in part the Petitioners' request with respect to those issues.¹ However, the Petitioners' concern regarding the adequacy of State Route 27 was noted to be still under consideration. The Petitioners were informed that the NRC had formally requested FEMA to evaluate the State Route 27 issue. On July 23, 1984, FEMA provided its "Evaluation of Evacuation Time Estimates for Maine Yankee Power Station," in which FEMA expressed a concern over not being able to properly substantiate the population estimates of either the Licensee (30,000) or the Petitioners (100,000) in the Boothbay Harbor Region. FEMA stated that it was unable to reach any final conclusion as to the likely effect that evacuation times would have on the public safety in the Boothbay Harbor Region. In order to obtain an

¹ *Maine Yankee Atomic Power Co. (Maine Yankee Atomic Power Station), DD-83-15, 18 NRC 738 (1983)*, hereinafter referred to as the Interim Decision.

update of the evacuation time estimates (ETEs) for the Maine Yankee plume exposure pathway emergency planning zone (EPZ) submitted by the Licensee on May 23, 1980, the NRC formally requested on August 10, 1984, that the Maine Yankee Atomic Power Company update its ETEs addressing in particular the peak summertime population including the seasonal resident and daily transient population in the Boothbay Harbor area. The Petitioners were informed of this request by letter on August 20, 1984. In addition, during the period August 23-28, 1984, the NRC with its consultant, Battelle Pacific Northwest Laboratories, conducted an on-the-scene evaluation of the Maine Yankee population distribution in the Boothbay Harbor Region. The results of a demographic study performed during this evaluation, which was documented in a Memorandum for Record,² indicated a peak summertime population of approximately 32,000 people for the Boothbay Harbor Region.

By letter dated November 6, 1984, Maine Yankee Atomic Power Company submitted updated ETEs for the Maine Yankee EPZ attached hereto as Exhibit A (not published). Subsequently, on December 14, 1984, the NRC forwarded the Licensee's November 1984 ETEs to FEMA and requested that FEMA evaluate the ETEs and provide a finding to the NRC as to whether the state of emergency preparedness in the Boothbay Harbor area is adversely affected by the alleged limitations for evacuation purposes of State Route 27 and, if so, whether any corrective measures should be taken. FEMA has now responded to the NRC's request and a final decision in this matter is now possible.

DISCUSSION

The Interim Decision noted that FEMA is responsible for evaluating the status of offsite emergency preparedness for nuclear power plants, including the adequacy of evacuation routes that may be used in taking protective measures during an emergency.³ Consequently, the NRC Staff formally requested that FEMA review the State Route 27 issue and the Director of Inspection and Enforcement deferred resolution of that portion of the Petition until after the Staff reviewed FEMA's response.

On March 15, 1985, FEMA responded to the NRC request. Its "Analysis Report on Issues Related to the Evacuation Time Estimates for the Maine Yankee Power Station, Wiscasset, Maine," dated March 11, 1985

² Memorandum for Record from Donald J. Perrotti, "Trip Report on Maine Yankee Emergency Evacuation Plans and Discussion on Maine Yankee Evacuation Time Estimate Study," October 11, 1984.

³ Interim Decision, 18 NRC at 741.

(hereinafter referred to as the FEMA Analysis) is attached hereto as Exhibit B (not published). FEMA completed its evaluation of the adequacy of the evacuation plan and road network in four phases: (A) review of State and local plans; (B) review of population estimates; (C) new evacuation model runs; and (D) suggestions for improvements to the existing plans.

With regard to population estimates, FEMA reviewed data provided by the Petitioners, the estimates from the new demographic study of the Boothbay Harbor area done by the Maine Yankee Atomic Power Company, and the results of the on-the-scene evaluation of the population distribution done by NRC and Battelle Pacific Northwest Laboratories. FEMA's review indicated, based on available data, that: (1) the peak population estimate of 100,000 put forth by the Petitioners does not withstand detailed demographic analyses; and (2) the estimates of the Maine Yankee Atomic Power Company and Battelle Pacific Northwest Laboratories are based on sound demographic methodology and the population is within $\pm 10\%$ of their estimates. With regard to population estimates, FEMA concluded that the maximum credible peak summer-time population is 36,000.

During its review process, FEMA identified that the description of the evacuation network in the local plans was not exactly the same as in the State plan.⁴ In addition, FEMA identified several areas for improvement which FEMA is recommending for inclusion in the State emergency plan. FEMA concluded, however, that the State and local radiological emergency plans and preparedness are not adversely affected by the alleged limitations for evacuation purposes of State Route 27.

CONCLUSION

In summary, the single issue remaining after issuance of the Interim Decision in this matter was whether the adequacy of State Route 27 was adversely affected by its alleged limitations for evacuation purposes. This matter has been examined by FEMA and it has been found that the State and local radiological emergency plans and preparedness are not adversely affected by alleged limitations for evacuation purposes of State Route 27. Consequently, I conclude that evacuation planning, including the use of State Route 27 as an evacuation route, is adequate for the Maine Yankee facility.

⁴ FEMA notes in the FEMA Analysis that the identified inconsistencies are to be addressed in the near future. A complete finding on the adequacy of State and local radiological emergency response plans for Maine Yankee will be forthcoming as part of the FEMA 44 C.F.R. Part 350 approval process.

Accordingly, the remaining portion of the Petitioners' request for action pursuant to § 2.206 is denied. As provided by 10 C.F.R. § 2.206(c), a copy of this Decision will be filed with the Secretary for the Commission's review.

James M. Taylor, Director
Office of Inspection and
Enforcement

Dated at Bethesda, Maryland,
this 13th day of May 1985.

[The exhibits have been omitted from this publication but may be found in the NRC Public Document Room, 1717 H Street, NW, Washington, DC 20555.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Harold R. Denton, Director

In the Matter of

Docket No. 50-483
(10 C.F.R. § 2.206)

UNION ELECTRIC COMPANY
(Callaway Plant, Unit 1)

May 17, 1985

The Director of the Office of Nuclear Reactor Regulation denies a petition submitted by Michele Varricchio and Billie Garde of the Government Accountability Project on behalf of the Concerned Citizens About Callaway and others. The petition had identified forty-eight allegations related to the adequacy of construction of the Callaway Plant and requested that in view of the allegations, the Callaway low-power license be suspended until the allegations were investigated and appropriate reinspection performed to determine the extent of the problem raised by each allegation.

**ATOMIC ENERGY ACT: ISSUANCE OF OPERATING
LICENSE**

A reactor operating license will only be issued by the Commission if it can be found there is reasonable assurance that power operation presents no undue risk to public health and safety.

TREATMENT OF ALLEGATIONS

When assessing the significance of allegations, the NRC makes an initial determination whether an allegation, if true, is relevant to safe operation of the facility. Allegations deemed not relevant to safe operation of

the facility and allegations determined to be frivolous, or too vague or general in nature to provide sufficient information to investigate, receive no further consideration. Allegations raising a safety concern are pursued further.

RULES OF PRACTICE: 2.206 PETITIONS

Petitions filed under 10 C.F.R. § 2.206 provide members of the public with a means of bringing safety problems concerning nuclear facilities to the Commission's attention. Section 2.206 petitions are not information-gathering devices for members of the public.

DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

I.

By letter to the Commissioners, dated September 28, 1984, Michele Varricchio and Billie Garde of the Government Accountability Project (GAP), on behalf of the Concerned Citizens About Callaway and others (hereinafter referred to as the Petitioners) requested that immediate action be taken with respect to the Callaway Plant. Specifically, the Petitioners identified forty-eight allegations related to the adequacy of construction of the Callaway facility, and requested that in view of these allegations, the Callaway low-power license "be suspended until such time that each of the specific allegations . . . is investigated and that appropriate reinspection is performed to determine the extent of the problem raised by each allegation." The Petitioners brought their request pursuant to 10 C.F.R. § 2.206, and in accord with the Commission's usual practice, the Petitioners' letter was referred to the Staff for consideration under that regulation. *See Lorion v. NRC*, 712 F.2d 1472, 1474 (D.C. Cir. 1983), *rev'd on other grounds sub nom. Florida Power and Light Co. v. Lorion*, 53 U.S.L.W. 4360 (U.S. 1985).

The NRC received the Petitioners' request only a few days before the Commission's scheduled meeting on authorization of a full-power license for Callaway Unit 1. The Staff reviewed the Petitioners' allegations, many of which were lacking in specificity, and after conducting a preliminary screening and assessment of the allegations, informed the Commission that the concerns raised by the Petition did not appear to warrant immediate action by the Commission to either suspend the Callaway low-power license or stay issuance of a full-power license. Accordingly, a full-power license was issued to the Callaway facility on October

18, 1984. In a letter dated November 7, 1984, the immediate relief requested by the Petitioners was denied. At that time, the Staff determined that there was sufficient evidence to conclude that the requested immediate relief was not warranted. The Staff's determination was based in part on the fact that several of the allegations raised by Petitioners had been previously reviewed and resolved, and that other allegations concerned areas where it had been determined that the necessary requirements were met. In addition, several allegations were quite broad and since previous NRC and Licensee inspections, evaluations and reviews had not identified problems in those areas, granting the immediate relief did not appear to be warranted. Nonetheless, the Staff continued to review the Petitioners' request. The Licensee was asked to review the allegations, and with the exception of allegation 42, prepare a written response to each.¹ The Licensee subsequently responded by letter dated December 7, 1984.

Initially, the Petitioners were informed that in the absence of more specific information supporting the petition, it would be difficult to assess the need for additional action at Callaway. See Letter to Billie Garde, Director, Citizens Clinic, GAP, from Edson G. Case, Acting Director, NRR (Nov. 7, 1984). The Staff renewed its offer to meet with those former workers whose allegations formed the basis for the petition.² See also Letter to Billie Garde, Director, Citizens Clinic, GAP, from Frank J. Miraglia, Deputy Director, Division of Licensing, NRR (Nov. 21, 1984). However, after meeting with GAP representatives, the NRC Staff determined that in view of the considerable Staff resources already expended on investigating the allegations, and the conditions proposed by GAP under which allegeders would be made available to NRC, the best course of action for timely resolution of the petition would be for the NRC to complete its evaluation based on available information. See Letter to Billie Garde from James Keppler (Jan. 11, 1985).

The results of Region III's examination are contained in Inspection Report 50-483/84-45 (Jan. 22, 1985). Based upon this review, the results of previous inspections, and the Licensee's conduct of an extensive preoperating testing program, the Staff has determined that the Callaway

¹ Since allegation 42 was essentially a request to the NRC seeking information pertaining to drug and alcohol use, gambling and prostitution at the Callaway site, the Staff determined that it was unnecessary for the Licensee to respond. Nonetheless, the Licensee responded to the allegation.

² The Region III Staff first learned in May 1984 (prior to submittal of the petition) of the existence of allegations concerning the construction of the Callaway Plant. Two former plant workers were interviewed by Region III in June 1984, and the allegations they raised were investigated and resolved, as documented in Inspection Report No. 50-483/84-30. Region III became aware of other worker allegations at Callaway, and made repeated attempts to obtain more specific information from the Government Accountability Project. See Letter to Billie Garde, GAP, from James Keppler, Region III Administrator (Sept. 27, 1984).

Plant was built in substantial conformance with applicable regulatory requirements, and that the systems in the facility would, if called upon, perform their intended safety functions. Accordingly, for the reasons in this Decision, the Petitioners' request is denied.

II.

In considering a request under 10 C.F.R. § 2.206 or, for that matter, any allegation of substandard workmanship or improper practices involving a nuclear power reactor, the NRC Staff is mindful of the Commission's overriding regulatory responsibilities to assure adequate protection of the public health and safety in the use of radioactive material and the operation of nuclear power facilities. *See Power Reactor Development Co. v. International Union of Electrical Radio and Machine Workers*, 367 U.S. 396, 406 (1961). Consistent with these responsibilities, a reactor operating license will only be issued by the Commission if it can be found that there is reasonable assurance that power operation presents no undue risk to the health and safety of the public. *See* 10 C.F.R. § 50.57. When assessing the significance of allegations, the Staff makes an initial determination whether an allegation, if true, is relevant to safe operation of the facility. Allegations deemed not relevant to safe operation of the facility and allegations determined to be frivolous, or too vague or general in nature to provide sufficient information for the Staff to investigate, receive no further consideration. Allegations raising a safety concern are pursued further. *See* NRC Statement of Policy: Handling of Late Allegations, 50 Fed. Reg. 11,030 (Mar. 19, 1985).

The Petitioners' allegations which raised a safety concern were pursued further, even though issuance of the Callaway full-power license had not been stayed. The Staff has now fully reviewed and evaluated each of the forty-eight allegations identified by the Petitioners and has concluded, as documented in Inspection Report 50-483/84-45, that the allegations either: (1) could not be substantiated; (2) did not pertain to issues of nuclear safety; or (3) had been previously addressed by the NRC and resolved to the NRC's satisfaction.³ Thus, the Staff has con-

³ These allegations can be characterized as follows:

Welding: allegations 1-12, 46
Interference with the quality control program: allegations 13-17
Electrical cabling: allegations 18-23
Concrete placement: allegations 24-27
Drainage in the auxiliary building: allegation 28
Pipehangers: allegation 29
Construction drawing deficiencies: allegations 30-32

(Continued)

cluded, as it did when it recommended to the Commission that the Callaway Plant be granted a full-power license, that the Callaway Plant has operated and may continue to operate without endangering the public health and safety.⁴ Since the Staff's conclusions with respect to each of the allegations are contained in the January 22nd inspection report, a detailed examination of each allegation is not warranted here. The following discussion amplifies some of the issues that are addressed in the January 22nd inspection report and provides additional perspective on the matters raised by the Petitioners and the Staff's resolution of those issues.

A. Welding Allegations

As is evident from a review of Inspection Report 50-483/84-45, certain alleged welding deficiencies were not further evaluated by the Staff once it was determined that the system, component or structure involved in that aspect of the allegation was not required to remain functional to assure required safety functions.⁵ For example, one allegation related to the approval of welds on the condenser in the turbine building without inspection. However, the Standardized Nuclear Unit Power Plant System Final Safety Analysis Report, § 10.4.1.1.1, Safety Design Bases (which is applicable to Callaway Unit 1), states that, "the main condenser serves no safety function and has no safety design basis." Thus, in the absence of a safety function, it was not necessary for the Staff to pursue this particular allegation further.

Two allegations raise issues concerning welder qualification worthy of emphasis in this Decision. Allegation 10 alleges that a technique used to pass welder applicants "was accomplished by allowing applicants to take the test as many times as was necessary. If an applicant failed, the test was not considered a test, but merely practice." The Petitioners then draw on the apparent existence of an underqualified and inexperienced

Undocumented rework: allegation 33
Reliability of the onsite laboratory: allegation 34
Failure to wear personnel dosimetry: allegation 35
Onsite morale/labor management practices: allegations 36-39
Waste/cost overruns: allegations 40-41, 43-45
Drug and alcohol use, gambling, prostitution: allegation 42
Sabotage: allegation 47
Improper NRC practices: allegation 48

⁴ The issue of granting Callaway an operating license was adjudicated before both the licensing and appeal boards. The issue of quality assurance, including the adequacy of welding and concrete placement raised in the present petition, was fully litigated, resulting in the determination that there was no general breakdown in quality assurance and that there was reasonable assurance the Callaway Plant could be operated safely. See *Union Electric Co.* (Callaway Plant, Unit 1), LBP-82-109, 16 NRC 1826 (1982), *aff'd*, ALAB-740, 18 NRC 343 (1983).

⁵ See Inspection Report 50-483/84-45 at 4-5.

welder work force as explanation for the “shoddy work” which necessitated rework at later phases of construction. *See* Allegation 11, Petition at 4-5.

Under the applicable codes, the number of times a welder-applicant takes a certification test has no significance, unless the employer specifies a more stringent requirement. At Callaway, contractor procedures controlling welder certification and qualification did not limit the number of times a welder-applicant could take a certification test. Therefore, it was acceptable under the applicable codes and the contractor’s procedures for welders to repeat tests. *See* Inspection Report 50-483/84-45 at 6, ¶ 5.

In considering allegation 11, the Staff has made no judgment as to whether the original work regarding pipe hanger and support welds in the control building were “shoddy” as Petitioners allege. However, it should be noted that, during construction, distinctively marked temporary pipehangers, which were installed to facilitate pipe installation, were subsequently replaced with permanent pipehangers. Those temporary pipehangers may account for the perception of “shoddy” workmanship Petitioners allege. In any event, NRC inspection indicates that no temporary pipehangers remain on safety-related systems in the lower elevations of the control building, and that the pipehangers presently in the control building are properly installed. *See* Inspection Report 50-483/84-45 at 7, ¶ 2.

B. Implications of Extensive Rework for Quality of Plant

Allegation 12 points out construction problems associated with repair and rework of welds, including the allegation that “[weld] rework weakens the metal because of the required reheating.” As noted in the inspection report, applicable American Welding Society and American Society of Mechanical Engineer codes permit rewelding and repairs. *See* Inspection Report 50-483/84-45 at 7, ¶ 3. The Staff evaluation found no indication of deficient welds or support members. Moreover, rewelding of carbon steel, when done correctly, does not significantly affect material strength.

C. Electrical Cabling Allegations

The Petitioners allege that certain spliced cables (high voltage cables) were both submerged at the Callaway facility without proper drainage and installed without required fireproofing. *See* Allegations 22-23, Petition at 6. As stated in the inspection report, a review of electrical draw-

ings and cable installation records indicates that these particular cables were not spliced and consequently, submersion in water would not undermine the cable's integrity. Since the cable was not spliced, fireproofing is not necessary. *See also* Inspection Report 50-483/84-45 at 11-12. The Staff relied upon electrical drawings and cable installation records in evaluating the allegation since the cables in duct banks are not accessible for visual inspection. Previous inspections at Callaway have given the Staff confidence that the quality records and drawings accurately document plant as-built conditions.

D. Waste and Cost Overrun Allegations

The Petitioners raise a series of allegations which in essence allege that the Licensee has mismanaged construction of the Callaway facility such that excessive cost overruns have occurred. *See* Allegations 40-41, 43-45, Petition at 9-10. As Petitioners themselves acknowledge, these "waste and cost overrun" allegations were included because the Petition was to be forwarded to the Missouri Public Service Commission. *See* Petition at 11. Issues of waste and excessive cost do not normally fall within the scope of the NRC's regulatory responsibilities, except to the extent these concerns may affect safe operation of a facility. While Petitioners point to possible wasteful practices and cost overruns, the Petitioners have provided no information which would link those overruns to the possibility of deficient construction which could lead to unsafe operation of the Callaway facility. The Staff is not aware of any such information. In the absence of such a nexus, there is no basis for the Staff to pursue these allegations further.

E. Alcohol and Drug Allegations

Petitioners allege that illegal drugs, alcohol, gambling and prostitution could be found on the Callaway job site. *See* Allegation 42, Petition at 9. In support of this allegation, Petitioners point to a February 1984 incident where quality control inspectors were fired for alleged drug use at the Callaway site. *Id.*

Regardless of any intrinsic moral or legal reprehensibility of gambling and prostitution, it is not clear that these activities, if they indeed occurred at the Callaway jobsite, would have affected safe construction of the facility, and the Petitioners have provided no information which would so indicate an adverse effect. Accordingly, the Staff has not pursued this aspect of the allegation further. However, drug and alcohol use, if present at the Callaway worksite, could affect safe construction

and subsequent operation of the facility. See *Commonwealth Edison Co.* (Dresden Nuclear Power Station; Zion Nuclear Plant), DD-83-8, 17 NRC 1183, 1185 (1983).

The Licensee was also aware of the significance of drug and alcohol use on site. In June 1982, the Licensee's prime construction contractor, Daniel International Corporation, placed drug awareness signs around the site and in the plant. Daniel International also initiated a program which utilized dogs trained to detect the presence of drugs at the site. The dogs were used in July and December 1982, and on a full-time basis from March 1983 through February 1984. During this period the dogs performed approximately five searches per week. In 1982 Daniel International revised the company safety manual, which is provided to employees, to include information on alcohol and drug abuse. Additionally, the Licensee established the Union Electric Company's alcohol and drug abuse program at the site in January 1984.

Upon identification of drug and alcohol use on site in February 1984, the Licensee took action to remedy the situation. As a first step, seven workers were fired. The Licensee and Daniel International conducted an extensive investigation of the incident and conducted a sampling reverification of the work done by the fired workers. Based on this review, the Licensee determined that the work done by the fired workers was acceptable.

It is important to note that, with one exception, the workers involved in this incident were reviewing inspection packages documenting previous work and that they were not conducting inspections in the field. While that individual had previously done field inspections a few years prior to the identification of drug and alcohol use on site, the Licensee also performed a sampling review of those activities and found that individual's work to be acceptable. The NRC Staff has reviewed the results of the Licensee's sampling verification and has concluded that the job performance of the fired workers had no significant safety impact.

In connection with allegation 42, the Petitioners requested that the Staff provide information to them concerning drug-related terminations and related developments at the Callaway facility. A questionnaire was attached to the Petition for this purpose. Petitions filed under 10 C.F.R. § 2.206 provide members of the public with a means of bringing safety problems concerning nuclear facilities to the Commission's attention. Section 2.206 petitions are not information-gathering devices for members of the public. See *Southern California Edison Co.* (San Onofre Nuclear Generating Station, Unit 1), Denial of Request for Hearing and Request for Stay, slip. op. at 10 n.8 (Commission order dated Feb. 19, 1985) (unpublished); *Texas Utilities Generating Co.* (Comanche Peak

Steam Electric Station, Units 1 and 2), DD-83-11, 18 NRC 293, 295 (1983). Thus, the Staff has not provided the information requested by the Petitioners.

III.

On the basis of the results contained in Inspection Report 50-483/84-45, and as described in this Decision, suspension of the Callaway Plant's license is not warranted. Accordingly, 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 C.F.R. § 2.206(c).

Harold R. Denton, Director
Office of Nuclear Reactor
Regulation

Dated at Bethesda, Maryland,
this 17th day of May 1985.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Harold R. Denton, Director

In the Matter of

Docket Nos. 50-352
50-353
(10 C.F.R. § 2.206)PHILADELPHIA ELECTRIC COMPANY
(Limerick Generating Station,
Units 1 and 2)

May 17, 1985

The Director of the Office of Nuclear Reactor Regulation denies the Petition pursuant to 10 C.F.R. § 2.206 of Del-Aware Unlimited, Inc. (Petitioner) requesting that the Commission staff require the Philadelphia Electric Company (Licensee) to provide to the Commission a full disclosure of its intended sources of interim supplemental cooling water for the Limerick Generating Station and the environmental consequences associated with their use. Interim supplemental cooling water may be required due to delays in construction of the Point Pleasant Diversion (PPD) Project which has been approved to provide supplemental cooling water for the Limerick facility. Petitioner also contends that an interim supplemental cooling water service proposed by the Licensee to the Delaware River Basin Commission (DRBC) constitutes a long-term or permanent solution superior to the currently planned PPD Project. The Director denied the Petition, noting that to the extent the Licensee wishes to operate the facility in a mode different from that presently represented in the license application, it must examine that proposed change in accordance with the environmental conditions of its license. The Director further notes that the Petition fails to provide information which suggests that the Licensee would be either unwilling or incapable of adhering to its license conditions in this regard.

TECHNICAL ISSUE DISCUSSED: COOLING WATER SUPPLY

Should the Licensee wish to utilize a source of supplemental cooling water other than that approved by the NRC, even though interim in nature, the Licensee would have to comply with its environmental license conditions prior to such use.

DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

INTRODUCTION

By letter dated November 21, 1984, Robert J. Sugarman, Esq., filed with the Office of Nuclear Reactor Regulation, on behalf of Del-Aware Unlimited, Inc. (Petitioner), a Petition pursuant to 10 C.F.R. § 2.206. The Petition requested that the Commission staff require the Philadelphia Electric Company (Licensee) to provide to the Commission a full disclosure of its intended sources of interim supplemental cooling water for the Limerick Generating Station, Units 1 and 2 (Limerick facility) and the environmental consequences associated with their use. The Petition enclosed a letter from the Licensee to the Pennsylvania Public Utility Commission stating that an interim supply of supplemental cooling water for the Limerick facility should be available by May 1985 to support commercial operation of the Limerick Unit 1 during the third quarter of 1985. The current design of the Limerick facility calls for its supplemental cooling water to be provided by the Point Pleasant Diversion Project (PPD Project) which may not be completed by the time Limerick Unit 1 is available for commercial operation.

The Petitioner supplemented its Petition on February 11, 1985, and March 28, 1985. The February 11, 1985 supplement provided additional information to support the claim that the Licensee was actively seeking to obtain interim supplemental cooling water for operation of the Limerick Unit 1. The supplement again urges that the NRC commence review of this matter. The March 28, 1985 supplement refers to an application filed by the Licensee with the Delaware River Basin Commission (DRBC) for interim supplemental cooling water and urges that the interim solution proposed by the Licensee constitutes a long-term or permanent solution superior to that currently planned, namely, the PPD Project. In essence, the supplement urges that there are alternatives to the PPD Project which are superior to that Project from an environmental perspective including the interim proposal suggested by the Licensee

and urges that those alternatives be examined and adopted for permanent use in supplying supplemental cooling water for the Limerick facility. This is especially true, the Petitioner argues, because of the many hurdles which will prevent implementation of the PPD Project for at least several years.

On January 15 and 22, 1985, and May 6, 1985, the Licensee submitted its comments regarding the Petition. My decision in this matter follows.

DISCUSSION

The Supplemental Cooling Water System (SCW System) for the Limerick facility, as described in the license application submitted to the Nuclear Regulatory Commission for operation of the facility, will draw water from the Delaware River some 30 linear miles from the plant site. The water will be pumped from the Delaware River at Point Pleasant, Pennsylvania, several miles through a Combined Transmission Main to the Bradshaw Reservoir. Approximately one-half of the water will be pumped through the Perkiomen Transmission Main and then flow down the East Perkiomen Creek to provide supplemental cooling water for the Limerick facility. The remainder of the water will be available to Central Bucks and Montgomery Counties, Pennsylvania, for public use.

The site of the Limerick facility is on the east bank of the Schuylkill River in Limerick Township, Montgomery County, Pennsylvania. The flows of the Schuylkill River vary widely during the course of the year and, consequently, there are extensive periods during which the Schuylkill River alone could not supply all consumptive water needs for the Limerick facility and still supply all of the downstream requirements. Consequently, the Licensee has proposed the SCW System for the Limerick facility described above to augment water drawn from the Schuylkill River. Unavailability of supplemental cooling water for the Limerick facility would not pose a safety concern as water requirements for safe shutdown conditions are based upon an onsite spray pond. There may be occasions, however, when the water available to the Licensee from the Schuylkill River would be insufficient to permit full-power operation of the Limerick facility in the absence of supplemental cooling water. Consequently, it is the role of the SCW System to provide such additional water as may be necessary to permit the Limerick facility to operate at its designed output in those instances when sufficient water would be unavailable to the Licensee from the Schuylkill River. In effect, then, the absence of supplemental cooling water for the Limerick facility would not pose a safety concern but could cause the facility to be operated at less than design output or indeed not be operated at all.

The proposed source of supplemental cooling water, i.e., the PPD Project, was described by the Licensee at both the construction permit and operating license stages of the proceedings before the Nuclear Regulatory Commission. The PPD Project has been the subject of extensive environmental reviews by a number of agencies and of decisions of the Atomic Safety and Licensing Board and an Atomic Safety and Licensing Appeal Board and has received approval.¹

I have also reviewed the various evaluations and authorizations relevant to this matter in my previous decisions responding to petitions filed by Petitioner pursuant to 10 C.F.R. 2 706.²

Consequently, to the extent the Licensee is able to implement the Point Pleasant Diversion Project to support operation of the Limerick facility, it is authorized to do so. Petitioner correctly notes that a number of obstacles presently exist to timely implementation of the Point Pleasant Diversion Project. The primary obstacle at this time is the opposition of Bucks County and the Neshaminy Water Resources Authority, the entities apparently obligated to complete construction of the Point Pleasant Diversion Project, to continuing construction of that Project. This matter is currently in litigation. It is highly doubtful that this matter would be resolved and that the Point Pleasant Diversion Project would be completed in the near future. Consequently, the Licensee has undertaken efforts, including the submittal of an application to the Delaware River Basin Commission, to obtain interim supplemental cooling water to support interim operation of the facility until the Point Pleasant Diversion Project can be completed. Such efforts by the Licensee do not appear to be unreasonable in light of the fact that full operation of the Limerick facility could be significantly hampered in the absence of supplemental cooling water.

Petitioner argues principally that it should be the role of the Nuclear Regulatory Commission to become active in the matter of selecting a possible interim source of supplemental cooling water to the extent of examining a variety of alternatives to solve this particular problem and even further to the extent of comparing proposed interim solutions to the presently authorized Point Pleasant Diversion Project with a view to determining that the interim solutions are superior to the Point Pleasant Diversion Project and therefore should become permanent solutions. Such is not the role of the Nuclear Regulatory Commission. I have explained this point to the Petitioner several times before, most recently in my letter to Petitioner dated September 10, 1984:

¹ ALAB-804, 21 NRC 587 (1985); ALAB-785, 20 NRC 848 (1984); LBP-83-11, 17 NRC 413 (1983).

² DD-82-13, 16 NRC 2115 (1982); DD-84-13, 19 NRC 1137 (1984).

The basic licensing function of the Commission is to review project proposals submitted by an applicant. I have noted this in earlier correspondence. In this matter, the Point Pleasant Diversion Project was submitted for review by PECo at both the construction permit and operating license stage of the proceeding. To the extent a submitted proposal is no longer viable, an applicant may submit an alternative for the Commission's consideration. In this context, the actions you request are inappropriate.

Facility Operating License NPF-27 issued to the Licensee by the Nuclear Regulatory Commission on October 26, 1984, authorizes the Licensee to conduct its activities in conformance with the application submitted to this agency for operation of the Limerick facility. The application submitted by the Licensee identifies the source of supplemental cooling water for the Limerick facility to be the Point Pleasant Diversion Project. It was this Project which the Commission reviewed for environmental acceptability, and it is this source of supplemental cooling water which the Licensee is presently authorized to use to support operation of the Limerick facility. Should the Licensee wish to utilize another source of supplemental cooling water, even though it be interim in nature, the Licensee would have to comply with the terms of its current license in undertaking such use. The Licensee would have to adhere to the terms of its Environmental Protection Plan (EPP) which is a condition of its operating license issued by the Nuclear Regulatory Commission and which is appended as Appendix B to the operating license for Limerick Unit 1. The requirements placed upon the Licensee by EPP with respect to activities affecting the environment include the following:

1. The Licensee may make changes in station design or operation or perform tests or experiments affecting the environment provided such activities do not involve an unreviewed environmental question and do not involve a change in the Environmental Protection Plan.³
2. Before engaging in any additional construction or operational activities which may significantly affect the environment, the Licensee shall prepare and record an environmental evaluation of such activity.
3. When the evaluation indicates that an activity involves an unreviewed environmental question, the Licensee shall provide a

³ A proposed change, test or experiment shall be deemed to involve an unreviewed environmental question if it concerns (1) a matter which may result in a significant increase in any adverse environmental impact previously evaluated in the environmental impact statements, environmental impact appraisals, or decisions of the Atomic Safety and Licensing Board regarding the Limerick facility or (2) a significant change in effluents or power level; or (3) a matter not previously reviewed and evaluated in the documents specified in (1) above, which may have a significant adverse environmental impact.

written evaluation of the activity and obtain prior NRC approval.

4. When an activity involves a change in the EPP, such activity and change in the EPP may be implemented only in accordance with an appropriate license amendment.

The requirements of the EPP are triggered at the time of the Licensee's proposed action. The Licensee must meet these requirements and take the appropriate actions prior to taking the action itself. Compliance with these requirements in a timely manner so as to gain the relief of any changes sought is a matter for the Licensee's consideration. Consequently, to the extent that the Licensee wishes to operate the Limerick facility in a mode different from that presently represented in its license application, it must examine that proposed change in light of the terms of the license conditions set out above. It must make the appropriate determinations and, should the activity involve an unreviewed environmental question, the Licensee must obtain prior NRC approval. Should the activity involve a change in the EPP, a license amendment is required. These provisions of the license for the Limerick Unit 1 facility provide adequate assurance that any change contemplated by the Licensee having potential environmental implications will be appropriately dealt with.

The Petition fails to provide information which suggests that the Licensee would be either unwilling or incapable of adhering to the terms of its license with respect to potential environmental modifications in the operation of its facility. At best, any concerns on the part of the Petitioner are premature as evidenced by the lack of specificity that any of the Licensee's activities are being carried on in violation of Commission requirements. At worst, the Petitioner's allegations are simply a repetition of claims made over a number of years which have been repeatedly rejected by every forum which has dealt with them.⁴ Consequently, I conclude that the Petition fails to provide any reasonable basis upon which this Commission should take action. With respect to the specific relief requested by the Petitioner, i.e., that the Nuclear Regulatory Commission should require the Licensee to disclose its intended sources of supplemental cooling water and assess the environmental consequences thereof, the Licensee has done this in its operating license application identifying the Point Pleasant Diversion Project as its source of supplemental cooling water. To the extent the Licensee anticipates other sources of supplemental cooling water, even of an interim nature, it is

⁴ See DD-82-13, *supra*, 16 NRC at 2121-26.

for the Licensee to bring this matter before the Commission as necessary and in accordance with the conditions of its license.

CONCLUSION

The currently authorized source of supplemental cooling water for the Limerick facility is the Point Pleasant Diversion Project. To the extent this project is unable to provide supplemental cooling water for the Limerick facility in a timely fashion, the Licensee may entertain alternative sources of supplemental cooling water. Should the Licensee wish to operate the Limerick facility with such an alternative source of supplemental cooling water, there is in existence a structured set of requirements in the license for the Limerick Unit 1 facility that must be addressed and met prior to taking such action. The timeliness of Licensee's action in taking steps necessary to gain an interim source of supplemental cooling water is a matter for the Licensee's consideration. The Petition provides no facts or specific information to suggest that the Licensee is failing to undertake its obligations in this regard. As such, the Petition is without adequate basis. In addition, the relief sought by the Petition is inappropriate. Accordingly, the Petitioner's request for action pursuant to 10 C.F.R. § 2.206 is denied. As provided by 10 C.F.R. § 2.206(c), a copy of this Decision will be filed with the Secretary for the Commission's review.

Harold R. Denton, Director
Office of Nuclear Reactor
Regulation

Dated at Bethesda, Maryland,
this 17th day of May 1985.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Thomas M. Roberts
James K. Asselstine
Frederick M. Bernthal
Lando W. Zech, Jr.

In the Matter of

Docket No. 50-206

**SOUTHERN CALIFORNIA EDISON
COMPANY, et al.**
**(San Onofre Nuclear Generating
Station, Unit 1)**

February 19, 1985

The Commission denies a request for a hearing on an order conditionally rescinding a previous suspension of the operating license for San Onofre Nuclear Generating Station Unit 1 and refuses to stay resumed operation of the facility. The Commission concludes that the rescinded suspension order, which imposed certain seismic upgradings as a condition for resumed operation, did not amend the San Onofre license and therefore may be lifted without the procedural steps, including offer of a hearing, required for a license amendment.

OPERATING LICENSE: CONFIRMATORY ORDERS

An order that does not expand a licensee's authority under its operating license or direct the licensee to take action inconsistent with or not already authorized by the existing license need not be treated as a license amendment.

OPERATING LICENSE: SUSPENSION

A license suspension is an action which can be entirely distinct from a license amendment.

OPERATING LICENSE: AUTHORIZATION FOR VOLUNTARY COMMITMENTS

A licensee's voluntary commitment to make a plant safer than its license requires does not contradict the license or in general call for additional authorization.

OPERATING LICENSE: COMMISSION DISCRETION WHETHER TO AMEND

The decision whether to incorporate into the license a cutback in licensee authority or the imposition of new burdens is one of agency discretion and intent, rather than statutory compulsion.

DENIAL OF REQUEST FOR HEARING AND REQUEST FOR STAY

On December 7, 1984, the Sierra Club, the Southern California Alliance for Survival Resources Center, and Tim Carpenter ("Petitioners") filed before the Commission a request for a hearing on an order issued November 21, 1984, by the Office of Nuclear Reactor Regulation and entitled "Contingent Rescission of Suspension" (hereinafter "November 1984 Order"). The November 1984 Order lifted the suspension of operation of San Onofre Nuclear Generating Station Unit No. 1 that had been imposed by an earlier NRC Staff order issued on August 11, 1982. The Petitioners also requested that the Commission stay the November 1984 Order pending completion of the requested hearing, thereby shutting down the facility. The San Onofre Unit 1 Licensees, Southern California Edison Company and San Diego Gas and Electric Company, and the NRC Staff opposed the request for a hearing and stay.

The Petitioners filed a lengthy "Reply to Opposition" on December 18, 1984, whereupon the Commission authorized the filing of further opposing briefs by January 9, 1985. The Staff and the Licensees then responded in detail to the Petitioners' "Reply to Opposition." Having carefully considered all this material, the Commission concludes for the rea-

sons given below that the request for hearing and the request for a stay should be denied.

I. BACKGROUND

San Onofre Unit 1, located on the Southern California coast near Oceanside, is one of the older nuclear generating facilities, having received an operating license in 1967. As part of a Systematic Evaluation Program ("SEP") the Staff has been reevaluating eleven older operating plants, including San Onofre Unit 1. In particular, pursuant to the SEP the Staff has been reevaluating the capability of the facility to withstand earthquakes. The original seismic design basis for San Onofre Unit 1 required that the plant be able to shut down safely following a 0.5g Housner spectrum earthquake, in current terminology. See Safety Evaluation Report, Return to Service Plan, San Onofre Generating Station, Unit 1, Docket No. 50-206, November 1984 ("SER").

In May 1982, during a plant outage, the Staff became concerned because of unexpectedly high stresses reported during reevaluation of certain piping systems and mechanical equipment that San Onofre Unit 1 might not meet its original 0.5g design basis. The Licensees proposed to the Staff by letters of June 15 and 24, 1982, that, instead of undertaking costly analysis to reconfirm that the plant met its original 0.5g design basis, the Licensees would instead commit to maintaining the plant in a shutdown condition until completion of a program initiated in 1973 to upgrade the plant to 0.67g, which is the seismic criterion applied to Units 2 and 3 that were later built at the same site. The Staff agreed that completion of the 0.67g upgrade program would resolve Staff concerns about whether San Onofre Unit 1 met its original design basis. Accordingly, on August 11, 1982, the Staff issued an "Order Confirming Licensee Commitments on Seismic Upgrading" (hereinafter "August 1982 Order"), which required that the Licensees

maintain San Onofre Unit 1 in the shutdown condition until modifications described in their submittal dated June 15, 1982 as supplemented by letter dated June 24, 1982 are completed and NRC approval is obtained for restart.

47 Fed. Reg. 36,058 (Aug. 18, 1982).

Since the August 1982 Order was issued the Licensees have completed a substantial part but not all of the committed-to modifications. As the work progressed it appears that the costs of the modification, together with the costs of the extended shutdown, were found to be greater than

the Licensees originally estimated.¹ In late 1983 the Licensees began to explore with the Staff the possibility that, consistent with NRC regulations and adequate protection of public health and safety, San Onofre Unit 1 might be returned to service for a limited period while the remaining upgrades needed to reach 0.67g are being completed.

In the November 1984 Order, "Contingent Rescission of Suspension," the Staff noted "that there is reasonable assurance that operation of San Onofre Unit 1 can be resumed prior to completion of the seismic reevaluation program without posing an undue risk to public health and safety." The Staff stated further "that the licensee has reasonably established the seismic capability of the systems which would provide the capability to achieve and maintain a hot standby condition in the event of a 0.67g modified Housner spectrum earthquake." Moreover, with respect to other systems, the Staff stated that "available information indicates that the plant should withstand a 0.5g seismic event, and may even withstand larger events without substantial damage." The Staff documented these conclusions in an accompanying Safety Evaluation Report (SER). Concluding on the basis of this evaluation that public health and safety no longer required suspension of plant operation, the Staff rescinded the suspension of operation imposed by the August 1982 Order, "provided that the remainder of the seismic reevaluation program and the resulting plant modification are completed by the end of the next refueling outage" or that the Licensees submit an adequate justification for an extension of time. November 1984 Order at 4, 5. The plant resumed operation shortly thereafter. On December 7, 1984, the Commission received the Petitioners' request for a hearing on the November 1984 Order and a request for a stay of that order.²

II. THE PETITIONERS' REQUEST FOR A HEARING ON THE NOVEMBER 1984 ORDER

At the outset we are confronted by the Petitioners' claim that the November 1984 Order is a license amendment and that the Commission is therefore obliged as a matter of law to offer a hearing on the order to

¹ The unexpected costs of an extended shutdown included a requirement by the California Public Utilities Commission that San Onofre Unit 1 either be returned to full service by January 1, 1985, or removed from the Licensees' rate base.

² In an order dated December 10, 1984 (unpublished), the Commission denied the Petitioners' request for a decision as early as December 12, 1984, but agreed to an expedited schedule for filing responses. On December 18, 1984, the Petitioners filed a lengthy "Reply to Opposition," which greatly expanded upon their original arguments. The Commission thereupon allowed opposing parties until January 9, 1985, to respond to this reply.

interested persons.³ Since the November 1984 Order does temporarily relieve the Licensees of certain burdens imposed by the August 1982 "Order Confirming Licensee Commitments on Seismic Upgradings" and authorizes operation of San Onofre Unit 1 before all the conditions of that earlier order have been met, the Petitioners are correct that the November 1984 Order would be a license amendment if the August 1982 Order had amended the San Onofre operating license. If, however, the conditions for further operations imposed by the August 1982 Order were not made part of the license by that order, then the Commission can modify or suspend those conditions simply by a subsequent order without going through the procedural steps required for a license amendment. In short, unless the August 1982 Order was itself a license amendment, the November 1984 Order rescinding it in part need not be treated procedurally as a license amendment on which interested persons would be entitled to a hearing.

The Commission has concluded that the August 1982 Order confirming the Licensees' commitment to complete the 0.67g upgrade program prior to restarting San Onofre Unit 1 did not amend the San Onofre Unit 1 license. Accordingly, the Commission rejects the Petitioners' argument that the conditional rescission of that order must be treated as a license amendment. The August 1982 Order in no way expanded the Licensees' authority under their 1967 operating license, nor did it authorize or direct the Licensees to take actions inconsistent with or not already authorized by their existing license. Instead, as a detailed examination shows, the order cut back on the Licensees' authority and was in effect a license suspension, an action which can be entirely distinct from an amendment.⁴

³ Section 189a of the Atomic Energy Act of 1954, as amended, 42 U.S.C. § 2239(a), states

In any proceeding under this Act, for the granting, suspending, revoking, or amending of any license . . . the Commission shall grant a hearing upon the request of any person whose interest may be affected by the proceeding.

Affidavits of the Petitioners appear to establish that in all probability they would qualify as interested persons by virtue of residence and activities in the vicinity of the San Onofre facility.

⁴ The Petitioners object to the characterization of the August 1982 Order as anything other than a license amendment in part because of various asserted discrepancies between the form of the order and the requirements of the Commission's regulations governing enforcement orders. 10 C.F.R. Part 2. The Commission sees such discrepancies as beside the point. It does not follow that if the August 1982 Order did not meet all the formal requirements of an enforcement order, it would then have been a license amendment. This is particularly so since the order did not meet the procedural requirements for a license amendment either, e.g., the prior notice and offer of a hearing to interested persons required by § 189a of the Atomic Energy Act were not included in the order, an omission which would have required an explanation and justification if the order had been intended to amend the license. *See* 10 C.F.R. § 2.204. Finally, if there were defects in the form of the order, they might or might not have been prejudicial to the Licensees, but they were not so for the Petitioners. Thus the Petitioners have no standing to complain of these alleged defects and they cannot use them as a basis for transforming the nature of the order to the disadvantage of the Licensees.

The San Onofre Unit 1 operating license required that the plant be built and operated so as to withstand earthquakes of 0.5g ground acceleration. The Licensees' voluntary commitment to upgrade the plant to 0.67g was in effect a commitment to make the plant safer than its license required. Such an action neither contradicted the existing license nor did it in general call for additional authorization. Similarly, the Licensees' decision to keep the plant shut down during the upgrading was an action within the terms of its existing license, since a shutdown is obviously a mode of operation allowable under the Atomic Energy Act without additional authorization. By confirming the Licensees' commitment to these actions, thereby making them enforceable by the Commission, the Staff's order of August 11, 1982, thus had the effect of *suspending* the 1967 operating license, which otherwise would have permitted continued operation prior to completion of the 0.67g upgrade, but it did not amend the license or otherwise foreclose the possibility that the Licensees' original authority could be promptly restored upon reconsideration by the Commission or upon a finding that circumstances no longer warranted the additional restrictions imposed by the August 1982 Order. The Commission's ability to suspend a license in this manner and later lift the suspension is a necessary part of its regulatory capability to act quickly in protection of health and safety, without being deterred by concern that prompt action against a licensee may prove difficult to undo later when the need for it has passed.⁵

In sum, then, the August 1982 Order was a suspension of the San Onofre Unit 1 license. The conditions specified for lifting the suspension did go beyond the conditions for operation already in the license, but the order did not formally amend the license to incorporate the added conditions. Accordingly, the Staff remained free to relax those conditions if it later perceived they were excessive or no longer required. As

⁵ This is not to say that it would never be appropriate to incorporate into the license a cutback on licensee authority or imposition of new burdens. The decision is one of agency discretion and intent, however, rather than statutory compulsion. Thus the Commission could have chosen as a matter of discretion to put the "Order Confirming Licensee Commitments on Seismic Upgrading" into the form of an order modifying the license, including therewith the appropriate notice and offer of a hearing to interested persons as required by § 189a, but it is obvious from the form of the order that this was not the intention. Because of the public interest in the status of San Onofre Unit 1, at the time the August 11, 1982 confirmatory order was issued, the Director of the Office of Nuclear Reactor Regulation issued a "Letter to California Residents" describing the confirmatory order. Nothing in this letter suggested that the Licensees' commitment to extend the San Onofre outage until the 0.67g upgrade was completed was being made part of the license. Any persons believing that the commitment should have been made part of the San Onofre license could have petitioned the NRC so to amend the license. 10 C.F.R. § 2.206. The 2.206 procedure was well known to interested citizens, who had previously filed such petitions seeking a suspension or revocation of the San Onofre license. No petitions for an amendment incorporating the Licensees' commitment were received.

an exercise of that authority, the November 1984 Order lifted the suspension, temporarily restoring to the Licensees the authority they possessed under their original license.⁶ It also temporarily and conditionally rescinded the new operating requirements which the Staff had imposed as an act of regulatory discretion in its August 1982 Order but had not made part of the license.

There is no statutory requirement for the Commission to offer a hearing on such an order. It is well established that the hearing requirements of § 189a do not apply when the Commission lifts a suspension.⁷ *San Luis Obispo Mothers for Peace v. NRC*, 751 F.2d 1287, 1314 (D.C. Cir. 1984). Similarly, the categories of agency action specifically enumerated in § 189a for which an offer of a hearing is required do not include the rescission of an order imposing extra-license requirements. Where Congress has made the statutory hearing requirements explicit, further implicit requirements should not be read into the language of § 189a. "If a particular form of Commission action does not fall within one of the eight categories set forth in the section, no hearing need be granted by the Commission." *Id.* Accordingly, the Commission is not obliged by law to offer the Petitioners a hearing on the November 21, 1984 "Contingent Rescission of Suspension."

III. THE PETITIONERS' REQUEST FOR A STAY OF THE NOVEMBER 21, 1984 ORDER

In view of the Commission's conclusion that the November 1984 Order was not a license amendment and that the order has complied with all procedural requirements of the Atomic Energy Act, there is no ongoing proceeding with respect to San Onofre Unit 1. Accordingly, the Petitioners' request that the Commission stay the order, thereby shutting down the plant, is properly before the agency only if viewed as a pe-

⁶ Contrary to the Petitioners' view, we do not see in the Staff's 1984 SER any admission that San Onofre Unit 1 is now operating with a smaller margin of safety than its 1967 license required. Rather, it is the Staff's position that, in view of the extensive upgrading already achieved, the margin of seismic safety has been increased, even relative to what the Staff believed that margin to be in November 1981, prior to the discovery of the high stress values which aroused the Staff's concern regarding whether the original licensing basis was satisfied. See ¶ 14 of Affidavit of Christopher I. Grimes, attached to the "NRC Staff's Response to Sierra Club, et al.'s 'Reply to Opposition.'"

⁷ As a matter of discretion the Commission may offer a hearing prior to lifting a license suspension. This is the course the Commission followed with regard to the restart of Three Mile Island, Unit 1. The Commission decision to require a formal hearing prior to TMI-1 restart was based on the particular circumstances of that case and did not establish an agency requirement for hearings on the lifting of license suspension. The Commission has generally denied such requests. See, e.g., the Commission's lifting of the suspension of the Diablo Canyon low-power operating license. *Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2)*, CLI-84-5, 19 NRC 953 (1984), *aff'd*, *San Luis Obispo Mothers for Peace v. NRC*, *supra*.

tion for enforcement action filed pursuant to 10 C.F.R. § 2.206.⁸ Such a request for an immediate shutdown could be granted, even if a license violation could be demonstrated, only in cases of willfulness or of immediate threat to public health and safety. See *Petition for Emergency and Remedial Action*, CLI-78-6, 7 NRC 400, 404 (1978) (citing the Administrative Procedure Act, 5 U.S.C. § 558(b)). In the present case the NRC Staff has specifically found that the operation authorized by the order presents no undue risk to public health and safety.⁹ The Commission finds that the Staff has given a reasonable explanation of this finding in the SER and the papers filed with regard to the Petitioners' requests. Based on this material the Commission denies the request for a stay.

CONCLUSION

For the reasons given above, the Request for Hearing and Request for Stay is denied.

Commissioner Asselstine disapproved this order and his separate views are attached. The additional views of Chairman Palladino and Commissioners Roberts, Bernthal, and Zech are also attached.

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 19th day of February 1985.

⁸ The provision for filing petitions for enforcement action pursuant to § 2.206 does not accord discovery rights, although the granting of a 2.206 petition might lead to a formal adjudication in which discovery would be available. There being no such proceeding involving San Onofre Unit 1, the Petitioners' discovery requests filed in connection with their hearing and stay request are not in order.

⁹ This being so, it is questionable whether the Petitioners' claim that restart of San Onofre Unit 1 "must be preceded by an environmental review under the National Environmental Policy Act," even if correct, would justify the immediate suspension of a license until such a review is performed, particularly in the absence of any attempt by the Petitioners to show that resumed operation of San Onofre Unit 1 will cause environmental impacts not already analyzed by the agency. Cf. *Wisconsin v. Weinberger*, 745 F.2d 412 (7th Cir. 1984); *Alaska v. Andrus*, 580 F.2d 405 (D.C. Cir.), vacated in part on other grounds sub nom. *Western Oil and Gas Ass'n v. Alaska*, 439 U.S. 922 (1978). In any event, the Commission rejects the claim that the contingent rescission order required a prior NEPA analysis. The order simply restored the status quo prior to the 1982 suspension order, permitting San Onofre 1 to resume an operation with no anticipated change in the environmental impacts which were evaluated and found acceptable in a Final Environmental Statement issued in October 1973. The Petitioners have suggested no reason why those impacts would be changed by the November 21, 1984 Order and none is apparent.

DISSENTING VIEWS OF COMMISSIONER ASSELSTINE

The central legal question presented by Petitioners' request for a hearing is whether the Commission's November 1984 "Contingent Recission of Suspension" is a license amendment. If it is an amendment, the Commission is most probably required by § 189 of the Atomic Energy Act (AEA) to provide an opportunity for a prior hearing if it cannot make a "no significant hazards consideration" finding. Whether the Commission's November 1984 Order amends the license depends upon whether the Commission's original shutdown order of August 1982 was an amendment. If the 1982 order was merely a license suspension and not an amendment, then the 1984 order merely lifts the suspension and no opportunity for a hearing is required. *San Luis Obispo Mothers for Peace v. NRC*, 751 F.2d 1287, 1314 (D.C. Cir. 1984).

The Commission has concluded that the August 1982 Order did not amend the San Onofre 1 license. The Commission says that the 1982 Order is not an amendment because the purpose of the upgrade to 0.67g was to make the plant safer and that action neither contradicted the existing license nor did it call for additional authorization. *See* p. 1574, *supra*. We are told that allowing the plant to operate in the interim until the upgrade is completed was within the terms of the existing authority so that the requirement in the 1982 order that the plant remain shut down pending completion was a license suspension, not a license amendment. The Commission majority says that it has complete discretion, then, to relax any part of the order at any time. *Id.* According to the Commission, it could have decided to incorporate the change in authority into the license, but again that decision is the Commission's. The Commission has, then, according to the majority, complete discretion to label its actions as either amendments or suspensions. *Id.*

I cannot agree with the Commission's conclusions. I sympathize with the majority's desire to retain maximum enforcement and regulatory flexibility. I too believe that our enforcement process should not become freighted with overly complex procedural requirements. On the other hand, I do not believe that the Commission has complete and unfettered discretion to determine when procedural rights accrue to interested parties and when they do not. I do not believe that the Commission is correct when it seemingly asserts that any time the Commission goes beyond existing license to require an upgrade or safety improvement the Commission has carte blanche to label that action an amendment or a suspension, and that that label is dispositive for purposes of determining whether the action triggers hearing rights on the part of third parties.

Unfortunately, the available law on the issue of what constitutes a license amendment is somewhat less than clear. In addition, the courts do not appear to have specifically addressed the issue presented by this case. The latest discussion of license suspensions and amendments appears in the *Diablo Canyon* case decided in December 1984 by the D.C. Circuit. *San Luis Obispo Mothers for Peace, supra*. The court decided that the Commission's decision to lift the suspension of the Diablo Canyon license did not trigger hearing rights under § 189 of the AEA. The court did not explain, however, how one determines whether a particular Commission action is an amendment or a suspension. The court said only that: "The lifting of a suspension does nothing to alter the original terms of the license; indeed, it removes a significant impediment to the enforcement of those terms." *Id.* at 1314. The court also appeared not to object to the statement it quoted from the *Sholly*¹ case that an amendment is something which "granted the licensee authority to do something that it otherwise could not have done under existing authority." *San Luis Obispo Mothers for Peace* at 1313.

The *Diablo Canyon* case appears not to address the situation in the San Onofre 1 case, i.e., an order which requires additional measures beyond the license requirements. The *Diablo Canyon* court said that where Commission action allows a licensee to do something it is not authorized to do under existing licensing authority, e.g., relaxes a license requirement, that action amends the license and triggers § 189 hearing rights. And, where the Commission action suspends a license because a licensee is found not to be in compliance with its license and then the Commission, after determining that the licensee is in compliance, lifts that suspension, third parties do not have a statutory right to a hearing. In the latter case, the Commission's action in lifting the suspension does not create a right to litigate the Commission's determination that the licensee is in compliance with the terms of the suspension order. However, the Court did not address the two questions relevant to the San Onofre situation: (1) whether and under what circumstances additional, new requirements beyond what the license requires amend the license, and (2) what Commission action with regard to these new requirements triggers a right to a hearing.

The Commission urges that in the case of a safety improvement whether a Commission action amends the license or merely suspends it depends solely on Commission intent and the label the Commission attaches to the action. There does not appear to be any reliable law on this

¹ *Sholly v. NRC*, 651 F.2d 780 (D.C. Cir. 1980), vacated on other grounds, 103 S. Ct. 1170 (1983).

subject which interprets the AEA. In *Sholly*, the Court indicated that Congress intended that "any significant change in the licensing status of a nuclear power plant" gave rise to an opportunity to intervene before that change could occur. 651 F.2d at 791. However, the *Diablo Canyon* Court cast doubt on the continued validity of that statement. The Court said that this dictum in *Sholly* was "inadequate precedent for the proposition that any significant change in the licensing status of a nuclear power plant triggers the procedural protection of section 189(a)." *San Luis Obispo Mothers for Peace*, 721 F.2d at 1314. The Court did not explain, however, what standard *should* apply for determining when a license is amended. It only said that a license suspension does not alter the terms of the license. To the best of my knowledge, no other case interpreting the Atomic Energy Act sheds substantial light on this issue.

Although it does not deal with § 189 of the AEA, a case in which the D.C. Circuit interpreted the hearing requirement of the Communications Act of 1934 may be helpful. *Temmer v. FCC*, 743 F.2d 918 (D.C. Cir. 1984). The Court held that where a license is granted subject to certain express conditions set forth in the license and the regulations, and the licensee then fails to meet those conditions, action by the FCC to revoke the license is not a "license modification," but rather the enforcement of the original license conditions. The Court said that whether the license has been modified depends upon whether agency action "substantially affected" an unconditional right conferred by the license. *Id.* at 927-28. The Court also said that the label attached to the agency action was not dispositive and that a reviewing court "must look beyond the form of the license document and beyond the language employed by the FCC to describe its action." *Id.* at 927.

The *Temmer* standard is consistent with the court's *Diablo Canyon* decision. I hesitate, however, to make general pronouncements about when an upgrade to a plant constitutes an amendment of the license. I am also reluctant to conclude that the Staff has no flexibility to alter its decision about what change is needed at some later time. Such an absolute rule could only lead to a reluctance on the part of the Staff to issue enforcement orders because they do not want to get "locked into" a position. I think this issue is best handled on a case-by-case basis to ensure reasonable enforcement flexibility. However, for lack of something better I have used the *Temmer* standard as guidance in concluding that the 1982 order for San Onofre 1 amended the license. The order at issue here was a substantial change to a fundamental part of the license, the seismic design basis. Further, the Commission's order prohibited operation of the facility until the changes were completed. Thus, the order substantially affected a condition of the license. I therefore conclude

that the 1982 order amended the San Onofre 1 license. By removing the condition that the plant remain shut down while the modifications were in progress, the 1984 order amended the license again.

However, deciding that a particular Commission action is a license amendment does not end the inquiry. We must also determine what hearing rights accrue. A case with some relevance to this issue is *Bellotti v. NRC*, 725 F.2d 1380 (D.C. Cir. 1983). In *Bellotti*, the Commission issued an Order Modifying License which amended Boston Edison's Pilgrim operating license to require development of a plan for reappraisal and improvement of management functions. The Attorney General of Massachusetts petitioned to intervene in the enforcement proceeding and asked to litigate various issues related to compliance with the Commission order. The Court held that the Commission could properly deny the petition to intervene because the issues the Attorney General wanted to litigate went beyond the scope of the hearing as defined by the Commission's amendment order. The Court said:

The Commission's power to define the scope of a proceeding will lead to the denial of intervention only when the Commission amends a license to require additional or better safety measures. Then, one who, like petitioner Bellotti, wishes to litigate the need for still more safety measures, perhaps including the closing of the facility, will be remitted to section 2.206's petition procedures.

725 F.2d at 1383. The Court says, then, that even where the Commission amends a license to require additional or better safety measures it can deny a hearing on that amendment to third parties. However, the Court went on to say:

If, on the other hand, the Commission proposes to amend a license to remove a restriction upon the licensee, the scope of the proceeding is defined by that proposal and section 189(a) permits public participation to oppose that relaxation. The upshot is that automatic participation at a hearing may be denied only when the Commission is seeking to make a facility's operation safer. *Public participation is automatic with respect to all Commission actions that are potentially harmful to the public health and welfare.*

Id. (emphasis added). This language is extremely broad and if read literally suggests that the need for a hearing depends upon whether the proposed agency "action" has the potential for increasing or decreasing public safety; if the latter, the public has an automatic right to a hearing. If that test is applied to the San Onofre 1 case the public had no right to a hearing on the issuance of the August 11, 1982 Order because it involved a safety improvement. The public would also have no right to a hearing on whether the terms of the order had been satisfied, but would

have an automatic right to a hearing if the NRC were to relax the requirements of that order.

It is not clear what weight we ought to give the Court's language because it appears to be dictum. Also, I cannot believe that the D.C. Circuit intended the anomalous situation described above. A basis for the Court's decision was the desire to maintain enforcement flexibility in the agency by not encumbering the enforcement process with numerous procedural requirements. *Id.* at 1382. The Court obviously was concerned about discouraging the use of orders because the Commission feared it would be "locked in." On the other hand, the Court obviously did not mean to exclude all public participation on enforcement matters especially where amendments to the license were involved.

Again, I hesitate to generalize because of the impact such generalizations could have on the agency's enforcement flexibility. However, in this case, I believe that the modifications to the license and the issues involved are significant enough that a relaxation of the conditions imposed by the 1982 order triggers the hearing requirement of § 189. Indeed, these issues are of sufficient importance that even if a hearing is not legally required the Commission should have granted a hearing as a matter of discretion.

Setting these procedural issues to one side, however, I have other, nonprocedural concerns about the decision to allow restart of San Onofre 1 at this time. The decision to put the Licensees' commitments into order form was based partly on an apparent reluctance by Southern California Edison (SCE) to complete the upgrade in a timely manner and because of a concern that the plant did not even meet the existing licensing requirement that the plant meet the seismic design basis of 0.5g. I am unable to agree to an alteration of the order because I do not believe these concerns have been adequately resolved. As long as the plant is permitted to operate, there is little incentive for SCE to complete the upgrade. In fact, the schedule for completion of the modifications set out in the Commission's Contingent Recission Order seems to require little in the way of timely completion. Further, I am extremely uncomfortable with the Staff's finding that the plant is "reasonably likely" to withstand an earthquake with ground motions of 0.5g. This does not appear to be the same standard the Staff would normally apply to issues such as this. Thus, the Staff seems to be accepting a lesser margin of safety in determining whether the plant now meets its original seismic design basis than it requires in other cases. This is particularly troubling in view of the Staff's conclusion that the correct seismic design basis for the San Onofre site is in fact 0.67g rather than the 0.5g figure adopted at the time of licensing San Onofre 1.

Finally, I am concerned by the fact that the motivating factor for the Commission's relaxation of its 1982 order was originally not a determination that the changes are no longer necessary, but that it is too expensive to keep the plant shut down while they are made. As I have said before, I do not believe that the financial difficulties of Licensees should be a factor in our decisions whether to relax safety requirements.

In conclusion, I believe the Commission's 1982 order modified the San Onofre 1 license and that the 1984 order was a further amendment of the license. Section 189 of the Atomic Energy Act requires that a hearing be held in this case. I voted not to allow restart of Unit 1 in November of 1984, and I would now grant the Sierra Club's request for a stay of the Commission's decision.

ADDITIONAL VIEWS OF CHAIRMAN PALLADINO AND COMMISSIONERS ROBERTS, BERNTHAL AND ZECH IN SAN ONOFRE 1

Commissioner Asselstine states in his dissent (at p. 1582) that "the motivating factor for the Commission's relaxation of its 1982 order was originally not a determination that the changes are no longer necessary, but that it is too expensive to keep the plant shut down while they are made."

This statement is not correct. The correct and complete explanation of the Commission's position is set forth in its previous statement in the San Onofre 1 proceeding which has not heretofore been publicly issued:

Considering all relevant circumstances, the Commission has decided that the August 1982 order should not be read as having amended the license to operate the San Onofre 1 reactor. The essence of the rationale for this conclusion is:

First, the Commission believes that it needs the enforcement flexibility that orders give it, and it is concerned that treating the August 1982 order as an amendment will discourage the practice of making licensee commitments legally binding. Second, there is no contemporaneous information which suggests that the August 1982 order was intended to amend the license. Indeed, the order resulted from a voluntary agreement by the Licensees to forego the submission of additional technical data demonstrating qualification of all safety systems to 0.5g and to instead modify the facility to a 0.67g level. Had this voluntary agreement not been offered and had the Licensees submitted data confirming qualification of equipment to 0.5g, the normal SEP upgrading process would have gone forward without any necessity for a plant shutdown order. Thus, the order merely suspended authority to operate pending modifications to the facility and approval by the NRC to restart. No provision of the license itself was modified.

The staff is directed to handle the restart matter procedurally according to the foregoing conclusion. The staff prior to authorizing restart must first make all of the required safety findings as it does in any other similar situation. The basis for approval of restart would be that continued suspension of the authority to operate is no longer required adequately to protect public health and safety.

Commissioner Asselstine subsequently indicated that he did not support this Commission decision. He provided the following statement of views:

I do not support the Commission decision to allow San Onofre 1 to return to service at this time. I am in essential agreement with the points raised in the November 5, 1984 memorandum from the Office of the General Counsel regarding San Onofre 1 restart. Specifically, I believe that the changes to the operation and design of the plant that were included in NRC's confirmatory order of August 11, 1982 were so substantial that they must be considered an amendment to the license. Therefore, the subsequent order relaxing those changes must also be considered a license amendment. In addition, I am troubled by the Commission's reliance on the economic impact on the licensee of the California Public Utilities Commission's ruling as the basis for relaxing the safety requirements called for by the August 1982 confirmatory order. I believe that in the context of this case, reliance on such economic impacts to relax safety requirements is inappropriate. Finally, I am concerned about the reductions in the margin of safety for this plant that are involved in the relaxation of the August 1982 order.

The Commission has provided the following response to Commissioner Asselstine's comments:

The Commission believes it is important that the basis for its decision on the procedural issue concerning restart of San Onofre 1 be accurately understood.

The action of the majority is consistent with the advice given to the Commission by its Office of the General Counsel. That office advised the Commission, both orally and in writing at the public meeting of the Commission on November 21, that the Commission had the legal authority to decide the procedural issue (i.e., whether the August 1982 confirmatory order should be construed to be an amendment) as it chose to do as a matter of regulatory policy.

As to the equities involved, given the California PUC order, the NRC was called upon in keeping with its broad statutory responsibilities and in fairness to the licensee, to determine promptly whether or not restart could be authorized consistent with the protection of public health and safety. While the Commission was aware of the PUC action and the need for a timely NRC decision, the resumption of operations at San Onofre 1 was authorized by NRC on the basis of a technical judgment that there is reasonable assurance that such operation during completion of seismic reevaluation does not pose undue risk to public health and safety. The Commission decision on the procedural issue was grounded on policy considerations relevant to the Commission's licensing and enforcement responsibilities and, as noted above, the legal authority which was available in the circumstances.

Finally, having made that legal and policy decision, the Commission directed that the staff, prior to authorizing restart, make all the required safety findings that it must in any similar situation. It is the Commission's understanding that staff is satisfied that all systems necessary to achieve a hot standby condition have been upgraded to 0.67g, thereby making the plant substantially safer than it was when originally licensed. As to the upgrade of remaining safety systems, while seismic evaluation continues, operation of San Onofre Unit 1 at this time rests on an NRC judgment similar to the judgment to be made in other Systematic Evaluation Program (SEP) cases. That SEP judgment addresses the question whether, under the specific circumstances of a particular case, operating authority must be suspended while issues concerning plant design are addressed.

Staff has presented to the Commission its technical judgment that, consistent with protection of public health and safety, the margin of safety is reasonable and adequate to authorize restart of San Onofre 1 and that continued suspension of operating authority is not necessary. The Commission finds no basis upon which to contravene staff's technical finding favorable to that restart.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Thomas M. Roberts
James K. Asselstine
Frederick M. Bernthal
Lando W. Zech, Jr.

In the Matter of

Docket Nos. 50-352-OL
50-353-OL

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

June 11, 1985

The Commission declines to make effective a Licensing Board authorization for issuance of a full-power operating license for the Limerick Generating Station (unpublished Order of May 24, 1985) because the authorization relied on a Licensing Board grant of an exemption from the emergency planning regulations raising important questions regarding intervenors' hearing rights which had not yet been resolved.

MEMORANDUM AND ORDER

By this Memorandum and Order, the Nuclear Regulatory Commission ("NRC" or "Commission") declines to make effective at this time the Atomic Safety and Licensing Board's ("Licensing Board") Order of May 24, 1985 (unpublished), which, together with prior Licensing Board de-

cisions in this proceeding,¹ authorized the Director, Nuclear Reactor Regulation ("Director") to issue to the Applicant Philadelphia Electric Company ("PECo") a full-power operating license for the Limerick Generating Station ("Limerick"). The Commission finds that important questions regarding the hearing rights of the inmates of the State Correctional Institution at Graterford, Pennsylvania, have not yet been resolved.

Accordingly, the Commission directs the Atomic Safety and Licensing Appeal Board ("Appeal Board"), consistent with conducting a fair and thorough proceeding, to consider expeditiously the issue of the propriety of granting an exemption during the pendency of contentions filed by the Graterford inmates. Should the Appeal Board find that the grant of an exemption denied the Graterford inmates their rights to a hearing, the Appeal Board should take whatever steps are necessary to preserve and give expeditious effect to those rights. Once this matter is resolved, either by the Appeal Board's finding that a grant of an exemption was proper, or, if the Appeal Board finds that grant of an exemption was improper, by a Licensing Board decision on the contentions, the Commission will again consider the issuance of a full-power operating license for this facility.

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 11th day of June 1985.

¹ Partial Initial Decisions LBP-84-31, 20 NRC 446 (1984), LBP-85-14, 21 NRC 1219 (1985) and LBP-83-11, 17 NRC 413 (1983), *aff'd in part and remanded in part*, ALAB-785, 20 NRC 848 (1984), *re-sponded to*, ASLBP No. 81-465-07-OL (unpublished order, Nov. 8, 1984), *aff'd*, ALAB-804, 21 NRC 587 (1985).

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Thomas M. Roberts
James K. Asselstine
Frederick M. Bernthal
Lando W. Zech, Jr.

In the Matter of

Docket No. 50-322-OL-4

**LONG ISLAND LIGHTING
COMPANY**

(Shoreham Nuclear Power Station)

June 20, 1985

The Commission reaffirms the holding of CLI-84-9, 19 NRC 1323 (1984), that where an environmental impact statement has been prepared for full-power operation, the National Environmental Policy Act (NEPA) does not require the Commission to prepare a supplemental environmental impact statement ("SEIS") which weighs the costs and benefits of low-power operation on the assumption that there will never be full-power operation.

**NEPA: ENVIRONMENTAL IMPACT STATEMENT (NEED
FOR LOW-POWER TESTING)**

Even if full-power operation is uncertain, the benefit to be gained from low-power operation (i.e., early identification of problems to assure that full-power operation will not be delayed, if and when it is authorized) is enough to permit a finding that the benefits of low-power operation outweigh its costs.

FEDERAL PREEMPTION

While parties are entitled to challenge the sufficiency of radiological emergency preparedness for a nuclear power plant, the Commission's ultimate finding on the adequacy of preparedness is controlling.

ORDER

On March 6, 1985, the State of New York and Suffolk County filed a "Renewal of Request for NRC Supplementation of the Shoreham FEIS as Required by NEPA." For the reasons set forth below, we deny the request.¹ In support of their request, Intervenors assert that because of the uncertainty of full-power operation due to the State and County's refusal to participate in emergency planning, the Commission is required under the National Environmental Policy Act to supplement the 1977 Shoreham Final Environmental Impact Statement (EIS). In that EIS, the Commission weighed the costs and benefits of full-power operation. Intervenors in essence argue in their Request that because of a decision by a New York Supreme Court adverse to LILCO on emergency planning issues, it is reasonably foreseeable that Shoreham will never operate at full power.² Thus, Intervenors contend, because low-power testing will further irradiate the core and contaminate the remainder of the primary coolant system without the compensating benefits of full-power operation, i.e., generation of electricity, the EIS should be supplemented to assess the costs and benefits of low-power testing assuming no full-power operation. It is unclear whether Suffolk County continues to press this argument, however. The Suffolk County Attorney told us in a June 4 oral argument that the County will begin to participate in the Shoreham emergency planning process, that full-power operation is possible, and that the Commission is not required under NEPA to prepare an SEIS for low-power operation of Shoreham. On the other hand, at the same oral argument, some County legislators asserted that this is not "the County's" position.

¹ On November 20, 1984, Suffolk County filed a Petition for Review of ALAB-788. In its Petition, Suffolk also requested the Commission to reconsider CLI-84-9, our earlier decision not to prepare an SEIS. The Commission declined to reconsider CLI-84-9 in the context of the Petition for Review. Letter of April 18, 1985, from S. Chilk to H. Brown. That decision was not a denial of Intervenors' March 6 request. Intervenors renewed their NEPA arguments in their "Petition for Reconsideration of CLI-85-1," dated May 7, 1985, at 41.

² Since that time, there has also been a Federal District Court decision adverse to LILCO.

Regardless of what is “the County’s” position, for reasons we have given earlier, we do not believe that uncertainty over the pending full-power issues mandates a Supplemental Environmental Impact Statement or some renewed cost/benefit analysis. See CLI-84-9, 19 NRC 1323 (1984); 10 C.F.R. § 51.92(a). While the New York State and Federal court decisions affect the degree of uncertainty over whether Shoreham will get a full-power license, so do many other interlocutory events, the County’s apparent change of position being just one recent example. The present uncertainty over Shoreham’s full-power license is not a new factor outside the range of possibilities initially considered by the Commission when it determined that the EIS for full-power operation satisfied NEPA despite the pendency of Shoreham contested issues.

Moreover, the “uncertainty” which the Intervenor perceive regarding eventual full-power operation of Shoreham stems from their view that adequate emergency planning cannot be achieved, even with their cooperation. Accordingly, the Intervenor have (at least until recently) refused to cooperate in the plan, apparently as a way to prevent any further steps toward what they regard as a quixotic venture.

We note that our Licensing Board in its decision of April 17, 1985 (LBP-85-12, 21 NRC 644), has found that an adequate emergency plan is in fact achievable if the State and County participate in emergency planning, as all other local and State jurisdictions have done when so called upon. Like any litigants before us, these Intervenor may challenge the adequacy of this Board’s determination, but they may not simply substitute their own judgment for the Commission’s regarding what the public health and safety requires for licensing the operation of a nuclear power plant. Congress has entrusted the protection of public health and safety in matters concerning nuclear power to the Commission, not to Suffolk County or New York State. See *Pacific Gas & Electric Co. v. State Energy Resources Conservation and Development Commission*, 461 U.S. 190, 205 (1983). Accordingly, we believe that the County and the State must recognize that when a health and safety issue has been fully litigated before the Commission, the Commission’s final judgment, subject to judicial review, must be the controlling determination, even if some continue to disagree with it.

Thus, while we express no opinion concerning the Board’s decision while it remains under administrative review, we are confident that if the Commission upholds the Licensing Board’s finding that an adequate emergency plan is feasible with State and local participation, the State and County will accede to that judgment and will provide the participation needed to make the plan successful. In short, we shall not take as

an element of uncertainty in the eventual full-power operation of Shoreham the possibility that either the State or the County will refuse to cooperate with LILCO on the basis of their own conception of what radiological public health and safety requires, rather than on the findings of the Commission.

Furthermore, even were we required to perform some cost/benefit analysis at this interim stage of these proceedings, we would not say that the uncertainty of Shoreham full-power operation is so great that it necessitates avoidance of the environmental effects of low-power testing. The environmental effects of low-power testing are well known, i.e., moderate irradiation of the core and contamination of the remainder of the primary coolant system, with no significant impact on the surrounding environment by releases of effluents during normal operation. These effects of low-power testing are subsumed in the FEIS's analysis of the far greater, but nonetheless very small impacts from full-power operation. In our view, the benefits of low-power operation clearly outweigh the environmental costs.

The primary benefit of early low-power operation is that it will allow the early discovery and correction of unforeseen but possible problems which may prevent or delay full-power operation at an enormous expense to LILCO and/or its customers.³ Thus, early low-power testing greatly increases the possibility that if and when the plant is ready for full-power operation, the benefits of that operation will be realized without delay. This benefit does not require speculation over the outcome of the full-power proceeding. So long as an applicant is willing to invest the substantial effort and money necessary to attempt to obtain a full-power license, the possibility of full-power operation at a future date gives substantial value to low-power testing. Moreover, whenever a low-power motion has been filed where full-power issues are also pending (a common occurrence), there is always uncertainty over the outcome of the full-power proceeding. Delaying the low-power license until that uncertainty is eliminated irretrievably deprives the applicant and its customers of the substantial benefits of early low-power testing.

To refuse to authorize low-power operation whenever there is uncertainty over whether full-power operation will be authorized would ignore Commission regulations which allow low-power operation when there is reasonable assurance that it will present no undue risk to the public health and safety notwithstanding the pendency of full-power

³ We note that low-power test programs for recently licensed reactors have identified problems which have taken many months to correct and consequently have delayed full-power operation. At Palo Verde, a pressurized water reactor, for example, a coolant pump design problem identified during initial testing took over 1 year to correct.

issues. 10 C.F.R. § 50.57(c). This regulation is premised on the idea that the inherent benefits of early low-power testing outweigh the uncertainty that a full-power license may be denied. We see no reason to refuse to recognize this premise in this case. In short, the sooner low-power testing is begun, the greater the probability that it will serve the purpose for which it is intended, i.e., to facilitate the earliest possible full-power operation of the plant in the event that the Commission finds reasonable assurance that full-power operation will present no undue risk to the public health and safety.

Accordingly, we again deny Intervenors' request to delay Shoreham low-power operation pending the preparation of an SEIS.

Commissioner Asselstine disapproved this Order and provided the attached separate views. In response to the separate views of Commissioner Asselstine regarding the value of low-power testing, we point out that the principal benefits of low-power testing are threefold: (1) testing and evaluation of plant systems which cannot be tested or operated at zero power conditions; (2) evaluation, assessment and familiarization with technical specifications and implementing procedures for the operation of the plant while at low power; (3) operator and plant staff experience on the actual plant in a critical but still low-power operation.

During low-power testing, plant systems such as control systems, turbines and electric power conversion systems, and other steam-driven equipment can be tested and functionally evaluated. Also during low-power testing, core physics calculations, basic thermal-hydraulic performance, and other core operating parameters can be further verified. If necessary, repairs or modifications of equipment and operating procedures may be made. Low-power testing provides an opportunity to assess technical specifications and implement procedures which cannot be accomplished at zero power. The low-power test program affords the operator and plant staff valuable experience in the actual operation of the plant and of the plant systems interactions, which otherwise cannot be totally compensated for by simulator training. Low-power test programs for recently licensed BWRs have provided invaluable experience to the plant staff and enabled testing of plant systems. For example, at Limerick the turbine and power conversion systems were successfully tested, and experience was gained at Grand Gulf and Limerick on implementing the technical specifications. In addition, historically, plant equipment testing led to the identification and timely correction of equipment and procedural problems.

It is so ORDERED.

For the Commission

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 20th day of June 1985.

SEPARATE VIEWS OF COMMISSIONER ASSELSTINE

The Shoreham case is unique. In no other case have the State and local governments refused to participate in emergency planning and preparedness. In no other case have both State and Federal courts found that, in the absence of governmental participation in emergency response, the utility does not have the legal authority to carry out portions of its emergency plan. Before a full-power operating license can be issued for Shoreham, the Commission must be able to find that "there is reasonable assurance that adequate protective measures *can and will* be taken in the event of a radiological emergency." 10 C.F.R. § 50.47(a)(1) (emphasis added). Absent participation by the State and County in emergency planning and preparedness, the Commission is unlikely to be able to make such a finding.

There is then a reasonable likelihood, which is much more likely than when the original EIS for Shoreham was completed, that Shoreham might never receive a full-power license. Given this change in circumstances, the Commission should perform an environmental evaluation, including a cost/benefit balance, of the issuance of only a low-power license. The somewhat crude weighing of costs and benefits in the Commission's order is clearly not sufficient.

The Commission's response to this is threefold. First, the Commission says that it will *not* consider as an element of uncertainty the refusal of the State and County to participate in emergency planning and preparedness for Shoreham. The Commission has confidence that, if the Commission finds that an adequate emergency plan is feasible with State and local participation, the State and County will accede to that judgment and will in fact participate in emergency planning and preparedness. The

Commission's reasoning is overly optimistic at best, at worst simply ignores reality. The Commission refuses to take the statements of the State and County at face value,¹ but prefers to rest its decision on some hope that the State and County will "see the light." Further, if the Commission intends to rely, in the face of continued State and County refusals to participate, on the Commission's confidence that should an emergency occur the State and local governments will in fact participate in an emergency response, that confidence would hardly support a finding that the emergency plan *will* be carried out. And, if the State and County do not participate in planning and drills, the Commission's confidence certainly would not support a finding that the State and local governments *can* adequately carry out the plan. The Commission's refusal to recognize the State and County unwillingness to participate as creating uncertainty about the likelihood of full-power operation at Shoreham is unfathomable.

The Commission next claims that uncertainty about the issuance of a full-power license for Shoreham is not a new factor outside the range of possibilities initially considered by the Commission when it determined that the EIS for full-power operation satisfied the National Environmental Policy Act (NEPA) despite the pendency of Shoreham contested issues. Obviously there is a possibility in every contested OL proceeding that some issue might arise that would prevent the issuance of a license to operate the plant. However, the Shoreham case is not a case where, before the licensing proceeding has begun and without more information, the Commission is being asked to consider in the abstract whether some issue might possibly prevent operation of the plant. Rather, in this case we have significant new information which indicates that there might in fact be a bar to full-power operation. The question is whether in light of this new information the Commission should first consider the costs and benefits of that action before permitting contamination of the plant. I believe that reasoned decisionmaking requires no less. And, the caselaw indicates that the Commission may be legally required to do so. See *Environmental Defense Fund, Inc. v. Andrus*, 619 F.2d 1368, 1377 (9th Cir. 1982).

¹ Further, the Commission seems to base its confidence on the statements of the County Attorney that Suffolk County will begin to participate and upon the Suffolk County Executive's agreement with LILCO to do so. I am not willing to be quite as optimistic as the Commission majority is on this score: there is a dispute between the Executive and the Legislature on the Executive's authority to carry out the agreement and in fact a New York State court has recently nullified the agreement at the request of the County Legislature; the State has not entered into the agreement or agreed to participate in the drill; and, even if the agreement is ultimately upheld, there is nothing in the agreement which prohibits the County from litigating the results of the emergency drill. This dispute could go on for quite some time.

Finally, even though it says it is not required to do so, the Commission then proceeds to conduct a crude balancing of the costs and benefits of permitting the plant to operate at low power. The Commission says that the costs have already been considered because they are subsumed within the greater effects of full-power operation. And, according to the Commission, the substantial benefits of low-power testing clearly outweigh the costs. Under normal circumstances the Commission might have a point. However, this case is unique. New circumstances have arisen which prevent the Commission from assuming that full-power operation will occur. Thus, the Commission cannot merely assert that the effects of low-power operation are subsumed in those of full-power operation. Further, the benefits cited by the Commission² assume that there will be full-power operation. If there will not be full-power operation, then there is no benefit to the early identification of problems which the Commission identifies as the primary benefit of low-power operation.

Clearly, the Commission's balancing was not a careful one. The Commission should carefully and in detail consider the costs, benefits and likelihood of Shoreham never being permitted to exceed 5% of power. The superficial, hurried effort reflected in the Commission's order does not amount to a reasoned consideration of the issue.

² Even the Commission's asserted benefits of low-power testing are overstated. An operating license limited to 5% of rated power is of limited utility to the operator of a boiling water reactor (BWR) such as Shoreham. Little testing can be accomplished at that power level that cannot also be completed without taking the reactor beyond cold criticality. To do substantial testing of a BWR plant the operators must be able to take the plant to 20% or more of rated power. Further, the Palo Verde experience in early identification of problems does not support the Commission's argument. The design problems cited by the Commission at Palo Verde were discovered during the hot functional tests of the plant well before a low-power license was issued. These extensive tests have already been completed at Shoreham.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Christine N. Kohl, Chairman
Gary J. Edles
Dr. Reginald L. Gotchy

In the Matter of

Docket Nos. 50-352-OL
50-353-OL

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

June 11, 1985

The Appeal Board denies intervenor's motion for a stay of the Licensing Board's third partial initial decision in this operating license proceeding (LBP-85-14, 21 NRC 1219), which resolved certain offsite emergency planning issues in favor of the applicant.

RULES OF PRACTICE: STAY OF AGENCY ACTION

Under the Commission's Rules of Practice, a party may seek a stay of "a decision or action." 10 C.F.R. § 2.788(a). *See* 42 Fed. Reg. 22,128, 22,129 (1977). Thus, outright denial or dismissal of a stay motion on the ground that the decision is merely passive would not appear to be justified.

RULES OF PRACTICE: STAY OF AGENCY ACTION

10 C.F.R. § 2.788(f) explicitly authorizes the filing of a request to stay a licensing board decision before either that licensing board or an appeal

board, but not both at the same time. *See also* 10 C.F.R. § 2.721(d); 42 Fed. Reg. at 22,129.

RULES OF PRACTICE: STAY OF AGENCY ACTION

Stay motions are decided by weighing the following four factors set forth in 10 C.F.R. § 2.788(e):

- (1) Whether the moving party has made a strong showing that it is likely to prevail on the merits;
- (2) Whether the party will be irreparably injured unless a stay is granted;
- (3) Whether the granting of a stay would harm other parties; and
- (4) Where the public interest lies.

RULES OF PRACTICE: STAY OF AGENCY ACTION (IRREPARABLE INJURY)

The second factor of 10 C.F.R. § 2.788(e), irreparable harm, is often the most important in deciding whether a stay is warranted. *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-789, 20 NRC 1443, 1446 (1984).

OPERATING LICENSE PROCEDURE: RESPONSIBILITY OF NRC STAFF

The delegation to the NRC staff of post-hearing verification of certain emergency planning measures can be proper, depending on exactly what is left for verification. *See Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1103-07 (1983).

EMERGENCY PLANNING: PREDICTIVE FINDINGS

The predictive nature of findings is the essence of litigation in the emergency planning area. Thus, an emergency plan need not be final, just sufficiently developed to provide reasonable assurance that adequate protective measures can and will be taken in an emergency. *See id.* at 1103-04.

OPERATING LICENSE PROCEEDINGS: ENVIRONMENTAL AND SAFETY ISSUES

In comparison with low-power authorization, different and more serious considerations pertain to full-power authorization. *See Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-84-5, 19 NRC 953, 959-60 (1984).

RULES OF PRACTICE: CONSOLIDATION

By Commission rule and policy, consolidation of intervenors with the same interest is acceptable and encouraged, providing that no undue prejudice results. 10 C.F.R. § 2.715a; *Statement of Policy on Conduct of Licensing Proceedings*, CLI-81-8, 13 NRC 452, 455 (1981).

RULES OF PRACTICE: CROSS-EXAMINATION (LIMITATION)

Limitations on cross-examination are appropriate in certain circumstances and, even where improper, actual prejudice must be shown to establish reversible error. *Waterford*, 17 NRC at 1096.

EVIDENCE: ADMISSIBILITY (SPONSORSHIP BY EXPERT)

Exclusion of evidence for lack of sponsoring testimony is consistent with NRC precedent. *See Duke Power Co.* (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-669, 15 NRC 453, 477 (1982).

OPERATING LICENSE PROCEEDINGS: ECONOMIC ISSUES

Rate issues and the like are not cognizable under the Atomic Energy Act, which is concerned with protection of the public health and safety from radiological hazards. State utility commissions, and in some instances the Federal Energy Regulatory Commission, exercise economic regulatory jurisdiction.

RULES OF PRACTICE: STAY OF AGENCY ACTION

For stay purposes, it is often necessary and appropriate to take into account various matters not actually litigated in the proceeding — providing proper documentation is supplied. *See* 10 C.F.R. § 2.788(b)(4).

RULES OF PRACTICE: STAY OF AGENCY ACTION

Under the third stay criterion, the Commission has in the past taken into account the economic harm that an applicant might suffer if a stay of its license is granted. *See, e.g., Louisiana Power & Light Co.* (Waterford Steam Electric Station, Unit 3), CLI-85-3, 21 NRC 471, 477 (1985); *Florida Power & Light Co.* (St. Lucie Nuclear Power Plant, Unit No. 2), ALAB-404, 5 NRC 1185, 1188 (1977).

APPEARANCES

Phyllis Zitzer, Pottstown, Pennsylvania, for intervenor Limerick Ecology Action.

Troy B. Conner, Jr., Robert M. Rader, and Nils N. Nichols, Washington, D.C., for applicant Philadelphia Electric Company.

Donald F. Hassell and Joseph Rutberg for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

Intervenor Limerick Ecology Action (LEA) has moved for a stay of the Licensing Board's third partial initial decision (PID) in this proceeding, LBP-85-14, 21 NRC 1219 (1985).¹ In that decision, the Licensing Board resolved all remaining offsite emergency planning issues (except for those raised by another intervenor, the inmates of the State Correctional Institution at Graterford) in favor of applicant Philadelphia Electric Company (PECo) and imposed two license conditions.² PECo and

¹ LEA filed its motion for stay on May 16, 1985, and supplemented it with a filing on May 20. In an unpublished order issued on May 22, we accepted the supplement as timely.

² Because of the outstanding issues concerning the inmates, the Board's decision did not contain an authorization for the Director of Nuclear Reactor Regulation (NRR) to issue an operating license to PECo. The NRC staff argues that, in the absence of such an authorization, there is no Board "action" that LEA can seek to stay; it thus urges us to deny the motion on that ground. Obviously, if no immediate action will come to pass as a result of a decision, it will be quite difficult for a movant to show the irreparable harm that is required for a stay. *See* p. 1599, *infra*. But under the Commission's Rules of Practice, a party may seek a stay of "a decision or action." 10 C.F.R. § 2.788(a). *See* 42 Fed. Reg. 22,128, 22,129 (1977). Thus, outright denial or dismissal of a stay motion on the ground that the decision is merely "passive" would not appear to be justified.

(Continued)

the NRC staff oppose the motion for stay.³ For the reasons explained below, we decline to stay LBP-85-14.

A.

Stay motions are decided by weighing the following four factors set forth in 10 C.F.R. § 2.788(e):

- (1) Whether the moving party has made a strong showing that it is likely to prevail on the merits;
- (2) Whether the party will be irreparably injured unless a stay is granted;
- (3) Whether the granting of a stay would harm other parties; and
- (4) Where the public interest lies.

Further, as we noted just last fall in addressing several earlier stay motions filed in this proceeding, the second factor, irreparable harm, is often the most important in deciding whether a stay is warranted. ALAB-789, 20 NRC 1443, 1446 (1984), and cases cited. We now consider each factor in turn.

B.

1. Presumably in an effort to make a strong showing that it is likely to prevail on the merits, LEA raises several substantive arguments in connection with LBP-85-14.⁴ LEA assigns the following errors to the Licensing Board's decision. First, the Board improperly delegated to the staff the responsibility of verifying compliance with the two license conditions imposed by the Board concerning (a) traffic control in the King of Prussia area, and (b) municipal staffing needs during a radiological

Be that as it may, events subsequent to the filing of the stay motion (but preceding the staff's stay opposition) have put more teeth into LBP-85-14. In an unpublished order issued May 24, 1985, the Licensing Board granted PECO's request for an exemption from the requirements of 10 C.F.R. § 50.47 insofar as the issues raised by the inmates are concerned. The Board thereby authorized the Director of NRR to issue an operating license to PECO, notwithstanding the continued litigation of the inmates' proposed offsite emergency planning contentions. Appeals from and motions to stay the May 24 order have been filed and will be addressed in due course. The decision here is limited solely to the issues raised in LEA's May 16 and 20 stay papers.

³ PECO and the staff filed their responses to the motion on May 28 and June 4, 1985, respectively.

PECO argues that under several NRC cases, LEA should have initially sought a stay from the Licensing Board. The cases PECO cites, however, were superseded eight years ago when the Commission promulgated 10 C.F.R. § 2.788(f). That provision explicitly authorizes the filing of a request to stay a licensing board decision before either that licensing board or an appeal board, but not both at the same time. See also 10 C.F.R. § 2.721(d); 42 Fed. Reg. at 22,129.

⁴ Many of LEA's arguments are not presented clearly enough for us to address meaningfully. The problem is worsened by LEA's failure, in all but a few instances, to cite to the portions of the Licensing Board's 306-page decision to which it objects. We therefore discuss the points we find most discernible.

emergency. On the latter point, LEA claims that the Board ignored concerns expressed by the Federal Emergency Management Agency's (FEMA) witness. Second, the Board's predictive finding of reasonable assurance — that local governments (particularly Montgomery County) and school districts will, in good faith and in accordance with state law, adopt and implement final, adequate radiological emergency response plans (RERPs) — is not justified. To support its claim, LEA refers to several recent FEMA memoranda identifying inadequacies in the plans. Third, LEA asserts that the record greatly understates the number of "transport-dependent" persons. Fourth, LEA incorporates by general reference the entire brief in support of its pending appeal from the Licensing Board's second partial initial decision, LBP-84-31, 20 NRC 446 (1984). Finally, in connection with the third PID, LEA complains about several of the Licensing Board's procedural rulings as well — to wit: the consolidation of LEA and another intervenor on one contention; the imposition of time limits on cross-examination; and the exclusion of certain evidence concerning traffic control.

LEA has not made the required "strong" showing on any of its arguments. First, the delegation to the staff of post-hearing verification of certain emergency planning measures can be proper, depending on exactly what is left for verification. See *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1103-07 (1983). Here, the Board conditioned the issuance of the operating license on verification of sufficient traffic control in the King of Prussia area, and FEMA's satisfaction with municipal emergency staffing. According to the record — which LEA does not seriously challenge — the former can be accomplished without problem by the establishment of a comparatively few additional traffic control points beyond the boundary of the emergency planning zone (EPZ). See LBP-85-14, 21 NRC at 1254. According to a recent FEMA memorandum (more recent than those on which LEA relies), determination of these points is now under way. Memorandum to E. L. Jordan from R. W. Krimm (May 21, 1985) at 2-3 (attached to letter to Licensing Board from D. F. Hassell (May 22, 1985)) [hereafter, "FEMA Memorandum"]. As for the municipal staffing needs, subsequent to the Board's decision, FEMA determined that "adequate staffing now exists in all risk municipalities to respond to a radiological emergency over an extended period of time." *Id.* at 3. Thus, any concerns in this regard expressed by the FEMA witness at the hearing appear to be resolved. See LBP-85-14, 21 NRC at 1366.

LEA's arguments about the adoptability and implementation of the municipal RERPs are likewise unconvincing. As LEA seems to acknowl-

edge, the predictive nature of findings is the essence of litigation in the emergency planning area. The plan need not be final, just sufficiently developed to provide reasonable assurance that adequate protective measures can and will be taken in an emergency. *See Waterford*, 17 NRC at 1103-04. Although only a few of the local jurisdictions involved here have actually adopted "final" versions of their plans so far, draft plans exist for all entities (including Montgomery County) and were introduced into evidence at the hearing. They have been reviewed by FEMA, the Commonwealth of Pennsylvania, and other officials.⁵ There is no credible reason to believe that the RERPs will not be adopted formally in the future, although it is expected that they will undergo further revision, given the very nature of emergency planning. *See LBP-85-14*, 21 NRC at 1369-1402. LEA has given us no cause, in its stay motion, to doubt the Licensing Board's reasonable assurance finding. *Cf. Detroit Edison Co.* (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-730, 17 NRC 1057, 1067 (1983). LEA's objection to the survey method used to determine transport-dependent individuals is also unavailing. The Board has adequately explained the discrepancies between the survey and census data. *See LBP-85-14*, 21 NRC at 1245-47.

Insofar as LEA refers us generally to its fully briefed arguments on appeal from the Licensing Board's *second* PID, it fails to make a strong showing that it is likely to prevail.⁶ We are not yet prepared to rule on the merits of LEA's appeal from the second PID. Our study of the matter thus far, however, reveals no error that would warrant a stay here, in connection with possible full-power operation.

With respect to LEA's procedural objections, we see no obvious error in the Board's rulings. By Commission rule and policy, consolidation of intervenors with the same interest is acceptable and encouraged, providing, of course, that no undue prejudice results. 10 C.F.R. § 2.715a; *Statement of Policy on Conduct of Licensing Proceedings*, CLI-81-8, 13 NRC 452, 455 (1981). Limitations on cross-examination are also appropriate in certain circumstances and, even where improper, actual prejudice must be shown to establish reversible error. *Waterford*, 17 NRC at 1096.

⁵ Planning and preparedness deficiencies earlier identified by FEMA have now been corrected to FEMA's satisfaction. *See* FEMA Memorandum at 1-2.

⁶ LEA can properly raise arguments concerning the Board's second PID here, in the context of its request to stay the Board's third PID. LEA's two earlier requests to stay, in effect, the second PID were denied by both the Commission and us. *See* Commission Order of February 19, 1985 (unpublished); Appeal Board Memorandum and Order of November 23, 1984 (unpublished). But those motions were filed in an attempt to enjoin the *low-power* operation authorized by the second PID. Different and more serious considerations pertain to full-power authorization. *See Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-84-5, 19 NRC 953, 959-60 (1984). LEA may thus renew its earlier concerns insofar as they pertain to the Board's third PID, the penultimate decision before full-power authorization.

LEA has not shown how the various procedural restrictions imposed by the Licensing Board — as explained in its decision, LBP-85-14, 21 NRC at 1233-36 — have resulted in actual prejudice to its case. As for LEA's evidence on traffic control, the Board's decision to exclude it for lack of sponsoring testimony is consistent with NRC precedent. *Id.* at 1241-42. *See Duke Power Co.* (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-669, 15 NRC 453, 477 (1982).

2. LEA's arguments of irreparable harm are rather generalized and unpersuasive. For example, LEA contends that its interest in lawful decisionmaking has been irreparably injured by violations of the National Environmental Policy Act, the Administrative Procedure Act, and unspecified regulations. Our response is equally general: if such violations have occurred, they can be corrected in due course through the appeal process and do not, without a specific showing, cause irreparable harm so as to warrant a stay *pendente lite*.

LEA also asserts that the risk to the public from an accident at Limerick is greater than at any other plant in the United States, except for one (Indian Point). Further, LEA asserts that full-power operation may forever render mitigating design alternatives neither cost-effective nor feasible (largely due to worker radiation exposure). But the premise of LEA's concern — the high risk to the public from operation of Limerick — is based on an erroneous understanding of the probabilistic risk assessment (PRA) for Limerick. One of the few plant-specific PRAs, it shows that Limerick's range of risk is about the same as that of other plants, especially those located in high-population density areas, and is not undue. *See* NUREG-0974, Final Environmental Statement (April 1984) at 5-115 to 5-126. *See also* NUREG-1068, Review Insights on the Probabilistic Risk Assessment for the Limerick Generating Station (August 1984), attached to Board Notification No. 84-147 (September 17, 1984). Moreover, although full-power operation unquestionably entails greater risks than low-power operation or testing (*see* note 6, *supra*), LEA fails to identify a specific risk not already considered and a corresponding, real (rather than theoretical) design alternative to mitigate it.

3. LEA asserts, without offering any supporting affidavits or documentation, that a stay would cause no adverse economic impact because there is sufficient electricity available to PECO elsewhere at a cheaper cost. It also argues that, in any event, PECO's economic interests cannot properly be considered in light of our holding in ALAB-789, 20 NRC at 1447, that such matters "are not within the proper scope of issues litigated in NRC proceedings." If economic interests were cognizable, howev-

er, in LEA's view they would be outweighed as a general principle by public health and safety concerns.

LEA has misconstrued our statement of long standing Commission precedent in ALAB-789. Rate issues and the like are not cognizable under the Atomic Energy Act, which is concerned with protection of the public health and safety from radiological hazards. State utility commissions, and in some instances the Federal Energy Regulatory Commission, exercise economic regulatory jurisdiction. For stay purposes, however, it is often necessary and appropriate to take into account various matters not actually litigated in the proceeding — providing proper documentation is supplied. See 10 C.F.R. § 2.788(b)(4). Thus, under the third stay criterion, the Commission has in the past taken into account the economic harm that an applicant might suffer if a stay of its license is granted. See, e.g., *Louisiana Power & Light Co.* (Waterford Steam Electric Station, Unit 3), CLI-85-3, 21 NRC 471, 477 (1985); *Florida Power & Light Co.* (St. Lucie Nuclear Power Plant, Unit No. 2), ALAB-404, 5 NRC 1185, 1188 (1977). Furthermore, refusal to consider economic harm would effectively eliminate the third stay criterion insofar as an applicant's interest is concerned, because the harm most likely to be incurred by a utility (paying financing costs on a completely constructed, but not yet operating, plant) is monetary. That is not to say, however, that this is or should be the principal basis on which stay decisions are based. Indeed, it is but one of the criteria that must be weighed under 10 C.F.R. § 2.788(e). Accordingly, PECO has called to our attention, and we give it due weight, the March 14, 1985, affidavit of V. S. Boyer, PECO's Senior Vice President, stating that delays in full-power operation will cost \$49 million per month, including \$15 million in fuel costs passed on to customers.⁷

4. Under the fourth stay criterion, LEA simply summarizes its other arguments, in an effort to show that a stay is in the public interest. Given that it has failed to make a strong showing of likely success on the merits, to establish irreparable harm, and to counter PECO's aver-

⁷ This affidavit was previously filed as an attachment to a letter to the Licensing Board from M. J. Weterhahn (March 18, 1985), amending an earlier motion filed with that Board.

LEA argues that any economic harm to PECO is speculative, inasmuch as full-power testing and operation of Limerick will not be possible in the coming months due to insufficient water for cooling purposes. The current status of the water supply PECO needs to operate at full power, however, is uncertain. All that we are aware of is that the Delaware River Basin Commission recently approved, in part, PECO's request for certain relief that would temporarily enhance the amount of water available for operation of Limerick this summer. See letter to S. Chilk from T. B. Conner, Jr. (June 10, 1985), Enclosure. But it is worth noting that, if LEA is correct in its claims, the lack of water and consequent inability to operate the plant in the immediate future necessarily undercut LEA's claims, under the second stay criterion, of irreparable harm to its own interest.

ment of economic harm if a stay is granted, LEA's final argument necessarily fails as well.

LEA's motion for a stay of the Licensing Board's third partial initial decision, LBP-85-14, is *denied*.⁸
It is so ORDERED.

FOR THE APPEAL BOARD

Jean Shoemaker
Secretary to the
Appeal Board

Mr. Edles did not participate in this memorandum and order.

⁸ We stress, however, that the denial of this stay motion is without prejudice to the merits of the pending appeals from both the second and third PIDs, as well as the pending appeals and stay requests in connection with the Licensing Board's May 24 exemption order (*see* note 2, *supra*). Like all stay decisions, our judgment here is necessarily circumscribed by the filings, time, and application of the stay criteria.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

Christine N. Kohl, Chairman
Gary J. Edles
Dr. Reginald L. Gotchy

In the Matter of

Docket Nos. 50-352-OL
50-353-OL

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

June 17, 1985

The Appeal Board vacates and remands two Licensing Board orders granting applicant an exemption from certain requirements of 10 C.F.R. § 50.47 and authorizing the Director of Nuclear Reactor Regulation to issue a full-power operating license to PECO. The Board finds that the Licensing Board failed to apply the proper standards for granting the exemption and that its decision lacks a reasoned basis.

EMERGENCY PLANNING: REQUIREMENTS

10 C.F.R. § 50.47 embodies the NRC's emergency planning requirements. It requires a finding of "reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency" before issuance of an operating license.

REGULATIONS: EXEMPTIONS

The principal authority for granting exemptions from any of the 10 C.F.R. Part 50 requirements for an operating license is found in 10

C.F.R. § 50.12(a). By its very terms, this provision and the criteria specified in it must be addressed before any exemption from Part 50 requirements can be authorized. See *Mississippi Power & Light Co.* (Grand Gulf Nuclear Station, Unit 1), CLI-84-19, 20 NRC 1055, 1059 n.7 (1984).

REGULATIONS: EXEMPTIONS

Where an applicant seeks an exemption from the requirements of 10 C.F.R. § 50.47, the standards of both 10 C.F.R. §§ 50.12(a) and 50.47(c)(1) must be satisfied.

REGULATIONS: EXEMPTIONS

The exemption authority in 10 C.F.R. § 50.12 is "extraordinary" and "available . . . only in the presence of exceptional circumstances." *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), CLI-84-8, 19 NRC 1154, 1156 n.3 (1984).

REGULATIONS: EXEMPTIONS

Through the exemption regulations, the Commission has recognized that some circumstances might warrant license issuance despite an applicant's inability to satisfy all regulatory requirements. Before such extraordinary relief is authorized, however, an applicant must show that it is justified under the appropriate NRC standards.

LICENSING BOARD: RESPONSIBILITIES

Merely listing the parties' filings and noting the extensive briefing of a matter is not a substitute for the reasoned decisionmaking contemplated by the Administrative Procedure Act, 5 U.S.C. § 557(c). See *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1087 n.12 (1983).

REGULATIONS: EXEMPTIONS

Both 10 C.F.R. §§ 50.12(a) and 50.47(c)(1) presuppose identification of the particular respects in which an applicant is unable to comply with the regulatory requirements from which it seeks an exemption.

APPEARANCES

Angus R. Love, Norristown, Pennsylvania, for intervenors, inmates of the State Correctional Institution at Graterford, Pennsylvania.

Frank R. Romano, Ambler, Pennsylvania, for intervenor, Air and Water Pollution Patrol.

Robert L. Anthony, Moylan, Pennsylvania, intervenor pro se and for intervenor, Friends of the Earth.

Troy B. Conner, Jr., Robert M. Rader, and Nils N. Nichols, Washington, D.C., for applicant, Philadelphia Electric Company.

Joseph Rutberg, Donald F. Hassell, and Nathene A. Wright for the Nuclear Regulatory Commission staff.

DECISION

Three intervenor groups — the inmates of the State Correctional Institution at Graterford, Pennsylvania; Air and Water Pollution Patrol (AWPP); and Robert L. Anthony/Friends of the Earth (Anthony/FOE) — have appealed from the Licensing Board's May 24, 1985, order in this operating license proceeding. That order implements the Board's May 9, 1985, order, which granted applicant Philadelphia Electric Company (PECo) an exemption from certain requirements of 10 C.F.R. § 50.47. The Board there concluded that possible continued litigation of issues raised by the inmates in connection with the emergency evacuation plan for the Graterford facility should not bar full-power license authorization for Limerick. Thus, the Licensing Board authorized the Director of Nuclear Reactor Regulation (NRR) to issue a full-power operating license to PECo.¹

¹ Several earlier decisions also supplied the necessary bases for full-power license authorization. In LBP-83-11, 17 NRC 413 (1983), the Licensing Board ruled favorably to PECo on issues relating to the supplementary cooling water system (SCWS) for Limerick. We affirmed most of that decision but remanded in part in ALAB-785, 20 NRC 848 (1984). On remand, the Licensing Board issued its Memorandum and Order of November 8, 1984 (unpublished), which we affirmed in ALAB-804, 21 NRC 587 (1985), finally resolving all contested SCWS issues. In LBP-84-31, 20 NRC 446 (1984), and LBP-85-14,

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Ordinarily, the Commission would now undertake its so-called "immediate effectiveness" review. *See* 10 C.F.R. § 2.764. But because "important questions regarding the hearing rights of the inmates . . . have not yet been resolved," the Commission has declined to make the Licensing Board's license authorization effective at this time. CLI-85-11, 21 NRC 1585, 1585-86 (1985). In this connection, the Commission directed us to expedite our consideration of the pending appeals from the Licensing Board's exemption order, and we have acted accordingly. *See id.* at 1586.²

As explained below, the Licensing Board failed to apply the proper standards for granting an exemption. Further, the Board's decision lacks a reasoned basis. We therefore vacate the Licensing Board's May 9 and May 24, 1985, orders and remand for further action in accordance with this opinion.

I.

We need not belabor the background of the inmates' efforts to litigate their concerns about the adequacy of the evacuation plan for Graterford, which is located within the emergency planning zone for Limerick. A few details, however, are useful to put the instant dispute in perspective. Although the inmates were admitted as intervenors to this proceeding in 1982, the emergency plan they sought to challenge did not exist and was not made available to them until December 1984 — shortly before the last of the scheduled hearings on PECO's operating license application was due to be completed. The inmates acted promptly and in accordance with prior Licensing Board orders to "reactivate" and to preserve their interest in the case. As explained in ALAB-806, 21 NRC 1183 (1985), however, these efforts were initially unsuccessful. But after two appeals, the inmates were reinstated and given the opportunity to file revised contentions. *Id.* at 1193-94. The inmates did so on May 13, 1985.

In the meantime (but shortly after the inmates renewed their interest in this proceeding), PECO filed a motion with the Licensing Board, pursuant to 10 C.F.R. § 50.12. The motion sought an exemption from 10

21 NRC 1219 (1985), the Licensing Board resolved issues relating to low-power operation and onsite and offsite emergency planning. We denied motions to stay these decisions in ALAB-789, 20 NRC 1443 (1984), and ALAB-808, 21 NRC 1595 (1985), but appeals from both LBP-84-31 and LBP-85-14 are pending.

² Prior to the issuance of CLI-85-11, we had shortened the briefing schedule for these appeals. Appeal Board Orders of June 3 and 5, 1985 (unpublished). In light of the Commission's directive, however, we further abbreviated the time for filing reply briefs. Appeal Board Order of June 12, 1985 (unpublished).

C.F.R. § 50.47 insofar as that regulation would require Board consideration, before a full-power license could be issued, of any contentions raised by the inmates.³ The inmates, the Commonwealth of Pennsylvania, AWPP, and Anthony/FOE opposed the grant of an exemption. See Graterford Inmates' Motion in Opposition (March 13, 1985); Commonwealth of Pennsylvania Response (March 18, 1985); Letter to Licensing Board from F. R. Romano (AWPP) (March 15, 1985); Anthony/FOE Motion in Opposition (March 15, 1985). The NRC staff argued that it was premature for the Board to consider the exemption request until a determination was made that the inmates have at least one admissible contention. See NRC Staff Response (March 18, 1985).

Subsequently — after ALAB-806 reinstated the inmates as intervenors but before they filed revised contentions — the Licensing Board addressed PECO's exemption request. The Board first determined that the matter was ripe for disposition because it believed litigation of the inmates' concerns was inevitable and PECO should not have to be penalized by the resultant delay. Licensing Board Order of May 9, 1985 (unpublished) at 2-3, 4. Relying solely on 10 C.F.R. § 50.47(c)(1), the Board also concluded that an exemption was warranted. *Id.* at 3-8. But while the Board appeared to grant PECO's motion, its May 9 order did not include the customary language that authorizes the Director of NRR to issue a license. Further, the Board called for additional comments. *Id.* at 8.

Once again, the inmates appealed. We dismissed the appeal without prejudice, finding the Licensing Board's May 9 order to be "merely tentative or proposed." Appeal Board Memorandum and Order of May 21, 1985 (unpublished) at 2. Three days later, the Licensing Board issued another order "implementing its grant of applicant's motion for exemption." Licensing Board Order of May 24, 1985 (unpublished). That order listed all of the pleadings that had been filed in connection with PECO's exemption request, but contained no significant new discussion. It reiterated, however, the Board's earlier conclusion that the criteria of 10 C.F.R. § 50.47(c)(1) had been met, and it explicitly authorized the Director of NRR to issue a full-power license to operate Limerick. *Id.* at 5-6. The appeals now before us of the inmates (their fourth in as many months), AWPP, and Anthony/FOE followed.⁴ PECO opposes the

³ Section 50.47 embodies the NRC's emergency planning requirements. It requires a finding of "reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency" before issuance of an operating license.

⁴ AWPP and Anthony/FOE both raise several arguments that do not relate to the exemption issue that is before us here on appeal. We need not and do not address such arguments. Further, in view of the de-

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appeals and urges affirmance of the Board's May 9 and 24 decisions. The NRC staff argues that the Board's ruling is erroneous in certain respects but it nevertheless opposes the appeals.

II.

A. The principal authority for granting exemptions from *any* of the 10 C.F.R. Part 50 requirements for an operating license is found in 10 C.F.R. § 50.12(a). It provides, in pertinent part (emphasis added):

The Commission may, upon application by any interested person or upon its own initiative, grant such exemptions from the requirements of *the regulations in this part* as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest. * * *

By its very terms, this provision and the criteria specified in it must be addressed before any exemption from Part 50 requirements can be authorized. Even if this were not so clear from the face of the provision, Commission precedent makes that point manifest. See *Mississippi Power & Light Co.* (Grand Gulf Nuclear Station, Unit 1), CLI-84-19, 20 NRC 1055, 1059 n.7 (1984).⁵ Indeed, PECO's motion for exemption acknowledges that the requirements of 10 C.F.R. § 50.12(a) must be satisfied in order for an exemption to lie. See Applicant's Motion for Exemption (February 7, 1985) at 1, 5-16.⁶

Despite the clear command of this regulation, the Licensing Board twice explicitly refused to address the requirements of section 50.12(a). Instead, the Board applied only 10 C.F.R. § 50.47(c)(1). That regulation provides:

Failure to meet the applicable [emergency planning] standards set forth in paragraph (b) of this section may result in the Commission declining to issue an operating

cision we reach on the inmates' appeal, we need not decide whether AWPP and Anthony/FOE even have standing to appeal the Board's exemption decision, inasmuch as their expressed interests and past participation in this proceeding have been primarily with regard to other issues.

⁵ A recent Notice of Proposed Rulemaking on Specific Exemptions also makes clear that 10 C.F.R. § 50.12 in its current form embodies the general criteria for an exemption. See 50 Fed. Reg. 16,506 (1985). The purpose of this pending rulemaking is to clarify certain standards now apparently applied as a matter of staff practice, but not expressly reflected in the regulation itself. See note 8, *infra*. Because the rule proposed in the notice is just that — proposed — it, of course, does not apply here. (The Licensing Board's suggestion that the effective date of the proposed rule was May 28, 1985, is incorrect; that was the due date for filing comments on the proposed rule. See Licensing Board Order of May 9 at 3; 50 Fed. Reg. at 16,506.) Nonetheless, the discussion in the notice provides useful insight on the application and purpose of the rule in its existing form. See note 7, *infra*.

⁶ PECO's brief on appeal, for the most part, curiously overlooks this fact. To advance one of its arguments, however, PECO cites the recent Notice of Proposed Rulemaking for 10 C.F.R. § 50.12 (see note 5, *supra*). Applicant's Brief (June 13, 1985) at 29-30.

license; however, the applicant will have an opportunity to demonstrate to the satisfaction of the Commission that deficiencies in the plans are not significant for the plant in question, that adequate interim compensating actions have been or will be taken promptly, or that there are other compelling reasons to permit plant operation.

In the Board's view, this was the only standard it need apply because,

when an applicant seeks an exemption of one of the Commission's regulations[,] then the Board should look first to any provisions within the regulation from which the exemption is sought. . . . We need not look elsewhere in the regulations and indeed have not considered the use of 10 CFR § 50.12.

Licensing Board Order of May 9 at 4.

In dismissing the inmates' interlocutory appeal from that order, we referred to "the exemption criteria of *both* 10 C.F.R. §§ 50.12(a) and 50.47(c)(1) (as well as pertinent case law)." Appeal Board Order of May 21 at 2 (emphasis added). Given the tentative nature of its decision, we thus assumed that the Licensing Board would reconsider the propriety of applying only the criteria of section 50.47(c)(1). Apparently our assumption was not justified. For, in its implementing order, the Board emphatically reiterated its view that it need and did consider only 10 C.F.R. § 50.47(c)(1). Licensing Board Order of May 24 at 1 & n.1.

We agree with the Board that it is proper to apply 10 C.F.R. § 50.47(c)(1) here, where PECo seeks an exemption from other requirements of section 50.47. But there is no basis for *not* applying the more general exemption standards of 10 C.F.R. § 50.12(a) as well. Nothing in these provisions makes them either mutually exclusive or mutually inclusive.⁷ There *may* well be some overlap in certain of the criteria (e.g., consideration of the "public interest" under section 50.12(a) and of "other compelling reasons to permit plant operation" under section 50.47(c)(1)). But for the most part, the four conjunctive factors of section 50.12(a) — i.e., authorization under law, no endangerment to life or property, no endangerment to the common defense and security, and the public interest — are distinct from the three disjunctive factors to be considered under section 50.47(c)(1) — i.e., the significance of the

⁷ Presumably, if the Commission intended section 50.47(c)(1) to provide the sole standard by which to consider exemptions in the emergency planning area, it would have said so, especially during one of the many recent occasions on which amendment of the emergency planning regulations was under consideration. In this regard, we note that the Commission's recent Policy Statement on 10 C.F.R. § 50.47(b)(12) discusses section 50.47(c)(1), but makes no mention of section 50.12. See 50 Fed. Reg. 20,892, 20,893-94 (1985). But the Commission's silence — in a Policy Statement addressed to a court remand involving a specific provision of the emergency planning regulations not involved here — cannot reasonably be construed as an intent to void the requirements of the long standing section 50.12. Compare 50 Fed. Reg. at 16,508, 16,509 (stressing that general criteria of section 50.12 should always be evaluated).

plan's deficiencies, adequacy and promptness of interim compensating actions, and existence of other compelling reasons for plant operation.⁸ The Licensing Board's failure to apply the requirements of *both* regulations to PECO's exemption request is reversible error, requiring a remand.⁹

In addition to the proper standards themselves, the Licensing Board should also take account of the intended purpose of both regulations. For instance, according to the Statement of Consideration accompanying certain amendments of the emergency planning regulations, the types of deficiencies to which 10 C.F.R. § 50.47(c) is addressed are those "that only reflect the *actual state of preparedness which may be easily remedied* . . . [and] should not delay licensing action." 47 Fed. Reg. 30,232, 30,234 (1982) (emphasis added). With respect to 10 C.F.R. § 50.12, just last year the Commission described that authority as "extraordinary" and "available . . . only in the presence of exceptional circumstances." *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), CLI-84-8, 19 NRC 1154, 1156 n.3 (1984). While observing that such a "discretionary" decision should reflect the equities of the situation, the Commission also stated that "these equities do not apply to the requisite findings on public health and safety and common defense and security." *Ibid.*¹⁰

In weighing the factors specified in both 10 C.F.R. §§ 50.12(a) and 50.47(c)(1), the Licensing Board should also be mindful of the special circumstances here involved. This is the only contested licensing proceeding, of which we are aware, in which issues have been raised concerning the adequacy of the evacuation plan for a maximum security

⁸ The factors set out in 10 C.F.R. § 50.47(c)(1) — e.g., interim compensating actions — may well be one area where the staff's existing *practice* vis-a-vis the granting of exemptions is already reflected in the regulations. The Commission's pending rulemaking on exemptions (note 5, *supra*) is intended to clarify and to codify such practice insofar as exemptions from any regulatory requirement are concerned. See, e.g., 50 Fed. Reg. at 16,508.

⁹ PECO never squarely addresses the real issue before us here — whether the Licensing Board applied the correct standards in ruling on PECO's exemption request. It cites *Southern California Edison Co.* (San Onofre Nuclear Generating Station, Units 2 and 3), ALAB-680, 16 NRC 127 (1982), and its progeny, however, implying that that decision holds that only 10 C.F.R. § 50.47(c)(1) need be considered when an exemption for emergency plan deficiencies is under consideration. See Applicant's Brief at 13, 26, 42. *San Onofre* relies on 10 C.F.R. § 50.47(c)(1) but makes no mention of 10 C.F.R. § 50.12. But that fact is neither surprising nor significant. Unlike PECO here, the applicants in *San Onofre* did not expressly seek an "exemption" from licensing requirements pursuant to section 50.12. Hence, that issue was not before us. Also unlike here, no outstanding contentions remained to be considered. Instead, the issues before us were whether there was support in the record for the Licensing Board's reasonable assurance finding, and whether a license condition requiring applicant to remedy certain deficiencies within six months of full-power operation was permissible.

¹⁰ In *Shoreham*, the Commission imposed several specific requirements on applicant that were not explicitly embodied in section 50.12(a). It later clarified that those requirements pertained only to the *Shoreham* case. See *Grand Gulf*, 20 NRC at 1059 n.7. There is no reason to assume, however, that the Commission's *general* comments about section 50.12, noted above, do not pertain here.

prison, with a population of over 2,000, located within a plant's 10-mile emergency planning zone.¹¹ On the other hand, the exemption is not a request for a permanent deviation from the emergency planning requirements; it is intended to apply only during Licensing Board consideration of the inmates' admitted contentions.

We do not decide or suggest that no exemption would be warranted in this case.¹² We simply identify the various factors that the Licensing Board is obliged to consider upon remand. Serious questions have been raised and they deserve serious and full consideration by that Board.¹³

B. The Licensing Board's exemption decision was also premature: the Board put the proverbial cart before the horse. In our Order of May 21 at 2, we stated that "we do not understand how the Board could properly weigh the exemption criteria . . . before it has determined whether any exemption will even be necessary — i.e., whether the inmates have proffered an admissible contention [footnote omitted]." We still find that to be the case.

Until one or more contentions have been admitted, the *specific*, potential emergency plan deficiencies that warrant further adjudication are not known. Both 10 C.F.R. §§ 50.12(a) and 50.47(c)(1) presuppose identification of the particular respects in which an applicant is unable to comply with the regulatory requirements from which it seeks an exemption. Indeed, only after the asserted deficiencies in the Graterford evacuation plan are defined, can PECo logically attempt to satisfy the various exemption criteria of the regulations.

The futility of addressing these criteria, before the specific context in which they are to apply is known, is evident from the Licensing Board's decision. For example, in considering the significance of the plan deficiencies and the adequacy of interim compensating actions, the Board could make only generalized statements about the overall adequacy of

¹¹ The adequacy of plans to evacuate prisoners was litigated in the *Waterford* proceeding. That case, however, involved only two county jails with an average prison population of 55 persons. See *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), LBP-82-100, 16 NRC 1550, 1566, 1584 (1982).

¹² Thus, to the extent the inmates and other intervenors argue that the "reasonable assurance" finding required for license issuance can never be lawfully made before consideration of the inmates' contentions is completed, we disagree. In the first place, a grant of an exemption does not deprive the inmates of their right to be heard (at a formal hearing, if necessary, or through written filings) on their admissible contentions. Second, through the exemption regulations — which no party here challenges per se — the Commission has recognized that some circumstances might warrant license issuance despite an applicant's inability to satisfy all regulatory requirements. Before such extraordinary relief is authorized, however, an applicant must show that it is justified under the appropriate NRC standards.

¹³ Merely listing the parties' filings and noting the extensive briefing of the matter — as the Licensing Board did in its May 24 order — is not a substitute for the reasoned decisionmaking contemplated by the Administrative Procedure Act, 5 U.S.C. § 557(c). See *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1087 n.12 (1983).

the plan and the outcome of several remedial emergency response exercises at Graterford. See Licensing Board Order of May 9 at 5-7. But given that the Commission's regulations require intervenors to set forth reasonably specific contentions and bases (see 10 C.F.R. § 2.714(b)), the reasons for granting an exemption despite the pendency of litigation of those contentions should be equally specific.

We appreciate the Board's desire to handle this matter — arising so late in the proceeding — as efficiently and expeditiously as possible. In some instances, procedural shortcuts and innovations can serve a useful purpose without working a hardship on any party. The Licensing Board in this very proceeding did so earlier in connection with the consideration of certain environmental issues, and we affirmed. See ALAB-785, note 1, *supra*, 20 NRC at 862-66. The shortcuts taken in this instance, however, cannot be justified and, unfortunately, have only led to more, rather than less, legal wrangling and delay.

In an order issued just last week, the Licensing Board ruled on the revised contentions submitted by the inmates. The Board determined that two parts of a proposed contention are admissible — those concerning the training of civilian personnel involved in the emergency response plan, and the methodology for determining the estimated time of evacuation. Licensing Board Order of June 12, 1985 (unpublished). The Board can now properly consider PECO's exemption request in the context of the two litigable issues identified in its June 12 order.¹⁴ We think it only fair, however, that the parties be given an opportunity to reassert their positions in light of our holdings here.¹⁵ In order to avoid further delay, we set forth below a schedule for future filings on this matter.

The Licensing Board's orders of May 9 and May 24, 1985, are *vacated*, and this matter is *remanded* to the Board for further action consistent with this decision.¹⁶ If PECO intends to renew its request for an exemption, its motion should be *received by the Licensing Board and the parties no later than June 24, 1985*. Responses to that motion should be *received*

¹⁴ We make no judgment as to whether these or any of the inmates' proposed contentions are admissible. Moreover, we have made no effort, in light of the Board's June 12 order, to apply the exemption criteria of 10 C.F.R. §§ 50.12(a) and 50.47(c)(1) ourselves. Like the Commission in *Shoreham*, 19 NRC at 1155 n.2, we are "extremely reluctant to assume the functions of an existing Licensing Board of compiling a factual record, analyzing it and making the initial determination based on the record."

¹⁵ Much of PECO's and the staff's briefs on appeal is devoted to showing why the asserted deficiencies in the emergency plan for Graterford are not significant. This is the type of argument more properly addressed to the Licensing Board on remand.

¹⁶ Because we have thus ruled on the merits of the appeals, vacating the Licensing Board decision that authorized license issuance, we need not address the requests of the inmates and Anthony/FOE for a stay pending appeal.

by the Licensing Board and mailed to the other parties 11 days later. The Licensing Board is directed to consider the matter expeditiously, "consistent with conducting a fair and thorough proceeding." See CLI-85-11, 21 NRC at 1586. Any appeals from (and requests to stay) the Licensing Board's ruling, accompanied by supporting briefs, are to be received by us and the other parties 14 days after service of the Licensing Board's decision. Reply briefs are to be received by us and mailed to the other parties 10 days thereafter.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the
Appeal Board

Mr. Edles did not participate in this decision.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

**Alan S. Rosenthal, Chairman
Gary J. Edles
Howard A. Wilber**

In the Matter of

Docket No. 50-322-OL

**LONG ISLAND LIGHTING
COMPANY**

**(Shoreham Nuclear Power Station,
Unit 1)**

June 19, 1985

The Appeal Board denies intervenors' motion for a stay of the effectiveness of the Licensing Board's partial initial decision in this operating license proceeding authorizing the issuance of a low power license for the Shoreham facility. The Appeal Board, however, continues a previously granted emergency stay for a brief additional period to afford intervenors the opportunity to seek relief from the Commission.

RULES OF PRACTICE: STAY OF AGENCY ACTION

10 C.F.R. § 2.788(e) requires that claims of entitlement to a stay be assessed in the context of four criteria:

- (1) Whether the moving party has made a strong showing that it is likely to prevail on the merits;
- (2) Whether the party will be irreparably injured unless a stay is granted;
- (3) Whether the granting of a stay would harm other parties; and
- (4) Where the public interest lies.

APPEAL BOARD: SCOPE OF REVIEW

It is not within the province of the Appeal Board to pass judgment, for stay purposes or otherwise, upon the correctness of Commission rulings.

RULES OF PRACTICE: STAY OF AGENCY ACTION (IRREPARABLE INJURY)

The potential mooted of an appeal does not *per se* constitute irreparable injury; it also must be established that the activity that will take place in the absence of a stay will bring about concrete harm. *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-794, 20 NRC 1630, 1635 (1984).

RULES OF PRACTICE: STAY OF AGENCY ACTION

If the movant for a stay fails to meet its burden on the first two section 2.788(e) factors, it is unnecessary to dwell long on whether a stay would cause serious injury to the applicant or to delve deeply into public interest considerations. *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-794, 20 NRC 1630, 1635 (1984).

RULES OF PRACTICE: STAY OF AGENCY ACTION

The function of the Appeal Board in passing upon stay motions is to determine, on an application of the four section 2.788(e) factors, whether the movant has established an entitlement to the sought relief.

APPEARANCES

Herbert H. Brown, Lawrence Coe Lanpher and Karla J. Letsche, Washington, D.C., for the intervenor Suffolk County.

Fabian G. Palomino, Albany, New York, for the intervenor State of New York.

Donald P. Irwin and Robert M. Rolfe, Richmond, Virginia, for the applicant Long Island Lighting Company.

Robert G. Perlis for the Nuclear Regulatory Commission staff.

MEMORANDUM AND ORDER

Before us is the joint motion of intervenors Suffolk County and the State of New York for a stay *pendente lite* of the effectiveness of the Licensing Board's June 14, 1985 partial initial decision in this operating license proceeding involving the Shoreham nuclear facility.¹ In that decision, the Board addressed the issue of whether the Transamerica Delaval (TDI) diesel generators now installed at the facility can be relied upon to satisfy the regulatory requirement of an onsite alternating current electric power system meeting certain standards.² Subject to several qualifications, the Licensing Board answered this question affirmatively. Accordingly, it authorized the Director of Nuclear Reactor Regulation to permit the facility to operate at levels up to five percent of rated power.³

Upon the receipt of the intervenors' motion, the Board Chairman entered an *ex parte* stay to preserve the *status quo* pending the consideration of the motion following the filing of the responses of the other parties.⁴ Those responses are now in hand. Both the applicant and the NRC staff oppose the relief requested.

As required by 10 C.F.R. 2.788(e), we have assessed the intervenors' claim of entitlement to a stay in the context of the four familiar criteria:

- (1) Whether the moving party has made a strong showing that it is likely to prevail on the merits;
- (2) Whether the party will be irreparably injured unless a stay is granted;
- (3) Whether the granting of a stay would harm other parties; and
- (4) Where the public interest lies.

For the reasons that follow, we conclude that that claim is without merit. We are, however, continuing our emergency stay for a brief additional period to allow the intervenors to seek relief from the Commission if they are so inclined.

¹ See LBP-85-18, 21 NRC 1637.

² That requirement is contained in General Design Criterion (GDC) 17, 10 C.F.R. Part 50, Appendix A.

³ LBP-85-18, 21 NRC at 1704. As matters now stand, the Shoreham facility has an authorization that extends only to fuel loading, precriticality testing, and cold criticality testing. See CLI-84-21, 20 NRC 1437 (1984). These activities have been uniformly referred to in this proceeding as Phases I and II of low-power operation. The June 14 decision authorized Phases III and IV of such operation.

⁴ See order of June 17, 1985 (unpublished), entered by the Board Chairman, in the absence of a quorum, under the authority of 10 C.F.R. 2.787(b)(1). That order also provided that the responses to the stay motion were to be in the hands of the Board by this morning.

I.

A. In addressing the first section 2.788(e) factor, the intervenors barely mention the June 14 partial initial decision. All we are told is that the Licensing Board committed “serious substantive and procedural” errors in, *inter alia*, its interpretation and application of the governing General Design Criterion⁵ and its exclusion of certain evidence proffered by the County and State.⁶ That representation, without further detail, is plainly insufficient to constitute the required “strong showing” that the intervenors are likely to prevail on an appeal from the June 14 decision.⁷

The intervenors’ main assertion, however, is that the Commission erred when, in response to a question certified by us, it held a year ago that the issuance of a supplemental environmental impact statement is *not* a prerequisite to low-power Shoreham operation.⁸ Needless to say, that assertion is addressed to the wrong forum. It is not within our province to pass judgment, for stay purposes or otherwise, upon the correctness of Commission rulings. Nor, contrary to the intervenors’ apparent belief, can we attach significance to the fact that the Commission determination in question is now pending judicial review by the Court of Appeals for the District of Columbia Circuit.⁹ As the intervenors acknowledge,¹⁰ the Commission denied their earlier request to withhold a low-power license pending the outcome of that review. Although they go on to insist that developments since that denial reinforce the foundation for their claim that the National Environmental Policy Act required the issuance of a supplemental environmental impact statement, we entertain substantial doubt that that is so. Be that as it may, it is for the Commission and/or the Court of Appeals — not us — to assess what impact, if any, recent events (both those cited by the intervenors and those not mentioned) might have upon the validity of the Commission determination that they have challenged.

B. There is no better footing to the intervenors’ claim that they will suffer irreparable injury if a stay is not granted (the second section 2.788(e) factor). In advancing that claim, the intervenors do not assert,

⁵ See note 2, *supra*.

⁶ Suffolk County and State of New York Motion for Stay of Low Power License (June 17, 1985) (hereafter “Intervenors’ Motion”) at 6-7.

⁷ See *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-794, 20 NRC 1630, 1632-33 (1984).

⁸ ALAB-769, 19 NRC 995 (1984); CLI-84-9, 19 NRC 1323, 1325-28 (1984).

⁹ See *Cuomo v. NRC*, No. 85-1042 (D.C. Cir., filed Jan. 18, 1985). It is our understanding that the briefing of the intervenors’ petition for review is almost complete, but the Court of Appeals has not as yet scheduled the matter for oral argument.

¹⁰ Intervenors’ Motion at 3.

let alone demonstrate, that operation of the facility at levels up to five percent of rated power would pose a threat to the public health and safety.¹¹ Rather, the asserted irreparable injury is the potential mootng of their pending petition for judicial review of the Commission's decision that a supplemental environmental impact statement is not required.

As we had recent occasion to observe in denying a stay in the *Catawba* proceeding, the potential mootng of an appeal does not *per se* constitute irreparable injury; it also must be established that the activity that will take place in the absence of a stay will bring about concrete harm.¹² Indeed, if the rule were otherwise, it would rarely be possible for an adjudicatory decision to take effect until all appellate remedies had been exhausted — an obviously untenable result. Thus, in the absence (as here) of the slightest showing of an actual threat to the public health and safety (or irreparable environmental damage) stemming from low-power Shoreham operation, the mootness consideration cannot carry the day.

C. As also observed in *Catawba*, if the movant for a stay fails to meet its burden on the first two section 2.788(e) factors, it is unnecessary to “dwell long on whether a stay would cause serious injury to the applicant” or to “delve deeply into public interest considerations.”¹³ Here, as there, it suffices to say that

even when viewed in its most favorable light, the intervenors' presentation on those factors does not approach balancing the shortcomings of their case on the other two factors. Indeed, standing by itself, the intervenors' failure to demonstrate that they might be irreparably injured in the absence of a stay is enough to call for the denial of their application.¹⁴

II.

Intervenors call our attention to the fact that, on the same day they filed their stay motion with us, they sought an emergency stay of the effectiveness of the June 14 partial initial decision from the Court of Appeals for the District of Columbia Circuit. According to intervenors, that

¹¹ The stay motion is accompanied by the unsigned and undated joint statement of Dale G. Bridenbaugh and Gregory C. Minor. Apart from the fact that it is not relied upon by the intervenors in connection with their irreparable injury argument, our inspection of this document has disclosed nothing to suggest that increasing the power level of the facility to five percent might be injurious to the general public. (Under its Phase II authority (*see* note 3, *supra*), the facility is now authorized to operate at levels up to 0.001 percent of rated power. *See* LBP-84-45, 20 NRC 1343, 1363, 1384 (1984).)

¹² 20 NRC at 1635.

¹³ *Ibid.*

¹⁴ *Ibid.*

development merits our grant of a stay to at least July 2 even should we find that the "traditional stay criteria" are not satisfied.¹⁵ The significance of the reference to July 2 is that the intervenors apparently have asked the Court of Appeals to rule (if necessary) upon their emergency stay motion by that date.

As we see it, our function in passing upon stay motions is to determine, on an application of the four section 2.788(e) factors, whether the movant has established an entitlement to the sought relief. We have now discharged that function here and reached a conclusion adverse to the motion. Whether the effectiveness of the June 14 decision should nonetheless be withheld for an additional period to accommodate possible judicial action is, in our view, a question appropriate, at least in this case, for response in the first instance by the Commission itself.

To this end, we will briefly extend the June 17, 1985 emergency stay entered by the Board Chairman. That stay will remain in effect *until 5:00 p.m. on June 20, 1985*. If, prior to that time, the intervenors have a renewal of their stay motion in the hands of the Commission, the emergency stay will be automatically extended to *5:00 p.m. on June 25, 1985*, assuming that the Commission does not direct otherwise in the interim.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the
Appeal Board

Mr. Edles did not participate in the consideration or disposition of this matter.

¹⁵ Intervenors' Motion at 11.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

**Thomas S. Moore, Chairman
Dr. W. Reed Johnson**

In the Matter of

**Docket Nos. 50-275-OL
50-323-OL**

**PACIFIC GAS AND ELECTRIC
COMPANY**

**(Diablo Canyon Nuclear Power
Plant, Units 1 and 2)**

June 27, 1985

The Appeal Board finds in this reopened operating license proceeding that the Licensee's Unit 2 verification program is sufficient to establish that the design of Diablo Canyon, Unit 2, meets its licensing criteria and provides adequate confidence that the Unit 2 safety-related structures, systems and components are designed to perform satisfactorily in service. The Appeal Board therefore concludes that there is reasonable assurance that Unit 2 can be operated without endangering the health and safety of the public and the license authorization granted to the Director of NRR by the Licensing Board's initial decision remains effective.

**OPERATING LICENSE PROCEEDINGS: PREDICTIVE
FINDINGS**

Predictive findings are a legitimate component of the Commission's licensing process. That process contemplates that operating license proceedings generally will be completed before construction of the facility is finished in order to avoid unnecessary and costly delays in plant operation. *See Statement of Policy on Conduct of Licensing Proceedings,*

CLI-81-8, 13 NRC 452 (1981). *See also Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-653, 16 NRC 55, 79 (1981), *reprinted* (with protected security plan information deleted) as an attachment to CLI-82-19, 16 NRC 53 (1982); *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-781, 20 NRC 819, 834-35 (1984).

OPERATING LICENSE PROCEEDINGS: ROLE OF STAFF

Supervision of a party's compliance with a commitment is left to the staff. If one party is dissatisfied with the way another party has fulfilled a commitment the matter may, in appropriate circumstances, be brought back to the licensing board. *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-781, 20 NRC 819, 835 n.58 (1984).

APPEARANCES

Joel R. Reynolds, John R. Phillips, Eric R. Havian and Ethan P. Schulman, Los Angeles, California, and **David S. Fleischaker**, Oklahoma City, Oklahoma, for the San Luis Obispo Mothers for Peace, *et al.*, joint intervenors.

John K. Van De Kamp, Attorney General of the State of California, **Andrea Sheridan Ordin, Michael J. Strumwasser, Susan L. Durbin** and **Peter H. Kaufman**, Los Angeles, California, for **George Deukmejian**, Governor of the State of California.

Robert Ohlbach, Philip A. Crane, Jr., Richard F. Locke and Dan G. Lubbock, San Francisco, California, and **Arthur C. Gehr, Bruce Norton** and **Thomas A. Scarduzio, Jr.**, Phoenix, Arizona, for Pacific Gas and Electric Company, applicant.

Lawrence J. Chandler and Henry J. McGurren for the Nuclear Regulatory Commission staff.

DECISION

In ALAB-763, we set forth our findings of fact and conclusions of law on the contested issues concerning the adequacy of the design of Diablo Canyon Unit 1 in this reopened operating license proceeding.¹ We then specifically deferred our findings on those same issues for Unit 2 and, in effect, stayed the full power license authorization for that unit granted previously by the Licensing Board's initial decision² until we made our findings with respect to Unit 2.³ This decision contains our findings on Diablo Canyon, Unit 2.

I.

The detailed history of the reopened Diablo Canyon operating license proceeding is recited in ALAB-763 and need not be repeated fully here.⁴ For present purposes, it suffices to note that, shortly after the Director of Nuclear Reactor Regulation (NRR) issued a low power license for Diablo Canyon, Unit 1, the Commission suspended it. The Commission acted after Pacific Gas and Electric Company (PG&E) reported errors in the assignment of a number of seismic design spectra for the Unit 1 containment and the NRC staff found significant weaknesses in the implementation of PG&E's design quality assurance program. The Commission then directed PG&E to undertake an independent design verification program of certain seismic-related design activities. In addition, the agency staff instructed PG&E to provide it with the results of a further design verification program so that the staff would be able to determine whether to recommend operation above low power. As pointed out in ALAB-763, PG&E's "verification efforts expanded far beyond those originally envisioned" and took more than two years to complete just for Unit 1.⁵

While the design verification efforts were ongoing, we granted the motions of the joint intervenors and the Governor of California to reopen

¹ 19 NRC 571 (1984).

² LBP-82-70, 16 NRC 756 (1982).

³ ALAB-763, *supra*, 19 NRC at 619.

⁴ *See id.* at 573-82.

⁵ *Id.* at 574.

The structure of PG&E's verification programs is set forth in ALAB-763, *id.* at 578-82. Those details will not be repeated other than to note that PG&E's verification efforts included an Independent Design Verification Program (IDVP) utilizing the services of independent companies and an Internal Technical Program (ITP) comprised of PG&E employees and those of PG&E's completion manager, Bechtel Power Corporation. *See also id.* at 580 n.42.

the operating license proceeding on the issue of the adequacy of PG&E's design quality assurance program. We also acceded to the request of the parties that we preside over the reopened proceeding. Although the evidence supporting the reopening motions consisted largely of the program deficiencies that had led to the suspension of the Unit 1 license, the focus of the reopened proceeding necessarily went beyond the past shortcomings in PG&E's design quality assurance program to questions of whether PG&E's design verification efforts were sufficient to substantiate the design of the Diablo Canyon facility. And, because the designs of Units 1 and 2 were nearly identical, the contested issues in the proceeding — as well as the parties' direct evidence and cross-examination — pertained, with few exceptions, to both units generally. Trial of the contested issues consumed fifteen hearing days and, after the joint intervenors and the Governor waived a number of issues by their failure to file proposed findings of fact on them, twenty-two issues remained in dispute.⁶

In order to avoid any unnecessary delay in the full power licensing of Unit 1, we severed our findings on the contested issues for Unit 2 from those in ALAB-763 on Unit 1 even though most of the issues and the record evidence addressed both Diablo Canyon units without differentiation. As noted in that decision, PG&E's verification program for Unit 2, unlike the completed program for Unit 1, was still under way at the time of the hearing and the staff had not finally reviewed PG&E's findings in a safety evaluation report supplement.⁷ On our own initiative, therefore, we deferred our analysis of the evidence with respect to each contested issue for Unit 2 and published our findings on just Unit 1.

In ALAB-763, we found in favor of PG&E on all but one of the contested issues. With respect to that issue, involving the possible jet impingement effects of three lines inside the Unit 1 containment, we attached a condition to the Licensing Board's full power license authorization requiring the analysis of those lines.⁸ In addition, we included a second condition to ensure that PG&E incorporated an appropriate technical specification for the component cooling water system.⁹ In light of our findings on the contested issues, we then found that PG&E's verification program established that the design of Unit 1 adequately met its licensing criteria, and that any significant design deficiencies resulting from past defects in PG&E's design quality assurance program

⁶ *Id.* at 576-77 & nn.15, 19, 20 & 21. The contested issues are set out in Appendix A to ALAB-763, *id.* at 621-25.

⁷ *Id.* at 582.

⁸ *Id.* at 602-03, 619.

⁹ *Id.* at 618-19.

had been remedied.¹⁰ Thus, we concluded that with respect to the design of Unit 1 “there is reasonable assurance that the facility can be operated without endangering the health and safety of the public.”¹¹

II.

A. After the Commission declined to review our findings on Unit 1,¹² we gave the parties a new opportunity to demonstrate that further hearings on the design verification of Unit 2 were needed. In particular, we directed any party claiming the need for further hearings to “specify which of the issues decided in ALAB-763 cannot be resolved with respect to Unit 2 on the existing record and fully explain why the record evidence is insufficient.”¹³

The Governor of California has not responded to our order, while PG&E and the staff assert that the existing evidentiary record is sufficient to resolve all contested issues for Unit 2.¹⁴ The joint intervenors, on the other hand, claim further hearings are needed but, contrary to our instructions, they neither identify the issues that cannot be resolved on the present record nor explain why the evidence on each such issue is inadequate. Instead, they argue generally that PG&E has failed to meet its burden of proof because the current record was compiled while PG&E’s Unit 2 verification efforts were still ongoing. They assert that the record is therefore insufficient and establishes only the scope of the Unit 2 verification program, not the final results of those efforts. According to the joint intervenors, the end results of the Unit 2 verification program are an essential prerequisite to any determination concerning the adequacy of the Unit 2 design. In further support of their argument, they claim that the two Diablo Canyon units were designed by the same organization using a deficient design quality assurance program, and the IDVP only verified the sufficiency of the design of Unit 1, not Unit 2. They also assert that the two units are not identical in numerous respects, the possibility exists that undiscovered errors in Unit 1 may be present in Unit 2, and the ITP verification program is insufficient by itself to provide assurance of the adequacy of the Unit 2 design. Thus,

¹⁰ *Id.*

¹¹ *Id.*

¹² CLI-84-14, 20 NRC 285 (1984).

¹³ Order of September 10, 1984 (unpublished) at 2.

¹⁴ See PG&E’s Response to Appeal Board Order of September 10, 1984 (September 28, 1984); PG&E’s Reply to Joint Intervenors’ Response (October 10, 1984); NRC Staff’s Response to Appeal Board’s Order of September 10, 1984 (September 28, 1984); NRC Staff’s Answer to Joint Intervenors’ Response (October 9, 1984).

they contend that additional hearings encompassing the results of PG&E's verification program are required before any findings are proper with respect to that unit.¹⁵

B. The joint intervenors' position is without merit. Their sweeping claim that the results of the Unit 2 verification program are a condition precedent to any findings concerning that plant ignores the settled principle that predictive findings are a legitimate component of the Commission's licensing process.

That process contemplates that operating license proceedings generally will be completed before construction of the facility is finished in order to avoid unnecessary and costly delays in plant operation.¹⁶ For that reason, adjudicatory hearings typically precede the completion of many of the applicant's construction-related activities. If any of the unfinished activities happen to be matters that are challenged in the proceeding, the parties then generally litigate the adequacy of the applicant's program for subsequent action in that particular area. Thus, as we pointed out in ALAB-653 dealing with PG&E's physical security plan, the "nature of the licensing process" in such circumstances requires that "we must, in effect, approve applicant's present plans for future regulatory compliance."¹⁷ Similarly, in ALAB-781, we held that the Licensing Board's findings on emergency planning for Diablo Canyon "can properly be predictive in nature."¹⁸ There, we explained that

[n]o unfairness results from such a system for just as one party can demonstrate that a planned course of action will resolve an identified deficiency, an opposing party can establish that the deficiency cannot be resolved by that planned action. Supervision of a party's compliance with a commitment or a licensing board condition is left to the staff. If one party is dissatisfied with the way another party has fulfilled a commitment or met a condition, the matter may, in appropriate circumstances, be brought back to the licensing board or become the subject of a petition under 10 C.F.R. 2.206.¹⁹

Indeed, in ALAB-781 we specifically rejected the joint intervenors' argument that "all corrective actions must be taken before the adjudicatory hearing, not after it, with the result that all licensing details must await the hearing process."²⁰

¹⁵ See Joint Intervenors' Response to September 10, 1984 Order (September 28, 1984).

¹⁶ See *Statement of Policy on Conduct of Licensing Proceedings*, CLI-81-8, 13 NRC 452 (1981).

¹⁷ 16 NRC 55, 79 (1981), reprinted (with protected security plan information deleted) as an attachment to CLI-82-19, 16 NRC 53 (1982). See also ALAB-653, 14 NRC 629 (1981) (containing public notice that ALAB-653 contained protected security plan information and would be sealed).

¹⁸ 20 NRC 819, 834-35 (1984).

¹⁹ *Id.* at 835 n.58. See generally *Southern California Edison Co.* (San Onofre Nuclear Generating Station, Units 2 and 3), ALAB-717, 17 NRC 346, 380 n.57 (1983).

²⁰ 20 NRC at 834.

As we did in ALAB-781, we reject the joint intervenors' argument here that the results of PG&E's Unit 2 verification program are an evidentiary prerequisite to any determination of the contested issues for Unit 2. In the present circumstances, the evidentiary record is not insufficient to resolve those issues simply because the verification program for that unit was still in progress at the time of the hearing. The program for Unit 1 was completed before the commencement of the hearing and, as even the joint intervenors apparently concede,²¹ PG&E established the scope of its Unit 2 program (i.e., its blueprint for verifying Unit 2) on the record. Because of the virtual identity of design of the two units, the record evidence of the scope of PG&E's Unit 2 verification program, combined with the detailed evidence of the extent and the results of the Unit 1 verification, provides an adequate basis for our findings (albeit predictive ones) with respect to Unit 2.

The joint intervenors faced no disadvantage, and no unfairness resulted, from the adjudication of the contested issues for both units while PG&E's verification program for Unit 2 was still ongoing. They did not object to that arrangement or seek to delay the hearing with respect to Unit 2. Nor did the joint intervenors attempt to have Unit 2 severed from the reopened proceeding on Unit 1. After the conclusion of the evidentiary hearings and in order not to delay operation of Unit 1, we withheld our findings regarding Unit 2 on our own motion. From the point we granted the motions to reopen the operating license proceeding — a proceeding that always has included both units — the joint intervenors were free to challenge the adequacy of PG&E's planned verification programs or the actual design sufficiency of both units. While only three of the intervenors' contested issues explicitly name Unit 2, and the remaining issues are silent as to their applicability to one or both units, the joint intervenors were not precluded from either proposing, or then pursuing, any contested issue for Unit 2 in an attempt to show that PG&E's verification plan for that unit was inadequate to detect and resolve potential design deficiencies. And, as is evident from all parties' pretrial discovery, direct testimony, cross-examination of witnesses, and proposed findings of fact, the adequacy of PG&E's program to ensure the design of Unit 2 was litigated. Hence, without specifying each contested issue for which the current record is insufficient and explaining why the existing evidence is inadequate, it is now too late for the joint intervenors' sweeping generalization that further hearings are needed to explore the results of that program.

²¹ See Joint Intervenors' Response to September 10, 1984 Order (September 28, 1984) at 6-7.

As we indicated in ALAB-781, “[s]upervision of a party’s compliance with a commitment . . . is left to the staff,” and “[i]f one party is dissatisfied with the way another party has fulfilled a commitment . . . the matter may, in appropriate circumstances, be brought back to the licensing board”²² Here, oversight of PG&E’s execution of the Unit 2 verification program — a plan that was fully delineated and subject to challenge on the adjudicatory record — is a matter properly left to the staff. The staff has now issued all outstanding supplemental safety evaluation reports on, inter alia, PG&E’s performance of the Unit 2 verification program,²³ and the joint intervenors have not sought to bring back before us any matter involving PG&E’s observance of its commitments. We note that those supplements, served on the parties pursuant to the Commission’s board notification policy, state the staff’s view that PG&E has executed satisfactorily its Unit 2 verification program.

Moreover, the purported factual assertions cited by the joint intervenors as support for their position neither advance their argument nor fairly reflect the preponderance of the evidence.²⁴ For example, while they are literally correct that the two Diablo Canyon units are not identical, the joint intervenors ignore the material fact that the differences to which they allude are not meaningful from a design standpoint. The two units are basically identical, mirror image plants.²⁵ The safety-related structures, systems and components are either common to both units or essentially identical, and the differences between the units are not significant with respect to the design criteria or licensing bases for the plant.²⁶ Units 1 and 2 were designed by the same PG&E engineering group, and it developed and used the same design criteria for both units.²⁷ This mutuality of design, in conjunction with the Unit 1 verification, provides the foundation of the Unit 2 verification program.²⁸

²² 20 NRC at 835 n.58.

²³ See NUREG-0675, Supplement No. 29, “Safety Evaluation Report Related to the Operation of Diablo Canyon Nuclear Power Plant, Units 1 and 2” (March 1985); *id.*, Supplement 30 (April 1985); *id.*, Supplement 31 (April 1985).

²⁴ See also note 28, and pp. 1630-32, *infra*.

²⁵ Anderson *et al.* Tr. fol. D-224 at 28-29; Schierling Tr. D-2774.

²⁶ Anderson *et al.* Tr. fol. D-224 at 28-29; Anderson Tr. D-1321; Cranston Tr. D-385; Schierling Tr. D-2771; Knight Tr. D-2774.

²⁷ Anderson *et al.* Tr. fol. D-224 at 29.

²⁸ The joint intervenors also claim that there is the possibility that undiscovered errors in Unit 1 exist in Unit 2. This mere speculation, however, is an insufficient basis for requiring further hearings encompassing the results of the Unit 2 verification. Further, in their proposed findings of fact, the joint intervenors make much the same claim concerning errors in the nonseismic design of Unit 1. But in ALAB-763, *supra*, 19 NRC at 588 n.68, we found that, although it was “likely there remained some design errors, . . . it was extremely unlikely any of the errors were safety significant.” See also *id.* at 591-92. Additionally, because the seismic design was essentially redone as part of the Unit 1 verification

(Continued)

As previously noted, the full details of the Unit 1 design verification are found in ALAB-763. In short, we found that the ITP, operating under a quality assurance program that met the requirements of 10 C.F.R. Part 50, Appendix B, essentially redid all of the seismic design for safety-related structures, systems and components and that this work was independently verified by the IDVP.²⁹ We determined that the final seismic design resulting from the ITP's efforts, and the IDVP review of that work, subjected the design of the facility to closer inspection than could have been provided by an original design quality assurance program complying with Appendix B.³⁰ Further, we found that "the seismic redesign process . . . provides adequate confidence that the seismic design of the structures, systems and components at Diablo Canyon Unit 1 is proper and meets licensing criteria."³¹ We also determined that the Unit 1 nonseismic design met appropriate licensing criteria.³² In particular, we found that the original nonseismic design process for Unit 1 was efficacious in producing a design in which "[t]he errors found were few, of minor significance, and did not indicate a pervasive weakness in any design area."³³ And, we found that PG&E's nonseismic verification efforts provided a degree of assurance comparable to that which would be furnished by a properly functioning quality assurance program.³⁴ Finally, we concluded that "the Unit 1 safety-related structures, systems and components are designed to perform satisfactorily in service and that any significant design deficiencies in that facility resulting from defects in the applicant's design quality assurance program have been remedied."³⁵

PG&E established the Unit 2 verification program to consider the applicability of the Unit 1 design verification for Unit 2 and to ensure the proper resolution of each Unit 1 issue for Unit 2.³⁶ The program is managed and run within the ITP by a Unit 2 project engineering group that operates under the same design quality assurance program meeting the provisions of 10 C.F.R. Part 50, Appendix B, as the rest of the ITP.³⁷

(pursuant to a quality assurance program meeting the requirements of 10 C.F.R. Part 50, Appendix B), we found there was reasonable assurance that there are no safety-significant seismic design errors in that unit. *See id.* at 583-86, 619.

²⁹ *Id.* at 583.

³⁰ *Id.* at 584.

³¹ *Id.* at 586.

³² *Id.* at 592-93.

³³ *Id.* at 593.

³⁴ *Id.*

³⁵ *Id.* at 619.

³⁶ Anderson *et al.* Tr. fol. D-224 at 29-30; Knight *et al.* Tr. fol. D-2649 (Contention 1) at 25.

³⁷ Anderson *et al.* Tr. fol. D-224 at 29; Dick *et al.* Tr. fol. D-847 at 24.

Pursuant to the procedures for the Unit 2 verification, the project engineering group receives each finding from the Unit 1 verification and determines whether it is applicable to Unit 2. Any inapplicable finding is documented and the basis for the decision recorded. If the finding is determined to apply to both Units 1 and 2, a decision is made whether the Unit 1 resolution also applies. Where the resolution is applicable, the program contains procedures to ensure the resolution is implemented for Unit 2 and, if the resolution involves physical modification, the procedures provide for the issuance of appropriate design change documents. In those instances where the Unit 1 item is not identical for both units, the ITP evaluates and documents the differences and determines the applicability of the item to Unit 2. The ITP then ascertains whether the item needs resolution and the effect of the differing resolution on the review of the item for Unit 2. Before the resolution is implemented, however, the ITP reviews it to confirm that the resolution is consistent with the applicable licensing criteria and that all appropriate steps are in place to ensure the Unit 2 requirements are met. The Unit 2 verification process is directed by explicit procedures that require complete documentation.³⁸ The entire program is periodically audited by PG&E as well as the NRC staff to ensure the Unit 1 verification issues are identified, addressed and resolved for Unit 2 so that unit is in conformance with applicable licensing criteria.³⁹

In brief, the Unit 1 verification established that the design process (i.e., the design criteria, methodology, analyses and procedures) used in the *final* seismic and nonseismic design of Unit 1 was efficacious in meeting applicable licensing criteria. Because the same seismic and nonseismic design process is applicable for Unit 2, we find the Unit 2 program sufficient to verify the adequacy of the Unit 2 design. Accordingly, we conclude, on the basis of our review of the entire record, that no further hearings are necessary and the existing evidentiary record is sufficient to support findings on the contested issues for Unit 2.

III.

We also conclude from our review of the record that the findings in ALAB-763 on the contested issues for Unit 1 are applicable to Unit 2. Therefore, we will not reiterate those findings and we need add little to

³⁸ Anderson *et al.* Tr. fol. D-224 at 29-30.

³⁹ *Id.*; Dick *et al.* Tr. fol. D-847 at 24; Knight *et al.* Tr. fol. D-2649 (Contention 1) at 25.

the discussion of the issues already contained in ALAB-763, other than to address the issues aimed exclusively at Unit 2.

Twenty-two contested issues remained after the hearing and five of them, issues 1(a) through 1(e), challenge various aspects of the IDVP review.⁴⁰ In particular, issue 1(e) explicitly addresses Unit 2, claiming that the scope of the IDVP was too narrow because it did not verify the design of Unit 2. Although the verification efforts of the IDVP were directed at Unit 1 and the IDVP's findings formed a significant component of our conclusion that Unit 1 met its licensing criteria, those efforts also must be considered as having verified, in significant part, the design of Unit 2. First, the IDVP reviewed the ITP's seismic redesign of Unit 1 that included, inter alia, the structures common to both units.⁴¹ Hence, those common structures — whether labeled Unit 1 or Unit 2 structures — were verified by the IDVP. Second, the IDVP reviewed the other Unit 1 structures that are basically the same as those for Unit 2 and that review included an examination of the criteria, methodology and analyses used in the seismic design of those structures.⁴² Because the same criteria and methodology (i.e., the basic design process) used in the design of Unit 1 were used for Unit 2 structures, the IDVP verified, to that extent, the design process employed for Unit 2.⁴³ Similarly, the IDVP reviewed a sample of the Unit 1 safety-related systems and found the design process that produced the nonseismic systems efficacious.⁴⁴ The Unit 2 safety-related systems are identical from a design standpoint, and the same design process that the IDVP found satisfactory produced the design of the Unit 2 systems.⁴⁵ Further, nothing developed during the course of the IDVP Unit 1 verification to indicate a need for expansion of the IDVP to include Unit 2.⁴⁶ Thus, we find that there was no necessity to replicate the IDVP for Unit 2.⁴⁷

Six of the contested issues challenge the seismic analysis and modeling used in the verification of various facility structures. Five of them deal with structures which are common to both units: the auxiliary building

⁴⁰ See note 6, *supra*.

⁴¹ *Id.* at 583-86; Cranston Tr. D-385.

⁴² ALAB-763, *supra*, 19 NRC at 583-86; Anderson *et al.* Tr. fol. D-224 at 28-29.

⁴³ Schierling Tr. D-2772-73.

⁴⁴ ALAB-763, *supra*, 19 NRC at 589-93.

⁴⁵ Anderson *et al.* Tr. fol. D-224 at 28-29; Knight Tr. D-2774.

⁴⁶ Knight *et al.* Tr. fol. D-2649 (Contention 1) at 24-25.

⁴⁷ Four of the contested issues, issues 2(a) through 2(d), dispute various features of the ITP verification but only issue 2(d) refers to Unit 2. That issue claims that the ITP review was too narrow because it failed systematically to verify the design of Unit 2. The joint intervenors and the Governor, however, failed to file proposed findings on issue 2(d) and thereby waived it. ALAB-763, *supra*, 19 NRC at 577 and nn.19 & 21. In any event, as we found in Part II, *supra*, PG&E's Unit 2 verification program is sufficient to verify the adequacy of the design of Unit 2.

(3(f)(iv) and 3(f)(v)), the fuel handling building (3(o)), the buried diesel fuel oil tanks (3(q)), and the intake structure (3(r)).⁴⁸ Hence, these issues have been fully resolved by ALAB-763. Similarly, our findings in ALAB-763 on the sixth issue (3(f)(iii)), which questions the effects of seismic uplifting on the Unit 1 containment, are fully applicable to the Unit 2 containment because of the similarity of the two containment structures.⁴⁹

Three of the contested issues concern discrete aspects of the nonseismic systems design review performed as part of the PG&E verification program. Specifically, they deal with fire protection for the auxiliary feedwater pump room (4(i)(1)), jet impingement effects of three lines inside containment (4(l)), and the nameplate ratings for three 4160-volt circuit breakers (4(t)).⁵⁰ Pursuant to PG&E's Unit 2 verification program, the resolution of each of these issues will be examined and, if appropriate, applied to Unit 2. Moreover, the interpretation of the Final Safety Analysis Report that we adopted in ALAB-763 and the condition we attached to the Unit 1 license authorization requiring PG&E to analyze certain lines inside the Unit 1 containment for jet impingement effects are equally applicable to Unit 2.⁵¹ Therefore, we attach the same condition to the license authorization for Unit 2.

The last contested issue referring explicitly to Unit 2, issue 5, charges that PG&E's verification efforts failed to substantiate that Units 1 and 2 "as built" conform to the design drawings and analyses. With regard to Unit 1, we found that PG&E's reconciliation of design documents with the plant and with design analyses was in compliance with the Commission's regulations.⁵² We determined that, although PG&E had had difficulties in the past with configuration control, those problems were primarily caused by PG&E's inability to revise affected documentation in a timely manner, and that PG&E had significantly modified its configuration control procedures to remedy this deficiency. We then found that experience under PG&E's modified procedures demonstrated their effectiveness, that all modification work on the site conformed to the new procedures, and that an audit of the modified configuration control process found the program was being effectively implemented. We also concluded that discrepancies cited by the intervenors as purported evidence of the inadequacy of the system demonstrated neither a pattern of

⁴⁸ *Id.* at 595-601.

⁴⁹ *Id.* at 593-95.

⁵⁰ *Id.* at 601-04.

⁵¹ *Id.* at 603, 619.

⁵² *Id.* at 607-08.

inadequate control procedures nor insufficient configuration control.⁵³ Our findings in ALAB-763 were directed at Unit 1 but those findings and the evidence underlying them established the effectiveness of PG&E's present configuration control process for ensuring that the facility, as built, conforms to the actual design drawings and analyses. That same configuration control process is applicable to Unit 2 and all completion and modification work on that unit will be subject to the control procedures.⁵⁴ Therefore, we are satisfied with respect to Unit 2 that PG&E's reconciliation of design documents with the facility and with the design analyses complies with the Commission's regulations.

None of the remaining four contested issues is particularized as to unit and our findings in ALAB-763 on these issues are thus equally applicable to Unit 2. Issue 6 claims PG&E failed to verify that Westinghouse-supplied safety-related equipment met licensing criteria. In ALAB-763, we found that there was no need for PG&E to verify this equipment because the Westinghouse quality assurance program, under which the Diablo Canyon nuclear steam supply system (NSSS) was designed, was adequate at all relevant times.⁵⁵ The Unit 2 NSSS was also designed by Westinghouse under the same quality assurance program and our earlier findings resolve this issue for Unit 2 as well. Similarly, issue 7 asserts that PG&E's verification program did not identify the root causes of the failures in PG&E's original quality assurance program and determine whether these failures raise generic concerns. In ALAB-763, we found that PG&E had identified and analyzed the root causes of the failures in its design quality assurance program.⁵⁶ Because both Diablo Canyon units were originally designed by PG&E under the same quality assurance program, PG&E's investigation and analysis of root causes were not unit-specific but necessarily aimed at the deficiencies in the program. Therefore, our previous findings also resolve this issue for Unit 2.

Issue 8 maintains that the ITP failed to develop and implement an adequate quality assurance program for performing the verification functions and any modifications to the facility. In ALAB-763, we found the contrary to be the case and that the ITP quality assurance program was adequate.⁵⁷ The same quality assurance program is central to the Unit 2 verification program so no further findings are necessary. Finally, issue

⁵³ *Id.* at 605-07 & n.179.

⁵⁴ Anderson *et al.* Tr. fol. D-224 at 32; Applicant Exhibit 161, Procedure 3.7 at Attachment A.

⁵⁵ *Id.* at 608-10.

⁵⁶ *Id.* at 610-13.

⁵⁷ *Id.* at 613-17.

9 asserts that PG&E failed to provide assurance of component cooling water system (CCWS) heat removal capacity to meet licensing criteria. In ALAB-763, we found that a PG&E proposed technical specification to monitor ocean water temperatures and to take prescribed steps in the event ocean temperatures reach certain levels was adequate to meet the requirements of the Commission's regulations. Consequently, we imposed the technical specification as a condition on license authorization.⁵⁸ Once again, because the CCWSs of both units are essentially identical, our previous finding is fully applicable to Unit 2. Likewise, the same condition is imposed on Unit 2.

IV.

For the reasons set forth in Parts II and III, we find that PG&E's Unit 2 verification program is sufficient to establish that the design of Diablo Canyon Unit 2 meets its licensing criteria. That program provides adequate confidence that the Unit 2 safety-related structures, systems and components are designed to perform satisfactorily in service. Accordingly, we conclude that there is reasonable assurance Unit 2 can be operated without endangering the health and safety of the public and the license authorization previously granted to the Director of NRR by the Licensing Board's initial decision remains effective.⁵⁹ Before exercising that authority for Unit 2, the Director shall ensure that PG&E has met the same two conditions we previously imposed on the licensing authorization for Unit 1.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the
Appeal Board

⁵⁸ *Id.* at 617-18.

⁵⁹ See LBP-82-70, *supra*, 16 NRC at 854.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

**Lawrence Brenner, Chairman
Dr. George A. Ferguson
Dr. Peter A. Morris**

In the Matter of

Docket No. 50-322-OL

**LONG ISLAND LIGHTING
COMPANY
(Shoreham Nuclear Power Station,
Unit 1)**

June 14, 1985

The Licensing Board finds, with respect to the issues in controversy, that the three Emergency Diesel Generators (EDGs) manufactured by Transamerica Delaval, Inc. (TDI) for use at the Shoreham nuclear plant are acceptable, for the first fuel cycle, to supply emergency electrical power as required by General Design Criterion 17. The issues in controversy involved the cylinder block, crankshaft, and LILCO's proposed "qualified load" of 3300 kW.

The Board recommends that the Commission direct the commencement of an investigation of whether TDI has violated its legal obligations to report potential defects in its diesel generators pursuant to § 206 of the Energy Reorganization Act of 1974, 42 U.S.C. § 5846, and 10 C.F.R. Part 21 of the Commission's regulations.

This decision authorizes the issuance of a full power operating license for the first fuel cycle insofar as the emergency diesel generator issues are concerned. However, there are still offsite emergency planning issues pending before another Licensing Board. Accordingly, this decision, effective immediately, authorizes the NRC Staff to issue only a

low power (up to five percent of rated power) operating license, providing the Staff has made findings supporting such a license on all issues not in controversy.

APPEARANCES

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PARTIAL INITIAL DECISION ON EMERGENCY DIESEL GENERATORS

I. INTRODUCTION

A. Background

When this Licensing Board issued the Partial Initial Decision (P.I.D.) in September 1983, we found that all issues in controversy, except one, had been resolved in favor of permitting the Applicant, Long Island Lighting Company (LILCO), to operate the Shoreham Nuclear Power Station, a one unit boiling water reactor located in Suffolk County, New York, at low power levels up to five percent of rated power. LBP-83-57, 18 NRC 445, 468 (1983). That issue related to certain alleged defects in the three emergency diesel generators (EDGs) manufactured by Transamerica Delaval, Inc. (TDI), and proposed for use on the Shoreham site. These EDGs are required to supply backup emergency electrical power to safely shut down the Shoreham plant in the event of a loss of offsite power (LOOP) in compliance with General Design Criterion 17. 10 C.F.R. Part 50, Appendix A.

Diesel issues were pending at the time of the P.I.D. because of a prior ruling by us, which was followed by a major diesel failure during testing. On June 22, 1983, we had granted, in part, the motion of Intervenor, Suffolk County, New York, to reopen the record and admit a new contention concerning the emergency diesel generators. LBP-83-30, 17 NRC 1132 (1983). A hearing on the low power aspects of the new contention was thereafter scheduled to begin on August 29, 1983. However, on August 12, 1983, the original crankshaft on EDG 102 severed during testing. Inspections revealed cracks in the crankshafts of the other two EDGs, 101 and 103. As a result, the pending hearing was cancelled at the unanimous request of LILCO, the NRC Staff and Suffolk County.

The background history thereafter is lengthy and unnecessary to recount in detail for present purposes. In short, the nuclear power plant owners and the NRC Staff launched into a comprehensive review of TDI diesels. Parts of the review were continuing at the end of the hearing. During the time of those reviews, numerous defects with respect to different components in TDI diesel engines came to light. Prominent among these was a defective cylinder block on the Shoreham EDG 103, which was replaced by LILCO. The Staff and LILCO believed the technical reviews were finally sufficiently complete for the hearing to begin on September 10, 1984, on the four diesel issues then in controversy

before us, which involved the crankshaft, cylinder block, cylinder heads and pistons. The diesel hearing began on that date.

As it later turned out, LILCO had not been ready for the hearing to begin when it did. Rather, LILCO apparently wished to change and justify its proposed operation of the diesels to a so-called "qualified load" of 3300 kilowatts (kW), rather than the original 3500 kW continuous rating and 3900 kW two-hour short time rating. LILCO also wished to conduct a 10E7 cycle 740 hour "endurance run" test (taking some credit for previous test hours) along with inspections which had been advocated by the NRC Staff and Suffolk County. As a result, as the originally contemplated evidentiary hearing drew to a close in November 1984, the Board granted LILCO's motion to reopen and supplement the record, as confirmed in our unpublished Order, dated December 4, 1984. Pursuant to the schedule agreed upon by the parties, the reopened hearing began on February 12, 1985. The record was closed on March 12, 1985. Proposed findings were filed by all parties pursuant to an agreed-upon accelerated schedule, culminating in LILCO's reply findings being filed on May 2, 1985.

B. Summary of Decision

The diesel issues remaining in controversy before us relate to three matters: blocks, crankshafts, and the qualified load proposal. Our decision is divided into these three parts, with the numbered findings beginning with B, C, or L, respectively. With respect to these issues, we find there is reasonable assurance that for the first fuel cycle the TDI EDGs can perform their required safety function, if necessary, at a qualified load level up to 3300 kW, and that operation at such a level will not lead to failure of the crankshaft. We also find that routine required surveillance testing can be conducted at 3300 kW plus or minus 100 kW without leading to failure of the crankshaft, and that an additional cumulative operation time of two hours between 3300 kW and 3400 kW during the first fuel cycle, if necessary, would not cause failure of the crankshaft. Operation above 3400 kW is not permitted because of our findings regarding the crankshafts. With respect to the blocks, we find there is reasonable assurance that the EDGs will not be prevented from performing their safety function of supplying standby electrical power, if needed, due to block top cracks, of which three types were in controversy: so-called ligament, stud-to-stud and circumferential cracks. Insofar as the diesel issues before us are concerned, this decision authorizes the issuance of a full power operating license for the first fuel cycle. However, as noted below, there are still offsite emergency planning issues pending

before another Licensing Board. Accordingly, this decision, effective immediately, authorizes the NRC Staff to issue only a low power (up to five percent of rated power) operating license, providing the Staff has made findings supporting such a license on all issues not in controversy.

During the litigation, the parties reached agreements, approved by us, on three issues: cylinder heads (October 30, 1984, Board Diesel Ex. 1 for Ident., ff. Tr. 25,204); pistons (November 14, 1984, Tr. 26,450-58, 26,620-22), and camshaft gallery cracks in the cylinder block (March 7, 1985, ff. Tr. 28,766). We reiterate our commendation of the parties and counsel for their energetic efforts to reach acceptable settlements on the issues in controversy. We think the parties and the public interest have been well served by these settlements. Some of these settlements require conditions, generally related to future monitoring and inspections. The NRC Staff and other responsible parties shall assure that those requirements are properly reflected in the operating license conditions or technical specifications.

The contentions in issue were jointly sponsored by Suffolk County and New York State. Suffolk County (SC or the County) was the lead intervenor at the hearing. As we had required for efficiency, the County and the State coordinated closely their participation and filed joint proposed findings. For brevity, we will refer only to the County in our decision on the joint contentions. The other parties participating were LILCO and the NRC Staff.

There are offsite emergency planning issues in controversy before another Licensing Board which must be resolved in LILCO's favor before a full power operating license could be authorized. At this point, that Board has effectively found against LILCO, but that proceeding is continuing. "Partial Initial Decision on Emergency Planning," LBP-85-12, 21 NRC 644, 919 (1985). For this reason the effect of our decision is to authorize only a low power license. The Commission has previously rejected the recommendation of this Licensing Board (then consisting of Judges Brenner, Carpenter and Morris), that so long as Suffolk County refused to participate in emergency planning, and that the willingness of New York State to participate was then unclear, a low power license should not be issued unless and until a factual inquiry could support a finding of reasonable assurance that offsite emergency planning, required for a full power license could be developed. LBP-83-21, 17 NRC 593 (1983); CLI-83-17, 17 NRC 1032 (1983). *See also* Partial Initial Decision, LBP-83-57, 18 NRC 445, 623-33 (1983); CLI-84-9, 19 NRC 1323, 1325-29 (1984).

C. Investigations

We have been informed that the NRC Office of Investigations (OI) has before it a pending investigation of Transamerica Delaval, Inc. We have inquired of OI, through the NRC Staff, on three occasions over the past year, whether anything in their investigation would materially affect the record on the TDI EDGs at Shoreham. We received no helpful information in OI's vague response over a year ago (Memo to G. Cunningham, ELD, from B. Hayes, OI, March 12, 1984), and we received no response from OI to our more recent inquiries on the record of the proceeding. Tr. 28,245-53 (February 21, 1985); Ltr to Board from B. Bordenick, NRC Staff Counsel, February 28, 1985; Tr. 28,408-11 (March 6, 1985); Ltr to Board from B. Bordenick, March 22, 1985. The NRC Staff did assure us that it presented our inquiries to OI as we had requested. *Id.*

We assume that OI's recent failures to respond are benign and due to some miscommunication of the import of our inquiry and expectation of a response. At the time, we considered taking further action, but decided this could lead to a collateral digression from the complex issues in controversy before us. A Licensing Board fully occupied at trial expects its bench requests to OI, through the only NRC entity present before it, the NRC Staff, to be given the same attention as direct written inquiries and orders. Indeed, Boards sometime use a bench order to permit prompt and fuller explanation of its wishes to avoid an unnecessarily digressive confrontational situation. We expect OI and the NRC Staff to examine the cause of the apparent communication breakdown and to see that it does not recur.

Since we are ignorant of the nature of the information before OI, our decision does not encompass it. OI was, of course, under an obligation to inform us if it had developed information material to the issues in controversy before us.¹ We therefore deem its silence to mean that it had no such information. If this is incorrect, OI shall immediately notify

¹ Mr. Hayes' memo of March 12, 1984, states:

The Office of Investigations (OI) has opened an investigation concerning Transamerica Delaval Incorporated and the Commissioners have been apprised of this investigation being initiated. However, due to limited resources and other priority commitments, actual field work has not commenced and a realistic estimated completion date cannot be ascertained at this juncture.

In accordance with OI policy, we are unable to reveal the particulars of the various allegations; however, they appear to be generic rather than site specific. If safety significant information is developed which impacts on Shoreham or any other facility, OI will make appropriate notifications to cognizant NRC staff members.

Staff Counsel's letter to the Board of February 28, 1985, states that as of that time, a year later, OI verbally informed the Staff that there was no change in the status of this investigation; i.e., the investigation is "opened" but no work has been done on it.

the Appeal Board and the Commission. We also note that OI stated that the Commission was informed about the pending investigation by OI. This gives us confidence that the Commission, by not stepping in while knowing we were approaching a decision on the diesel issues, believes there is no information before OI which forms a basis to prohibit reliance on the TDI diesels at Shoreham.

During the course of the prehearing and hearing stages of this case, information has been publicly filed, or testified to by parties, which we believe provides a basis for the Commission to investigate whether TDI has violated its legal obligations to report potential defects in its diesels being proposed or used for backup emergency electrical power at nuclear power plants. *E.g.*, § 206, Energy Reorganization Act of 1974, 42 U.S.C. § 5846; 10 C.F.R. Part 21. Some of this information related to an apparent failure by TDI to disclose potential defects as recently as the August-September 1984 timeframe of the filing of testimony and the beginning of this hearing. We emphasize that none of the information we have in mind undercuts the findings in our decision, or provides a basis to believe that there are existing defects in the TDI diesels at Shoreham. However, given the Commission's extensive reliance on self-reporting and inspections by vendors and licensees, we believe that possible violation of reporting requirements by TDI is a serious matter with respect to the integrity of the Commission's overall regulatory responsibilities. We recommend that the Commission direct OI or another appropriate NRC Staff or Commission entity to investigate whether TDI has violated reporting requirements, and, if so, what enforcement or other action is required.

The parties in the proceeding before us, particularly LILCO and its consultants, are knowledgeable sources of the information regarding apparent nonreporting by TDI which we are mindful of through the public filings before us, and perhaps of additional instances of apparent nonreporting. We choose not to catalogue the apparent instances in this decision. If the Commission accepts our recommendation, we are willing, after our jurisdiction terminates, to point the investigating body to the public information filed with us which contains examples of apparent nonreporting. We do note that the apparent nonreporting of defects by TDI has been a concern pursued by the NRC Staff several times, but each time there were subsequent assurances by TDI that all matters had then been reported. *See, e.g.*, Region I Report No. 50-322/83-17, at 10 (July 8, 1983); Region IV (vendor) Report No. 99900334/83-01, Notice of Violation by TDI (October 3, 1983); 1984 Region I Systematic Appraisal of Licensee Performance (SALP) Report, at 14 (May 8, 1984);

Region I Report No. 50-322/84-37, at 2 (November 28, 1984). Thereafter, additional instances of apparent nonreporting by TDI came to light. Three prominent, but by no means complete, examples are: (1) The inadequate degenerate metallurgical structure of the original EDG 103 block, which was discovered by LILCO only after the block cracked in April 1984; (2) the existence of cracks in the camshaft gallery of the blocks, not discovered by LILCO until 1984. Moreover, these cracks had been repaired by welding and painted over by TDI after fabrication (in the 1970's), but this was not discovered by LILCO until September 1984. (Indeed, written testimony filed before us by TDI witnesses on August 14, 1984, but fortuitously for TDI, withdrawn by LILCO before presentation as evidence, discussed the camshaft gallery cracks but failed to disclose that they had been welded over); and (3) the fact that TDI's torsional stress calculations for the original 13 x 11 crankshafts were grossly in error. (As we understand it, TDI used this size crankshaft only in the three diesels of that model sold to LILCO, and not in others made after the mid-1970's timeframe when the three Shoreham diesels were fabricated).

We reiterate that we believe the situation regarding apparent nonreporting by TDI deserves the Commission's attention. To the extent Commission entities have looked into this matter, it appears to us that the inquiries may not have been comprehensive or inclusive, and may not have received the proper priority and resources.

II. CYLINDER BLOCKS

A. Introduction

B-1. Suffolk County and the State of New York jointly contend that the Emergency Diesel Generators (EDGs) at Shoreham are inadequate because:

- Cracks have occurred in the cylinder blocks of all EDGs and a large crack propagated through the front of EDG 103.
- Cracks have also been observed in the camshaft gallery area of the blocks.²
- The replacement cylinder block for EDG 103 is a new design which is unproven in DSR-48 diesels and has been inadequately tested.

² By stipulation dated January 14, 1985, the parties advised that the County no longer sought to disqualify the blocks on the basis of the camshaft gallery cracks. LILCO Ex. B-67. Accordingly, our decision does not deal with these cracks.

B-2. The three Shoreham EDGs are Transamerica Delaval, Inc. ("TDI"), model DSR-48 diesel engines with eight cylinders in line, having a 17-inch base and 21-inch stroke. These EDGs constitute the onsite electrical power system for the Shoreham plant. Hubbard and Bridenbaugh, ff. Tr. 23,826, at 12, 14. The safety function of this system (assuming the offsite system is not functioning) is to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents. The onsite electrical power supplies, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure. 10 C.F.R. Part 50, Appendix A, General Design Criterion (GDC) 17. A single failure means an occurrence which results in the loss of capability of a component to perform its intended safety functions. Multiple failures resulting from a single occurrence are considered to be a single failure. *Id.*, Definitions and Explanations.

B-3. The function of the cylinder blocks is to form the framework of the liquid-cooled engine, provide passage for coolant and support for the cylinder liners and cylinder heads and to restrain the forces generated by gas loads. McCarthy *et al.*, ff. Tr. 24,372, at 8. The configuration for one cylinder liner and head is illustrated in LILCO Exhibit B-7 (Figure 1, attached), and plan views of block tops, showing crack locations and depths for DG 101, DG 102 and DG 103, are given in LILCO Exhibits B-16, B-17 and B-25 (Figures 2, 3 and 4), respectively. The block material was specified as ASTM A-48-64 Class 40 gray cast iron. *Id.* at 9.

B-4. As part of the engine qualification testing program, each engine was operated for 100 hours at or above full load (3500 kW) and then disassembled and inspected. This inspection, in February 1984, identified ligament cracks in the blocks of all three EDGs, and stud-to-stud cracks and one stud-to-end crack in the original EDG 103 block. *Id.* at 13-15, Tr. 24,603-04 (Schuster). A ligament crack extends from the cylinder head stud counterbore to the cylinder liner counterbore and lies in a vertical plane, extending downward from the block top surface. A stud-to-stud crack extends from one stud counterbore to an adjacent stud counterbore of an adjacent cylinder. The locations of ligament and stud-to-stud cracks are illustrated in LILCO Exhibit B-20 (Figure 5). A stud-to-end crack extends from a stud counterbore of an end cylinder (either no. 1 or no. 8) to the end of the block. *See McCarthy et al.*, ff. Tr. 24,372, at 14-15.

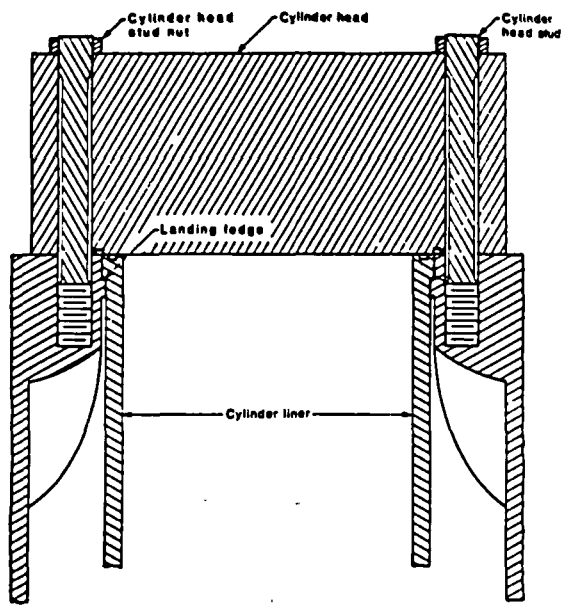


FIGURE 1. Configuration for cylinder liner and head (LILCO Ex. B-7).

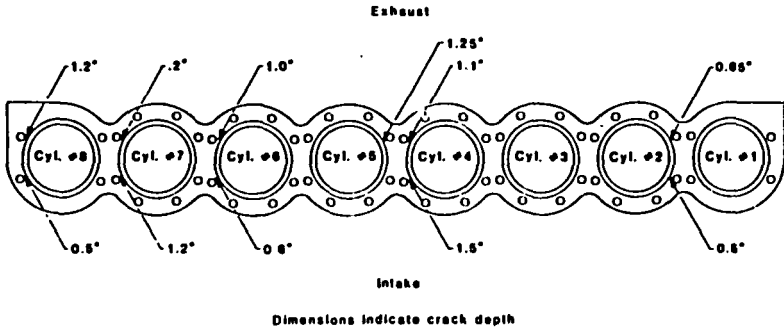


FIGURE 2. SNPS DG 101 crack map (LILCO Ex. B-16).

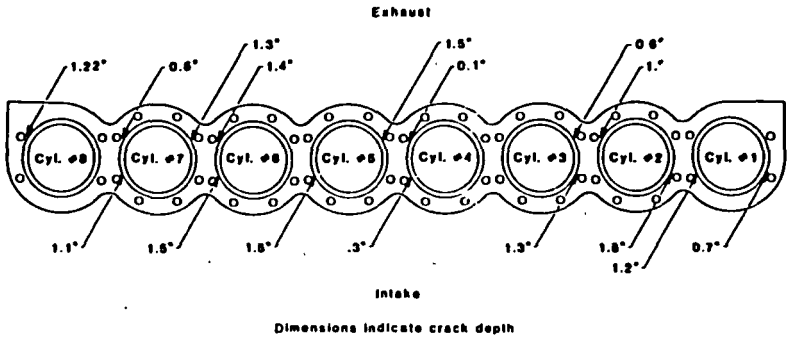
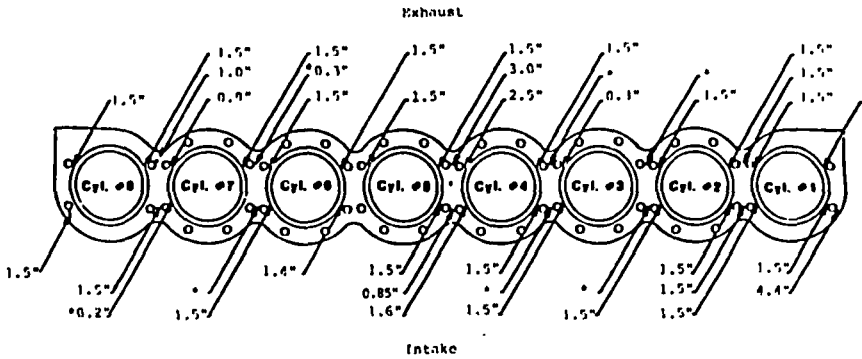


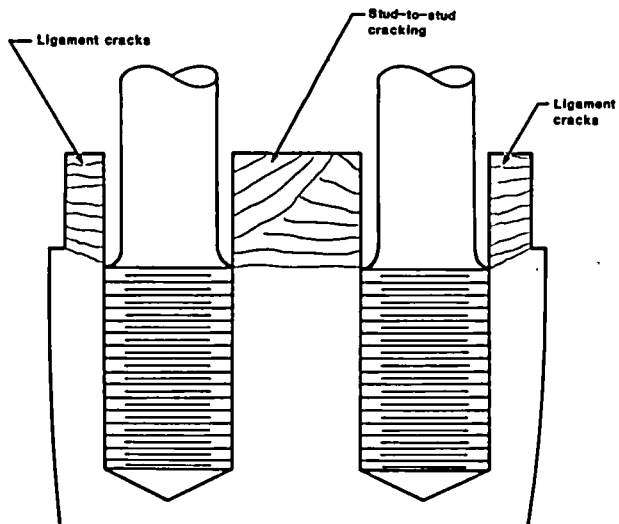
FIGURE 3. SNPS DG 102 crack map (LILCO Ex. B-17).



Dimensions indicate crack depth

*Top surface indication. No depth to crack measurable down stud hole.

FIGURE 4. SNPS DG 103 crack map as of 9/22/84 (LILCO Ex. B-25).



**FIGURE 5. Stud-to-stud cracking in SNPS DG 103
(LILCO Ex. B-20).**

NOTE: Cracks are vertical, i.e., approximately parallel to the plane of the page, and not all extend as far as portrayed.

B-5. The location and depth of the ligament cracks were measured using a series of liquid penetrant, eddy current and visual inspections of the block tops, stud holes and cylinder liner landings. *Id.* at 13. EDG 101 had 13 ligament cracks, EDG 102 had 18 ligament cracks and EDG 103 had 21 ligament cracks at the time of these inspections. LILCO Exs. B-16, B-17 and B-18. These cracks varied in depth, with the ones in EDG 103 being the most severe. *Id.* No ligament crack in EDGs 101 and 102 extended below a depth of 1.5 inches or on to the liner landing. As of March 11, 1984, the original EDG 103 block had no measured ligament cracks deeper than 1.5 inches. The deepest stud-to-stud crack in the original EDG 103, between cylinders no. 4 and 5, was measured by eddy current to have a depth of 1.4 to 1.6 inches. LILCO Exs. B-16, B-17, B-18; McCarthy *et al.*, ff. Tr. 24,372, at 14, 15; Tr. 28,823-24 (Johnson); Tr. 28,825-27 (Rau). The original EDG 103 also had seven surface "indications" (cracks which were not deep enough to be measurable), five of which occurred in stud-to-stud locations and two of which were located between a stud hole and the outer perimeter of the block top. *Id.*

B-6. Following inspection, EDG 102 was operated through 100 starts to loads greater than 50 percent (i.e., greater than 1750 kW). McCarthy *et al.*, ff. Tr. 24,372, at 15; LILCO Ex. B-21. Based on subsequent eddy current examination, LILCO concluded that there had been no discernible extension of cracks on the 102 block. *Id.* It appears, however, that this general conclusion was based on eddy current measurements only at cylinder no. 7. *See* Tr. 24,411 (Johnson); LILCO Ex. B-21. While this may be reassuring, since based on the EDG 102 crack map cylinder no. 7 has the worst cracks, we do not find it conclusive that no crack extension at all took place.

B-7. Between March 11 and April 14, 1984, EDG 103 underwent additional operational testing for a longer time at higher loads than the EDG 102 testing. LILCO Ex. B-15. On April 14, the EDG block experienced an abnormal load excursion in which the power demand exceeded the EDG capacity for approximately 25 seconds, causing the engine to slow from the normal 450 rpm to 390 rpm. The engine was operating with the fuel rack set at 3500 kW when the power demand from the site load was accidentally picked up. The engine speed slowed until the output breaker tripped due to low engine rpm; the diesel continued to run at no load for an additional ten minutes before it was shut down. McCarthy *et al.*, ff. Tr. 24,372, at 17-18; Tr. 24,655-61 (Youngling, Seaman). The engine was later restarted and the qualification testing continued at 3900 kW for about 1.75 hours, when an operator noticed oil seeping from a crack running down the front of the block at cylinder

no. 1, and the engine was shut down. The engine was operating satisfactorily and producing power prior to shutdown. McCarthy *et al.*, ff. Tr. 24,372, at 17-18; Tr. 24,434 (McCarthy); Tr. 24,661-62 (Youngling). The area of this crack had not been inspected after the load excursion and before restarting the engine. Tr. 24,663 (Youngling). The crack was later measured to be 4.4 inches long at the front surface of the block. No one recalled its depth at the stud hole, but it would not be more than 4.4 inches because that was the largest measurement observed. Tr. 24,668 (Wells), Tr. 24,669 (Schuster, Johnson).

B-8. After shutdown of the EDG 103 engine on April 14, 1984, inspection of the block revealed that the deepest stud-to-stud crack, located between cylinders no. 4 and 5, had extended from a depth of 1.4 to 1.6 inches to a maximum depth of three inches.³ McCarthy *et al.*, ff. Tr. 24,372, at 18; Tr. 28,823-24 (Johnson); Tr. 28,905-06 (Rau); LILCO Exs. B-18, B-25. Between March 11 and April 14, 1984, additional ligament and stud-to-stud cracks had initiated and propagated at other block top locations; however, none of the ligament cracks extended on to the liner landing. McCarthy *et al.*, ff. Tr. 24,372, at 18-19; Tr. 25,538 (Johnson); LILCO Exs. B-16, B-18, B-25.

B-9. Based on the lack of confidence that the EDG 103 block could be repaired satisfactorily, LILCO decided to replace it. Tr. 24,665-66 (Youngling). A new block was installed in the EDG 103 in June 1984. Johnson *et al.*, ff. Tr. 28,799, at 5.

B-10. In September 1984, destructive sectioning, magnetic particle, and ultrasonic examinations revealed the presence of shallow circumferential cracks in the original EDG 103 block. McCarthy *et al.* (Supp.), ff. Tr. 24,372, at 2, 11; Anderson *et al.* (Supp.), ff. Tr. 25,565, at 10-11; SC Ex. S-10. These cracks were located in the sharp corner formed by the cylinder liner counterbore and the cylinder liner landing. They extended at about a 45° angle from the corner to a maximum depth of 3/8 inch. McCarthy *et al.* (Supp.), ff. Tr. 24,372, at 2, 11. *See also* Anderson *et al.*, ff. Tr. 25,565, at 10-11; SC Ex. S-10.

B-11. As of September 22, 1984, the EDG 101 and 102 blocks had each accumulated more than 1200 hours of operation. On the EDG 101 block, about 440 hours were at or above full load (3500 kW), including 25 hours at or above 110 percent of full load. Tr. 28,887 (Rau); LILCO Ex. B-13. On the EDG 102 block, about 475 hours were at or above full load (3500 kW), including 30 hours at or above 110 percent of full load. Tr. 28,887-88 (Rau); LILCO Ex. B-14. The original EDG 103 block also

³ All measurements referred to are the revised measurements (for EDG 103) taking into account the presence of Widmanstaetten graphite. Tr. 24,442 (Rau).

accumulated more than 1200 hours of operation, of which about 428 hours were at or above full load (3500 kW), including 30 hours at or above 110 percent of full load. LILCO Ex. B-15.

B. Methods of Evaluation

B-12. It is abundantly clear from this proceeding that the evaluation of the adequacy of the Shoreham diesels has presented a novel situation. Complete failure of the EDG 102 crankshaft, the presence of ligament cracks, stud-to-stud cracks, circumferential cracks, camshaft gallery cracks and replacement of the EDG 103 block, perforce have led to new bases for evaluation, as developed by the Staff and LILCO (and the TDI Owners Group), to show compliance with GDC 17. Traditionally, and in all cases prior to the appreciation of the difficulties with the TDI diesels, especially at Shoreham, evaluation was guided by the concepts described in Institute for Electrical and Electronics Engineers, Inc. (IEEE) standards and NRC Regulatory Guides. This approach made reference to "continuous duty" and "short-time" ratings compared to the actual loads anticipated over the life of the plant. LILCO, in fact, used this approach originally in its Final Safety Analysis Report (FSAR), using 3500 kW as the continuous duty rating and 3900 kW as the short-time rating.

B-13. Neither LILCO nor the Staff now uses the IEEE approach for Shoreham. Rather, a new concept of "qualified load" (3300 kW) has been introduced and extensive investigations of crack initiation and propagation have been carried out to attempt to demonstrate that the diesels will perform their intended safety function during the course of a coincident loss of offsite power and a loss of coolant accident (LOOP/LOCA). Further, this demonstration applies only to the first refueling cycle. Tr. 23,105-06 (Ellis). LILCO testified that based on its analysis, "EDG 101 and EDG 102 should perform their intended function, plus surveillance and periodic operational testing, *until the first refueling outage* without developing significant stud-to-stud cracking." McCarthy *et al.*, ff. Tr. 24,372, at 74 (emphasis added). We do agree with LILCO and the Staff that the record supports the approval of continued operation of the Shoreham TDI EDGs for multiple fuel cycles — with appropriate inspections — but consider it prudent for the NRC to defer a decision on operation past the first fuel cycle until industry experience with TDI diesels up to that time can be reviewed. Similarly, the results of inspections during and after the first fuel cycle at Shoreham should be evaluated before the second fuel cycle. LILCO and the Staff aver that their evaluations do demonstrate compliance with GDC 17; the County

contends they do not. We proceed to examine the parties' positions in detail.

B-14. First, we observe that GDC 17 is the applicable regulation, whereas Regulatory Guide 1.9, Selection, Design, and Qualification of Diesel-Generator Units Used as Standby (Onsite) Electrical Power Systems at Nuclear Power Plants (which references IEEE standards), is not a substitute for the regulation, and compliance with it is not required. "Methods and solutions different from those set out in the guide will be acceptable if they provide a basis for the findings requisite to the issuance . . . of a . . . license by the Commission." Regulatory Guide 1.9, Rev. 2, December 1979, explanatory footnote at 1. GDC 17 does not provide specific standards for evaluating the capacity and capability of the EDGs. It does specifically require that the onsite electrical power system provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents. LILCO has interpreted this to mean that the EDGs will be capable of supplying (sufficient) power for a seven-day (168 hour) period in response to a LOOP/LOCA event. Tr. 24,823 (Youngling).

B-15. While normally an application for an operating license would contemplate an analysis and evaluation of the design and performance of structures, systems and components during the life of the facility (10 C.F.R. § 50.34(a)(4); § 50.34(b)(4)), we understand and determine that LILCO is requesting approval of its analysis and evaluation of the EDGs for only the first refueling cycle and for only one LOOP/LOCA should that occur during this cycle. See B-13, *supra*. The Staff has not taken this position. In fact, the Staff took the position that the adequacy of the diesels must be evaluated on the basis of whether the EDGs can withstand repeated LOOP/LOCA events throughout the life of the plant. Tr. 28,139, 28,141-42, 28,148 (Berlinger). The Staff later explained, however, that its evaluation, in accordance with GDC 17, does not consider whether there will be one LOOP/LOCA or one hundred LOOP/LOCAs. Tr. 28,184 (Berlinger). The Staff would assume that maintenance and surveillance programs would be incorporated at the plant which would assure that in the future the engines would be maintained in order to respond to a LOOP/LOCA or any other LOOP event, if there were repeated LOOP events. Tr. 28,285 (Berlinger). The Staff, however, did not provide any testimony that the EDGs could perform their function for more than one LOOP/LOCA. We repeat, that with respect to the acceptability of the EDG blocks, we consider their capability to perform their

function for one LOOP/LOCA occurring before the end of the first refueling cycle.

B-16. The County would have us reject the LOOP/LOCA “standard” proposed by LILCO and the Staff. SC PF, Cylinder Blocks, at 11, ¶ 17. We do not view the LOOP/LOCA test as a standard, *per se*, but as a proposed basis for evaluating the capability of the EDGs to perform their function in compliance with GDC 17 for one LOOP/LOCA event occurring during the first refueling cycle. Tr. 26,234-37 (Berlinger). We accept this approach and shall examine the expected response of the blocks to the duty cycle imposed on the EDGs as a result of a LOOP/LOCA during the first refueling cycle. As a preliminary matter, we first examine the material properties of the blocks.

C. Material Properties of the EDG 101, 102 and Replacement 103 Blocks

B-17. There is no disagreement among the parties that the original EDG 103 block contained widespread, degenerate, Widmanstaetten graphite structure⁴ and that it therefore lacked the tensile strength of normal Class 40 gray cast iron. McCarthy *et al.*, ff. Tr. 24,372, at 29-35; Berlinger *et al.*, ff. Tr. 23,126, at 25; Tr. 25,781 (Bush); Tr. 25,552-53, 25,674 (Anderson); Tr. 24,746 (Wachob).

B-18. As a result, the original 103 block was more susceptible to fatigue crack initiation and propagation because the block strength was as low as 14.9 kips per square inch (ksi) which is approximately 40 percent below the anticipated minimum value of 25 ksi for typical Class 40 gray cast iron of this thickness. McCarthy *et al.*, ff. Tr. 24,372, at 35-36; Tr. 25,284-86 (Wachob). *See also* LILCO Ex. B-40. LILCO’s consultant, Failure Analysis Associates (FaAA), calculated that the fatigue life of the original EDG 103 was reduced by a factor of 10 to 100 times as a result of the presence of degenerate graphite. McCarthy *et al.*, ff. Tr. 24,372, at 40.

B-19. In contrast, the FaAA inspection of the microstructure of 101 and 102 confirms that they are typical Class 40 gray cast iron. Tr. 24,771 (Rau). The uniform tensile strengths (UTS) for 101 and 102 were in the range of 45 to 47 ksi. Tr. 24,766 (Wachob).

⁴ Widmanstaetten graphite is a degenerate form of graphite that occurs infrequently in heavy-section gray cast iron. A combination of very slow cooling rate and tramp elements can combine to form Widmanstaetten graphite. McCarthy *et al.*, ff. Tr. 24,372, at 30-31; Tr. 24,745, 25,010 (Wachob); Tr. 25,059-60 (Rau, Wachob); Tr. 25,064 (Rau).

B-20. LILCO and the Staff contend that the EDG 101 and 102 blocks consist of normal Class 40 gray cast iron and that they are, therefore, superior to the original EDG 103 block. McCarthy *et al.*, ff. Tr. 24,372, at 41-42; Berlinger *et al.*, ff. Tr. 23,126, at 26-27; Tr. 24,752-55 (Rau); LILCO Exs. B-33, B-38. Metallurgical analyses using two different techniques were used by LILCO (FaAA) to analyze the cast iron material of the blocks. First, metal samples were removed from the EDG 101, 102, and original 103, and replacement 103 block tops. These samples were then metallographically polished and examined under a microscope to evaluate their microstructure. Second, plastic replicas were taken of polished surfaces of the EDG 101, 102, and original 103 blocks. Both of these techniques revealed extensive quantities of Widmanstaetten graphite throughout the original EDG 103 block and typical gray cast iron microstructure throughout the 101, 102, and replacement 103 blocks. McCarthy *et al.*, ff. Tr. 24,372, at 29-31, 41-42; Tr. 24,741, 24,746, 24,752-55 (Rau); Tr. 24,748-54, 24,756-57, 24,769-71 (Wachob); LILCO Exs. B-33-B-38.

B-21. The County contends that there is insufficient evidence of the properties of EDG 101 and 102 blocks to conclude that they are superior to the original EDG 103 block. In essence, the County asserts that to reach conclusions about the material strength of the blocks of EDGs 101 and 102 compared to that of the original EDG 103, the material of all three blocks must be properly evaluated. Anderson, ff. Tr. 25,564, at 172. The County does not tell us what a proper evaluation would be, but alleges that there is insufficient evidence of any actual block material properties of EDGs 101 and 102, because:

- FaAA examined only a small area of each block top,
- within the same block the cast iron properties may vary widely due to the presence of trace elements in certain areas,
- a meaningful analysis of the material properties of a cylinder block would require metallurgical examination of numerous sample areas of the block,
- FaAA assumed the block to be homogeneous,
- FaAA assumes the materials of the EDG 101 and 102 blocks are at least as strong as "typical" material.

Id. at 171-72.

B-22. The metal samples tested were cut from identical sites on each of the EDG 101, 102, and original 103 block tops: the block top corners adjacent to cylinders no. 4 and 5 on the exhaust side and the crotch between cylinders no. 4 and 5 on the exhaust side. Tr. 24,738-39,

24,941-44, 26,651-52 (Wachob, Rau); Tr. 24,951 (Wachob). On the replacement 103 block, one metal sample was taken from the exhaust manifold adjacent to cylinders no. 4 and 5. Tr. 24,951 (Wachob). Various metallographic preparation procedures were employed to examine the samples, and the results were evaluated and compared to assure that the observed microstructure had not been affected by artifacts produced by the polishing procedures. Tr. 24,947-48 (Wachob); Tr. 24,948-49 (Rau). The samples, and all of the approximately 10 replicas evaluated from the EDG 101 and 102 blocks, showed typical gray cast iron microstructure.⁵ McCarthy *et al.*, ff. Tr. 24,372, at 41; Tr. 24,749, 28,830 (Wachob); Tr. 24,771 (Rau); Tr. 24,945-48 (Wachob, Rau).

B-23. LILCO and the Staff agree that the samples and replicas taken from the EDG 101 and 102 blocks provide a representative sample for determining that extensive Widmanstaetten graphite is not present.⁶ Tr. 25,063-65 (Rau); Tr. 26,651-53 (Wachob, Rau); Tr. 26,287-88 (Bush). At least two factors support this conclusion. First, the formation of Widmanstaetten graphite is influenced by the rate of cooling which is virtually uniform throughout the heavy-section portions of a large casting such as the blocks. Thus, the microstructure in one block top location would be representative of the microstructure throughout the block top. Second, the extensive additional metallography and mechanical testing performed on the original EDG 103 block confirmed that, at a range of depths beneath the block top, extensive Widmanstaetten graphite was present. Thus, each location sampled, including the identical locations sampled in the EDG 101 and 102 blocks, confirmed that the sample locations were representative of the microstructure of the entire block. McCarthy *et al.*, ff. Tr. 24,372, at 32; Tr. 25,063-65 (Rau); Tr. 24,743-45, 26,651-53 (Wachob, Rau); Tr. 24,745-47, 24,949-50 (Rau, Wachob); *see* LILCO Ex. B-39; *see also* Tr. 24,612-15 (Wachob).

B-24. SC witness Dr. Robert N. Anderson asserted that FaAA's sampling technique did not provide sufficient evidence that all portions of the EDG 101 and 102 block tops have typical gray cast iron microstructure. Anderson *et al.*, ff. Tr. 25,564, at 171; Anderson *et al.* (Rebut), ff. Tr. 26,326, at 1; Tr. 25,552-53 (Anderson). He based that opinion, in part, on his belief that the material of each block is not homogeneous.

⁵ Although small, isolated locations in the EDG 102 block contain some unconfirmed Widmanstaetten microstructural features, the areas represent such a small fraction of the cell wall in that location and a negligible fraction of the cell walls in the structure that they have no significant impact on mechanical properties. Tr. 24,755, 26,657 (Rau).

⁶ Although Dr. Spencer H. Bush would have preferred to see additional metallurgical site evaluation, he agreed that there is a very definite difference in the microstructure of EDGs 101 and 102 and the original EDG 103 microstructure. Tr. 26,287-88 (Bush).

However, Dr. Anderson's opinion is entitled to little weight since he offered no independent metallographic evaluation of the Shoreham EDGs to refute either (1) the principle that these large blocks would have a virtually uniform cooling rate and therefore be homogeneous, or (2) FaAA's testing of several samples of each, which indicated that the blocks have a virtually uniform microstructure. Also unpersuasive is Dr. Anderson's testimony that the samples are not reliable because they are not a significant portion by weight of the entire block. As LILCO and Staff witnesses agreed, reliability is assured by sample location, not sample weight. Tr. 24,756-57 (Rau); Tr. 24,745-46 (Rau, Wachob); Tr. 26,651-53 (Rau, Wachob). Compare Anderson *et al.* (Rebut), ff. Tr. 26,326, at 1 with Tr. 26,032-33, 26,287-88 (Bush); Tr. 26,651-53 (Wachob, Rau). In fact, Dr. Anderson subsequently agreed that sample location is a more important factor than the sample weight. Tr. 26,649-51 (Anderson).

B-25. The County also argues that the results of tensile strength measurements of test B-bars cast with the blocks of EDGs 101 and 102 cannot be used to infer the tensile strengths of the EDG 101 and 102 blocks, because there is no independent proof that the blocks of EDGs 101 and 102 do not contain Widmanstaetten graphite, because the sampling was inadequate. SC PF, Cylinder Blocks, at 31, 33. The County says it is particularly uncomfortable with the lack of thoroughness of FaAA's examination in view of the fact that Dr. Wachob (FaAA's witness) could not affirm that FaAA found no evidence of Widmanstaetten graphite in the EDG 102 block. *Id.* at 33. LILCO, however, asserts that metallographic testing of the EDG 101 and 102 blocks demonstrates that they have a normal microstructure for Class 40 gray cast iron, and the B-bar tests exceed the minimum strength requirements for Class 40 gray cast iron, therefore the strength of the blocks also exceeds the minimum requirements for Class 40 gray cast iron. Tr. 24,642, 24,770-72 (Rau). We recognize the importance and the difficulties of extrapolating from B-bar results to the large castings (e.g., because of differences in cooling rates), but despite the County's uncomfortableness, find that there is reasonable assurance that the EDG 101 and 102 block materials at least meet the minimum strength requirements for Class 40 gray cast iron and clearly are superior to the material of the original EDG 103 block.

B-26. The County also argues that the cracking in the EDG 101 and 102 blocks is sufficiently similar to the cracking in the EDG 103 block prior to its replacement to rebut LILCO's claims that EDG 101 and 102 blocks possess superior metallurgical properties. SC PF, Cylinder

Blocks, at 34. We do not agree that whatever similarity exists overrides the persuasive evidence from metallurgical and metallographic analyses that are consistent in showing the superiority of the EDG 101 and 102 block material; e.g., the difference in microstructure, LILCO Exs. B-35, B-36 and B-37, and the fatigue crack growth rate measured for a sample of material taken from the original EDG 103 block. LILCO Ex. B-44.

B-27. The B-bar test for the EDG 103 replacement block indicated a UTS of 54 ksi, which is well in excess of the specified Class 45 requirement, and, indeed, in excess of requirements for Class 50 gray cast iron. Tr. 24,764-69 (Rau, Wachob). Since FaAA's metallographic testing confirmed that the replacement block has a normal microstructure, similar to that of the B-bar, the B-bar test results may be relied upon to indicate that the strength of the replacement block exceeds the requirements for Class 45 gray cast iron. McCarthy *et al.*, ff. Tr. 24,372, at 36-38, 41-42, 69-70; Tr. 24,767-69, 28,849 (Rau); Tr. 24,951-52 (Wachob); *see* LILCO Ex. B-42.

B-28. Based on the foregoing, we believe that indeed the Widmanstaetten graphite severely degraded the original EDG 103 block and was a large contributor to the extensive cracking found after the endurance testing. Further, we accept the analysis of FaAA concurred in by Dr. Bush that there is sufficient evidence to support a finding that EDG 101 and 102 blocks are free from the extensive Widmanstaetten graphite that degraded original EDG 103 block.

D. Block Stress Analyses

B-29. The primary loadings that influence block cracking result from the stud preload, thermal stresses, and pressure stresses associated with cylinder firing during operation. To quantify these stresses, strain gage measurements were made on the original EDG 103 block to evaluate the total stresses developed in the block top region. McCarthy *et al.*, ff. Tr. 24,372, at 15-16, 22-23, 27; Tr. 24,511 (Youngling); *see also* LILCO Exs. B-22, B-23.

B-30. The recorded strain gage data were used to compute the stresses at the locations on the blocks where the gages were placed and, in conjunction with finite element analyses, to compute the stresses present elsewhere in the block top. McCarthy *et al.*, ff. Tr. 24,372, at 27-28; *see* LILCO Exs. B-22, B-26-B-31; Tr. 24,518 (Wells).

B-31. FaAA conducted two-dimensional and three-dimensional finite element stress analyses of the block top. The results of these analyses were used to determine scale factors that conservatively relate the stress at the location of strain gage no. 13, located between cylinder

heads no. 5 and 6 in the stud-to-stud region, to the stresses at the edge of the stud holes where ligament and stud-to-stud cracks have been observed to initiate. McCarthy *et al.*, ff. Tr. 24,372, at 42-44; Tr. 24,650, 24,724 (Rau); *see* LILCO Exs. B-22, B-27, B-30, B-45-B-48.

B-32. Three mechanisms of crack initiation were identified that can act separately, or in combination, in the block top. They are (1) low cycle fatigue, associated with the stress range developed during startup to high load levels, (2) high frequency fatigue, associated with stress variations resulting from cylinder firing during operation, and (3) overload rupture associated with the highest tensile stress resulting from a combination of pressure, thermal, and preload stresses. McCarthy *et al.*, ff. Tr. 24,372, at 44-45; Tr. 24,690-95 (Wells, Rau).

B-33. To ascertain whether fatigue crack initiation was possible in blocks with minimum typical materials properties for Class 40 gray cast iron, the stresses calculated from FaAA's conservative finite element analyses were plotted on two modified Goodman (Smith) diagrams. *See* LILCO Exs. B-49, B-50. The Goodman diagrams predicted the possibility that stresses in the block top were sufficiently high for fatigue crack initiation (either ligament or stud-to-stud) to occur in the EDG 101 and 102 blocks. McCarthy *et al.*, ff. Tr. 24,372, at 45-56; Tr. 24,648-51 (Rau).

B-34. The finite element analyses and materials properties used in the Goodman diagram analysis of fatigue crack initiation have been demonstrated by actual operating experience at Shoreham and other nuclear plants to be extremely conservative. McCarthy *et al.*, ff. Tr. 24,372, at 46-47; Tr. 24,654 (McCarthy); Tr. 26,291-92 (Bush). In addition, the scale factors based upon the results of the conservative finite element analyses introduce further conservatism into the Goodman diagram analysis of possible crack initiation. Tr. 24,640-41, 24,649-50 (Rau); Tr. 29,112-13 (Bush).

B-35. The Goodman diagrams are far too conservative and were not intended to be used to predict the specific load levels at which cracks would initiate. Tr. 24,649-50 (Rau); Tr. 24,707-08 (McCarthy). The conservatism is confirmed by the fact that ligament cracks have not occurred at all locations even in the original EDG 103 block with degraded properties. Tr. 24,654 (McCarthy); Tr. 24,649-50 (Rau); *see* LILCO Exs. B-16, B-17, B-25. Further conservatism is shown by the fact that the Goodman diagrams indicate the possibility of stud-to-stud cracking in only a few loading cycles, yet stud-to-stud cracks have not initiated in the EDG 101 or 102 blocks despite extensive high load service. Tr. 24,648-51 (Rau); Tr. 26,062, 26,065-66, 26,291-92 (Bush); Tr. 24,654 (McCarthy); *see* LILCO Exs. B-16, B-17.

E. Ligament Cracks

B-36. Ligament cracks in the EDG blocks appear to be caused by operation of the EDGs, i.e., the loads to which the engines are subjected and the time at these loads. McCarthy *et al.*, ff. Tr. 24,372, at 22-23; Anderson *et al.*, ff. Tr. 25,564, at 181. FaAA's analysis concluded that the cracks result from the interaction of stresses imposed on the cylinder blocks by a number of forces including (i) the preload forces derived from clamping of the cylinder heads to the block tops by the cylinder head stud nuts; (ii) the thermal loads derived from temperature differences in the cylinder liner, cylinder block, cylinder head and cylinder head studs; and (iii) the firing pressure loads derived from gas pressure in the combustion chamber. The interaction of all these loads is very complex. McCarthy *et al.*, ff. Tr. 24,372, at 22-26. LILCO and the Staff assert that ligament cracks are benign because they are unlikely to propagate deeper than 1½ inches and, even if they propagated deeper, they would at most cause minor cooling water leakage that would not affect continued operation of the engine. Tr. 25,271-74 (McCarthy); Tr. 25,930-32 (Berlinger). The County is not persuaded that the risk of ligament cracks propagating to the point of EDG failure during a LOOP/LOCA is so small that it is acceptable.

B-37. LILCO bases its conclusion on considerations of material properties, operating experience, finite element stress analysis, strain gage measurements, detailed knowledge of dimensions and geometry of the blocks and expert opinion. As discussed in Section III, above, we have found that the material properties of the blocks are sufficiently well known to conclude that the ultimate tensile strengths of the EDG 101, 102 and replacement 103 blocks meet or exceed those for Class 40 gray cast iron.

B-38. Testing of the EDG 102 resulted in no discernible crack propagation following 100 consecutive fast starts, including three fast starts to full load in less than 60 seconds in accordance with FSAR requirements. McCarthy *et al.*, ff. Tr. 24,372, at 15. After more than 1000 hours of operation, including more than 350 hours at or above 3500 kW, none of the ligament cracks on the EDG 101 or 102 blocks propagated onto the cylinder liner landing or extended deeper than 1.5 inches in the stud hole counterbore. *Id.*; Tr. 24,404 (Johnson); Tr. 24,507-08 (Schuster, Wells); Tr. 28,821 (Rau); *see* LILCO Exs. B-13, B-14, B-16, B-19; *see also* Tr. 24,399-400 (Schuster, Johnson); Tr. 24,505-06 (Youngling). No ligament cracks on the original EDG block extended onto the cylinder liner landing, but one crack adjacent to the three inch deep stud-to-stud crack between cylinders no. 4 and 5 extended to a depth of 2½

inches on the stud hole side of the ligament. Tr. 25,538 (Johnson); LILCO Ex. B-25.

B-39. The County would have us find that the experience with the original EDG 103 block contradicts LILCO's assertion that ligament cracks are benign, because "the crack growth demonstrated in that engine could not happen." SC PF, Cylinder Blocks, at 15-16. The "crack growth demonstrated" to which the County refers, however, is not that which LILCO has determined to be present for ligament cracks. That is, the one ligament crack that propagated to 2½ inches did not do so at the liner landing;⁷ the stud-to-stud crack and the stud-to-front surface crack are not ligament cracks. In any event, the experience with ligament cracks in the original EDG 103 block is not directly applicable to a conclusion as to the likelihood of propagation of such cracks in the EDG 101, 102 and replacement 103 blocks. The County also would have us find that LILCO's reliance on "field experience" (presumably experience with other plant EDGs) is misplaced. In fact, LILCO, in its proposed findings, does not reference any such experience. In any event, what evidence there is in the record on such experience we find too insubstantial to rely upon. *See, e.g.,* McCarthy *et al.*, ff. Tr. 24,372, at 20-22, 47; Tr. 24,685-86 (Wells); Tr. 24,708-09 (Wells).

B-40. As discussed in Section IV, the finite element stress analyses, combined with the strain gage measurements on the original EDG 103 block and using modified Goodman (Smith) diagrams, conservatively predict crack initiation in the EDG 101, 102 and replacement 103 blocks. The stress analysis, however, does not predict precisely where ligament crack propagation will arrest. LILCO and the Staff agree that stresses decrease with distance beneath the surface of the block top and become fully compressive. Tr. 24,465-66, 28,820, 24,689 (Rau); Tr. 25,845, 25,854, 25,880 (Bush); *see also* Tr. 25,853-54 (Berlinger); *but see* Tr. 26,059 (Bush). Although Dr. Bush expressed some reservation that secondary thermal stresses were not completely taken into account in the analysis, his reservation was limited to the exact point at which stresses became compressive and did not affect his conclusion that the ligament cracks move into a compressive stress field and arrest. Tr. 25,845-49 (Bush). Not entirely consistent with LILCO's assertion that ligament cracks are not likely to propagate more than 1½ inches below the block top was testimony that the stress at the first thread of the stud hole in the block (located about an inch and a half below the block top) would be in the range of three to five ksi. Tr. 25,499-500 (Rau). Thus,

⁷ Stresses are highest at the top of the block and they are highest adjacent to the stud hole. Tr. 24,689 (Rau).

in the stud hole region, the stress would still be positive at a depth of about an inch and a half. LILCO's position is that there have not been any ligament cracks that extended below the liner ledge. Tr. 25,501 (Johnson).

B-41. There are additional observations that bear on the conclusions that can be drawn from the results of stress analysis. For example, there were only three strain gage locations, all on the surface of the original block, from which stresses throughout the block were deduced from the finite element stress analysis. McCarthy *et al.*, ff. Tr. 24,372, at 15-16, 27; LILCO Exs. B-22, B-23. The Staff would normally expect the highest stresses to occur during a fast startup of the EDGs and believed that stresses are normally greater in emergency diesels because of the quick start feature, but FaAA's strain gage data and stress determinations indicate that such stresses are not higher than at steady state operation. Tr. 26,294-95 (Berlinger); Tr. 25,804 (Bush). The Staff also had reservations about the way in which FaAA had accounted for the thermal gradient occurring during a "cold" startup and for the pulsating thermal gradient resulting from firing in the cylinders. Tr. 25,843-50 (Bush); Tr. 25,874-80 (Bush). Also, it appears that there was conflicting strain gage data obtained by TDI. Testimony by TDI personnel originally filed by LILCO was withdrawn, however, so that these data could not be examined.

B-42. In summary, the available operating experience data tend to support the conclusion that ligament cracks in the EDG 101, 102 and replacement 103 blocks will not propagate on to the liner landing. It is less certain that they will not propagate below 1½ inches in the stud hole. The finite element stress analysis supports the conclusion that the ligament cracks will arrest, but where this will occur is uncertain. The County raised the possibility that a leakage path may be established to the cooling water jacket. Both LILCO and the Staff appear to conclude that ligament cracks would arrest before such leakage could occur. Neither the Staff nor the County had performed independent finite element stress analyses or fracture mechanics analyses of crack progression. Tr. 25,844 (Bush); Tr. 25,619 (Anderson); Tr. 25,631-40 (Christensen, Bridenbaugh, Hubbard, Eley, Anderson); Tr. 26,377-78 (Eley, Bridenbaugh); Tr. 25,630-31 (Stipulation re Christensen, Eley).

B-43. In the absence of dispositive hard facts, we must consider what facts there are and the credibility of the analyses and expert opinion before us. We are favorably impressed with the technical competence of LILCO's consultant, FaAA, and are generally inclined to accept its technical conclusions. We cannot ignore the expert opinions of the

Staff's technical experts (particularly Dr. Bush), but must also acknowledge that those opinions were largely reservations with respect to FaAA's analyses and conclusions stemming from a lack of an independent analysis and a lack of complete knowledge as to how FaAA's analyses were done. Neither can we totally ignore the questions raised by the County, although many of these were speculative and raised by non-experts who also had performed no independent analysis.

B-44. Based on the above, we conclude that it is not likely that coolant leakage paths would result from ligament cracks in the blocks of EDGs 101, 102 and replacement 103. We cannot rule it out completely, however, and therefore must consider the consequences of such a circumstance.

B-45. Both LILCO and the Staff agreed that a ligament crack could lead to seepage of water from the coolant jacket to the stud hole if it propagated at least 2½ inches deep on the liner side and traversed to the stud hole. Tr. 26,055-56 (Henriksen); Tr. 24,459 (Wells). See Staff Ex. D-9. No party provided any definitive analysis of how much leakage could be expected. It is obvious that this would depend on the number of cracks and their width and extension. The County asserts that coolant could leak rapidly because the coolant water is under pressure. Christensen and Eley, ff. Tr. 25,564, at 153. The normal pressure is 25 pounds per square inch (psi). Tr. 25,490 (Johnson). LILCO and the Staff agree that any coolant water leakage would be minor and would not cause an operational problem. Tr. 24,459, 25,210-11, 25,231-32 (Wells); Tr. 25,238 (McCarthy); Tr. 25,232 (Youngling); Tr. 26,055, 26,187 (Henriksen), Staff Exs. 9 and 10. If coolant leakage did occur, a loss of 20 gallons would cause a low level water alarm. Tr. 25,232 (Youngling). Virtually unlimited makeup coolant water could be added to an engine during operation through a 1.5 inch water pipe capable of delivering 70 gallons per minute (gpm) from storage tanks having capacities of 100,000 and 600,000 gallons. Tr. 25,272 (McCarthy); Tr. 25,492 (Youngling); Tr. 26,188 (Henriksen). Even at 70 gpm (which is far greater than seepage) the tank storage would last for a week and could easily be augmented. Thus, we conclude that for any credible leak, even though unlikely, the cooling water system would not be depleted and that continued EDG operation would not be affected. Tr. 26,189 (Henriksen).

B-46. We conclude that there is reasonable assurance that ligament cracks will not initiate and propagate sufficiently to impair the performance of the EDGs.

F. Stud-to-Stud Cracks

B-47. Although no stud-to-stud cracks have been observed on the EDG 101 and 102 blocks, the initiation and propagation of such cracks must be considered for at least two reasons. Such cracks did occur in the original EDG 103 block (although its material properties were admittedly markedly inferior) and at least the possibility of such cracks is predicted by use of finite element stress analysis and Goodman diagrams for low cycle and high frequency fatigue at load levels of 3150 kW and above and possibly below. LILCO Exs. B-49 and B-50. Tr. 24,705 (Rau); Tr. 24,707-08 (McCarthy). LILCO, therefore, assumed the presence of such cracks in the EDG 101 and 102 blocks and did an analysis to determine the effect on the performance of the EDGs during a LOOP/LOCA.

B-48. Since the Goodman diagrams do not predict the rates of crack propagation, FaAA performed a cumulative fatigue damage analysis to bound the rate of crack propagation in the EDG 101 and 102 blocks. McCarthy *et al.*, ff. Tr. 24,372, at 48. The starting point of the analysis is a calculation, based on FaAA's strain gage measurements, of the different stress ranges imposed on the original EDG 103 block by the various power levels of the engine during the qualification testing between March 11 and April 14, 1984. Tr. 24,694 (Rau). The analysis relates that operating profile to the cumulative damage (crack growth) actually experienced during that testing. *Id.* The block experienced a maximum crack extension of one and one-half inches, with the deepest stud-to-stud crack extending to a maximum depth of three inches on the exhaust side between cylinders no. 4 and 5). McCarthy *et al.*, ff. Tr. 24,372, at 53. The reason that this crack was considered in the cumulative damage analysis, rather than the 4.4 inch stud-to-end crack at cylinder no. 1, was because there was even more margin (for the 4.4 inch crack) between the required LOOP/LOCA cumulative damage and that which had been demonstrated by the performance of the original 103 block during the test period, due to the different stresses present. Tr. 24,811-13 (Rau). The analysis then calculates the cumulative damage predicted to result from a LOOP/LOCA load profile. Tr. 24,694-95 (Rau); McCarthy *et al.*, ff. Tr. 24,372, at 49-52. These calculations take into account the crack growth rate dependence on the material properties. Tr. 24,693 (Rau).

B-49. FaAA's calculations showed that the cumulative damage to which the original EDG 103 block would have been exposed during a postulated LOOP/LOCA event would have been about two-thirds of the cumulative damage actually sustained during the qualification testing. McCarthy *et al.*, ff. Tr. 24,372, at 52-53. Its cumulative damage analysis of the EDG 101 and 102 blocks indicated that the cumulative damage

predicted for these blocks during a postulated LOOP/LOCA load profile⁸ is less than two percent of the damage sustained by the original EDG 103 block during the qualification testing. *Id.* at 53-54. From this result, FaAA inferred that the EDG 101 and 102 blocks can withstand 50 consecutive “3900/3500 kW” LOOP/LOCAs before accumulating the same amount of fatigue crack growth experienced by the original EDG 103 block that did not affect its operation during the test period. Tr. 25,313-14. Further, FaAA found that the crack propagation rate is 3.5 times slower at 3300 kW than it is at 3900 kW and a crack would require 20 percent more time at 3300 kW than at 3500 kW to propagate an equal amount. Tr. 28,904-05 (Rau).

B-50. Suffolk County finds the FaAA cumulative damage analysis to be unreliable. LILCO finds the analysis to be conservative. We proceed to examine their bases.

B-51. The County would have us find that the evidence does not establish that the physical properties of the blocks in EDGs 101 and 102 are superior to EDG 103. SC PF, Cylinder Blocks, at 30. In Section III we have already concluded that this is not the case. The superiority is dramatically portrayed in LILCO Ex. B-40, which lists the differences in ultimate tensile strength; Ex. B-42, which portrays the differences in cyclic strain amplitude; Ex. B-44, which portrays the differences in fatigue crack growth rate; and in the differences in microstructure illustrated in Exs. B-33, B-34, B-35, B-36, B-37 and B-38, not to mention the differences in crack frequency and character actually observed for similar operating experience. LILCO Exs. B-16, B-17, B-18. *See also* Tr. 29,079 (Bush).

B-52. The County would have us find that the evidence is insufficient to establish that the load excursion (during qualification testing of the original EDG 103) caused additional damage to the EDG 103 block, or that that damage would not have been disabling. SC PF, Cylinder Blocks, at 35. As support, the County implies that the FaAA analysis incorrectly assumes rapid crack growth rate during the excursion. Although he couldn’t quantify it, Dr. Bush was convinced that the load excursion was a major contributor to such crack growth. Tr. 29,039-40 (Bush). In fact, the analysis attributes all crack growth during the qualification test period to fatigue and does not take credit for any rapid crack propagation that might have occurred during the unusual load excursion. Tr. 29,076-78 (Bush). *See also* McCarthy *et al.*, ff. Tr. 24,372, at 19-20, 57-58; Tr. 25,324-25, 28,831-33, 28,896-99 (Rau).

⁸ The load profile assumed was 0.2 hour at 3881 kW, 0.8 hour at 3409 kW and 167 hours at 2617 kW.

B-53. The County challenges the LILCO position that the original EDG 103 was likely to continue to function with the three-inch stud-to-stud crack. SC PF, Cylinder Blocks, at 36. We agree with the County that we do not have an evidentiary basis for predicting how long the engine would have continued to function under this circumstance. We find it irrelevant, however, because the evidence is strong that the EDG 101, 102 and replacement 103 blocks will not encounter this situation. We also note that during the 30 to 45 minute test operation of the original EDG 103 at 3830 kW, a strain gage placed to detect changes in the stud-to-stud crack opening, before the load excursion, indicated no increase, implying no increase in the depth of the crack. McCarthy *et al.*, ff. Tr. 24,372, at 19; Tr. 24,626 (Wells, Youngling); Tr. 24,515 (Youngling).

B-54. The County does not address the nine specific conservatisms that LILCO lists in its proposed findings; it simply states that it does not agree that all of them are valid bases for describing the analyses as conservative for reasons discussed elsewhere. SC PF, Cylinder Blocks, at 39.

B-55. The County asserts that the Staff witness (Dr. Bush) appears to have no confidence in the analysis because he testified that he would stop engine operation if any stud-to-stud crack existed in EDGs 101 or 102. This seriously distorts Dr. Bush's complete position on the analysis (although we agree that should stud-to-stud cracks occur in EDG 101, 102 or replacement 103 blocks, operation should not continue without thorough reassessment). Although Dr. Bush would have performed the analysis differently, he agreed that FaAA's methodology was conservative. Tr. 26,228, 26,313, 29,077-78, 29,094-95 (Bush).

B-56. The County attacks the validity of the analysis because LILCO asserts that the analysis purports to analyze the worst crack extension in the original EDG 103 during the qualification testing, but it ignores the 4½ inch crack running down the block front at cylinder no. 1. SC PF, Cylinder Blocks, at 40. In fact, FaAA did consider the stud-to-end crack from cylinder no. 1 and demonstrated by cumulative damage analysis that propagation of this crack during a postulated LOOP/LOCA would be less than that for a stud-to-stud crack. Tr. 24,808, 24,811-13 (Johnson, Rau).

B-57. The County asserts that crack dynamics are affected by the sequence of loads as well as load duration and the analysis fails to account for that fact. SC PF, Cylinder Blocks, at 41. It is correct that the analysis model did not take into account the relative sequence of the different power levels. The uncontroverted testimony, however, is that unless there are enormous differences in the magnitude of the stresses (such as on an airplane wing bouncing up and down in wind gusts) there would

be no significant difference (in the results of the analysis resulting from a difference in the order of the sequence of loads). Tr. 24,818 (Rau).

B-58. The County asserts, "most importantly," that FaAA lacked significant information about the behavior of the original EDG 103 that is vital to valid predictions of behavior of the other blocks. SC PF, Cylinder Blocks, at 41. The County then lists a series of questions it asked in its prefiled testimony. Anderson and Bridenbaugh, ff. Tr. 25,564, at 169-70. It claims that FaAA failed to provide any satisfactory answer to the concerns raised by the County. SC PF, Cylinder Blocks, at 41. The questions the County asked relate to when cracks initiated in each of the three blocks and, of course, cannot be answered *post facto*.

B-59. The County's "greatest concern" is "that no one knows when the cracks started and how fast they grew." *Id.* at 43. The County therefore concludes that no one can reliably predict how they will behave in the future. The whole point of the cumulative damage benchmark analysis was to relate the observed damage between two known times to the known load profile and resulting stress history. *See* discussion below. The analysis was a non-linear one. The County's overly simplistic exercise of adding up total depth of cracks serves to emphasize that SC's witnesses performed no independent cumulative damage analysis on the blocks and have no experience in performing such analyses. Tr. 25,637-39 (Anderson); Tr. 25,639-42 (Bridenbaugh, Christensen, Eley, Hubbard). SC's principal witness on cumulative damage did not review FaAA's cumulative damage calculations. Tr. 25,637-38 (Anderson). By not limiting its analysis and not taking credit for variations in crack growth rates at various points in time due to load sequencing, FaAA actually increased conservatism in its cumulative damage analysis. McCarthy *et al.*, ff. Tr. 24,372, at 57-58; Tr. 25,324-25, 28,831-33, 28,897-99 (Rau).

B-60. The cumulative damage model was not based on inadequate crack propagation data. FaAA used accurate data obtained by direct testing on the original EDG 103 block and on Class 40 gray cast iron with a normal thick-section microstructure like that present in the EDG 101 and 102 blocks. Tr. 28,828-30 (Rau, Wachob); Tr. 29,071-73, 29,118 (Bush); *see* LILCO Ex. B-44. FaAA did not rely upon imprecise crack measurements. The deepest crack at the beginning of the benchmark period was measured by eddy current to be between 1.4 and 1.6 inches. Tr. 28,823 (Johnson). The deepest crack after the load excursion was accurately determined to be 2.8 to 3 inches by destructive sectioning and four independent NDE techniques. Tr. 28,825-27 (Rau); McCarthy *et al.* (Supp.), ff. Tr. 24,372, at 10. In any event, assuming a final crack

size of three inches, whether it started at 1.6, 1.4 or 1.0 inches, the conclusions won't change and the numbers will not change significantly. Tr. 25,316 (Rau).

B-61. It is not necessary to identify when ligament or stud-to-stud cracks initiated, because the cumulative damage analysis (for prediction of crack growth) does not take credit for the time required for crack initiation. Rather, the analysis begins with the conservative assumption that ligament and stud-to-stud cracks having a depth of 1.5 inches are already present. Tr. 28,894-98, 28,908-10 (Rau); Tr. 29,074-77 (Bush).

B-62. The County asserts that FaAA should have performed a fracture mechanics analysis to predict growth of the ligament and stud-to-stud cracks. Anderson *et al.*, ff. Tr. 25,564, at 170. In fact, FaAA's cumulative damage analysis is a fracture mechanics analysis that conservatively bounds the rate of crack growth. Since this analysis has demonstrated a significant margin, 50 consecutive 3900/3500 LOOP/LOCAs, it is not necessary to perform a more detailed fracture mechanics analysis, merely to verify that the blocks will perform their intended function. Tr. 24,803 (Rau). Moreover, FaAA directly measured the fatigue crack propagation rates in both conventional Class 40 gray cast iron which contains the same microstructure as EDG blocks 101 and 102, and in the material cut from the original EDG 103 block. Tr. 28,828-30 (Rau, Wachob).

B-63. The EDG 101 and 102 blocks have operated at or above 3500 kW for more than 400 hours (more than 5×10^6 loading cycles) without developing stud-to-stud cracks. This operation, combined with the superior fracture and fatigue properties of these blocks compared to the original EDG 103 block, tends to support the conclusion that stud-to-stud cracks are unlikely to initiate in the EDG 101 and 102 blocks. McCarthy *et al.*, ff. Tr. 24,372, at 60, 74; Johnson *et al.*, ff. Tr. 28,799, at 12; Tr. 28,810-11, 28,884-88, 28,853-54 (Rau); Tr. 29,052-53 (Bush); LILCO Exs. B-13, B-14, B-42; *see also* Tr. 29,129 (Bush).

B-64. Following any operation of EDGs 101 or 102 at loads greater than 1800 kW, the block tops will be inspected visually and by eddy current to detect any stud-to-stud cracks, Attachment 1, Block Top Inspections, below; Staff Ex. 14, at 25;⁹ Tr. 29,098 (Bush); Tr. 25,897-98 (Berlinger). If a crack is detected the engine will be removed from service and the crack evaluated. If the crack is not more than 1.5 inches deep, LILCO believes that the EDG remains acceptable for emergency

⁹ Staff Ex. 14 is the marked up version of Dr. Bush's testimony, which was initially bound into the record following Tr. 28,503. *See* Tr. 29,020.

standby service, because the cumulative damage analysis has demonstrated a margin of at least 50 consecutive LOOP/LOCAs even assuming the existence of a 1.5 inch deep crack. McCarthy *et al.*, ff. Tr. 24,372, at 71. The Staff acknowledges that FaAA's cumulative damage analysis provides a conservative bound on crack growth rates, but nevertheless Staff believes that if a stud-to-stud crack initiates, further analysis should be conducted before the EDG is returned to service. In its view, continued operation without repair of such a crack in normal-quality cast iron would not be justified. The presence of such a crack would indicate that the current analytic techniques do not accurately model crack initiation and growth. Bush and Henriksen, ff. Tr. 25,775, at 29a-30; Tr. 29,076-78. The Board agrees with the Staff and orders that any license authorizing operation of the TDI EDGs 101 and 102 be conditioned to require the additional analysis upon discovery of a stud-to-stud crack, prior to continued operation.

B-65. The County contends that a deep stud-to-stud crack could cause loosening of the cylinder head studs, causing loss of power and overloading of the remaining cylinders, causing engine failure. Bridenbaugh *et al.*, ff. Tr. 25,564, at 165. LILCO asserts that a stud-to-stud crack would not be disabling to the EDG even if it propagated more deeply than LILCO predicts. The worst consequence LILCO could envision from a stud-to-stud crack would be loosening of one cylinder head stud, which would not be a problem because there are seven other studs to hold the cylinder head down. Tr. 25,234-37 (Wells). The County was also concerned about coolant leakage. According to LILCO, a stud-to-stud crack cannot realistically get to the water coolant area. Tr. 25,236 (Wells); 25,238 (McCarthy). Such a crack would have to be six or seven inches deep to sever the structural material. Tr. 25,234 (Wells). In that case, there would be some loss in the ability of the block top to withstand the bending moment caused by the support of the cylinder heads on the block top. Two mitigating factors limit the consequences of such a crack: the presence of cylinder compartment webs and the strength of the heads themselves. Tr. 25,235-37 (Wells).

B-66. The County thinks it is pertinent that LILCO had not undertaken an analysis of the effects of extensive stud-to-stud cracking. SC PF, Cylinder Blocks, at 50. We find, however, that based on the expert testimony of both LILCO and the Staff such an analysis is not necessary. Extensive stud-to-stud cracking is very unlikely. Tr. 25,234-37 (Wells); Tr. 26,189-90 (Henriksen, Bush, Berlinger). We also note that LILCO will perform eddy current testing between adjacent cylinder heads after any operation of EDG 101 or 102 at greater than 1800 kW. *See* Attachment I, Section I, below.

B-67. We conclude that there is reasonable assurance that stud-to-stud cracks will not initiate and propagate sufficiently to impair the performance of the EDGs.

G. Circumferential Cracks

B-68. The County would have us find that the possibility of circumferential cracks renders EDGs 101 and 102 unfit for nuclear service. SC PF, Cylinder Blocks, at 52. LILCO would have us find that circumferential cracks are not present and will not impair EDG operation if they initiate. LILCO PF, Cylinder Blocks, at 20. Such cracks, at the juncture of the cylinder counterbore and the cylinder liner landing (*see* Figure 1), were found in the original EDG 103 block sometime after August 14, 1984. Rau and Wachob (Supp.), ff. Tr. 24,372, at 11. According to LILCO, the cracks were "very shallow," extending a maximum of 3/8 inch into the block top. *Id.* A magnetic particle examination report, dated September 19, 1984, indicated that linear indications extended entirely around the circumference of all eight cylinders of EDG 103. Hubbard and Anderson (Supp.), ff. Tr. 25,565, at 11; SC Ex. S-10.

B-69. All three of the EDGs had been inspected for circumferential cracks using liquid penetrant in February and March 1984. Tr. 24,866-67 (Schuster). A liquid penetrant inspection of EDG 103 was repeated in April 1984. *Id.* There were no reported indications of cracks prior to the sectioning of EDG 103. Tr. 24,444 (Johnson). It is difficult to inspect for these cracks (using penetrant), because the cracks, if present, form in the corner between the cylinder liner counterbore and the cylinder liner landing. It is hard to clean this area entirely for testing, making interpretation of the results more difficult. McCarthy *et al.* (Supp.), ff. Tr. 24,372, at 12.

B-70. Liquid penetrant and ultrasonic inspections performed on the EDG 101 and 102 blocks indicate that these blocks have no circumferential cracks. Tr. 28,815-16, 28,870-72 (Schuster); Tr. 28,816-17 (Johnson); Tr. 28,813 (Rau); Tr. 24,447-50 (Schuster); Tr. 26,692-93, 26,871-72 (Rau). Although liquid penetrant inspections on the 101 block revealed some background indications, these indications occurred as a result of liquid penetrant collecting in a carbon deposit that had not been completely removed. Tr. 24,444-50 (Schuster, Wells); Tr. 28,815 (Schuster). Ultrasonic inspections are highly reliable for circumferential crack detection because they are not affected by deposits collecting in the corner or on the cylinder liner counterbore. Tr. 24,449-50 (Schuster); Tr. 26,692-93, 26,871-72 (Rau); Tr. 28,816 (Johnson); Tr. 28,872-73 (Schuster).

B-71. The Staff originally testified that it had no confidence that the EDG 101 and 102 blocks did not have circumferential cracks. Bush and Henriksen, ff. Tr. 25,775, at 709; Tr. 26,020, 26,155 (Bush). Dr. Bush originally misunderstood the procedure used by LILCO in its ultrasonic testing. Tr. 26,874-75 (Bush). He later agreed that the UT procedure used by LILCO was technically feasible for detecting circumferential cracks. *Id.*

B-72. SC does not believe LILCO's non-destructive examinations of EDG 101 and 102 blocks, for circumferential cracks should be considered reliable, and therefore the Board should conclude that EDGs 101 and 102 should be assumed to have circumferential cracks. SC PF, at 53-54. Regardless of any difficulty with dye penetrant testing, the results of the most recent penetrant testing (after careful cleaning) and of the reliable ultrasonic testing indicate that no circumferential cracks are present in the EDG 101 and 102 blocks. SC offers no evidence to the contrary.

B-73. Even if circumferential cracks were to develop in the EDG 101 and 102 blocks, they would not affect the suitability of these EDGs for nuclear standby service. Tr. 28,813 (Rau); Tr. 26,020 (Bush, Berlinger); Tr. 26,023 (Bush); Staff Ex. 14, at 25-26. FaAA conservatively assumed the presence of circumferential cracks 360° around each cylinder, and analyzed these cracks using the results of its finite element stress analysis. These analyses indicated that such circumferential cracks would slow in propagation rate, arrest, and therefore not impair EDG operation. McCarthy *et al.* (Supp.), ff. Tr. 24,372, at 12-14; Tr. 28,812-13 (Rau). Specifically, the analyses show that if a crack initiated, it would propagate from the corner at an angle of 45° and would arrest within 0.4 inch when the stresses become fully compressive. Tr. 25,100, 25,343-45, 28,819 (Rau); McCarthy *et al.* (Supp.), ff. Tr. 24,372, at 13. This conclusion is strongly supported by the experience with the inferior EDG 103 block, which operated more than 1200 hours, including more than 400 hours at or above 3500 kW, wherein the circumferential cracks did not propagate to a depth beyond 3/8 inch and did not impair engine operation. McCarthy *et al.* (Supp.), ff. Tr. 24,372, at 13.

B-74. Although Dr. Bush testified that he would not be surprised if circumferential cracks initiated in the EDGs, he concluded, based on his engineering judgment, that the stresses decrease rapidly with distance into the block top and move into a compressive stress field. Tr. 26,021, 26,149-52, 26,225, 26,279 (Bush). He also concluded that this compressive stress field is strong enough so that circumferential cracks, if they initiate, will not propagate to the point that they impair engine operation. Bush *et al.*, ff. Tr. 25,775, at 8; Tr. 26,019-21 (Bush).

B-75. SC witness Anderson testified that he observed multiple, small, disconnected cracks branching out below the tip of the 3/8 inch circumferential crack on the original 103 block, and that he did not see extensive amounts of Widmanstaetten graphite in the sample he examined from the original EDG 103 block. Anderson *et al.*, ff. Tr. 25,565, at 11-12. Neither Dr. Rau nor Dr. Wachob, LILCO consultants from FaAA, observed any branching cracks. Tr. 25,096 (Rau, Wachob). Dr. Anderson's observations may have been unreliable because they were made on a rough cut surface that had not been metallographically polished. See Tr. 26,354 (Anderson); Tr. 25,097-98 (Rau, Wachob); Tr. 26,666 (Rau). Complete, accurate and detailed examination of gray cast iron requires careful metallographic polishing because flakes of graphite are broken out of the iron when it is cut, leaving artifacts which appear as shallow holes or trenches in the surface of the iron. Tr. 26,663-64 (Anderson); Tr. 26,666-68 (Rau). These artifacts make it impossible to draw reliable conclusions about the presence or size of cracks or the amount of Widmanstaetten graphite present. Tr. 25,097-98, 25,138-40, 26,666 (Rau). Liquid penetrant, magnetic particle and eddy current testing of the sample examined by Dr. Anderson established that there were no cracks deeper than 3/8 inch. Tr. 25,139-40, 26,667 (Rau). Because Dr. Anderson's only basis for concluding the circumferential crack in the original EDG 103 block was propagating was his unreliable visual observation of branching cracks, Tr. 26,409 (Anderson), there is no sound basis for his conclusion that circumferential cracks propagate.

B-76. SC's witnesses also testified that the development of a large circumferential crack could permit some up and down movement of the cylinder liner against the gasket that seals the liner to the cylinder head. They postulated that this could cause leakage of combustion gases into the jacket water, and that crack propagation through the liner landing would cause the cylinder liner to fall into the crankcase. Anderson *et al.*, ff. Tr. 25,565, at 13; Anderson *et al.*, ff. Tr. 26,326, at 3. This testimony, based on Dr. Anderson's incorrect and unsupported conclusion that circumferential cracks propagate, is not probative.

B-77. Even if crack propagation beyond 3/8 inch were assumed to occur, SC's claim that combustion gases could escape into the cooling water system is far-fetched. Tr. 26,216-17 (Henriksen). SC witnesses have performed no calculations or analyses of stresses in the block top to support their claim. Tr. 26,355, 26,370-71, 26,373-75 (Eley, Anderson). Since at least one-third of the circumference of the liners is supported by eight gusset-reinforced stud bosses, Tr. 25,100, 25,246-47 (Wells); see also LILCO Ex. B-9 and Staff Ex. 9, a circumferential crack

would have to propagate vertically four to five inches to cause appreciable motion between the cylinder liner and the block. The chances of this occurring are remote. It contradicts both the physical observations and FaAA's finite element analyses, which demonstrate cracks propagate at about a 45° angle, move into a compressive stress field, and arrest. Tr. 25,095-96, 25,100-01, 25,246-47 (Wells); Tr. 28,812-13, 28,819 (Rau); LILCO Ex. B-64.

B-78. Even if combustion gases did leak, they would not necessarily enter the water jacket because there is virtually no driving force to push the gases into the cooling system. Tr. 26,217-19 (Henriksen). Moreover, if combustion gases did enter the cooling system, they would cause no operational problem because the gases would be released into the expansion tank. Tr. 26,218-19 (Henriksen).

B-79. SC's claim that the cylinder liner landing could separate from the block, causing the cylinder liner to fall into the crankcase, is improbable because, as noted previously, a crack would have to propagate vertically four to five inches through the gusset-reinforced stud bosses to cause the liner landing to separate from the block. If a circumferential crack propagated at a 45° angle from the liner landing through all the ligament material to the stud hole, it would still not affect the ability of the block material to support the cylinder liner. Tr. 25,100-02, 25,104-06 (Wells, Rau); see LILCO Ex. B-9.

B-80. The evidence supports the conclusion that the EDGs are qualified for nuclear service, even if circumferential cracks should initiate. McCarthy *et al.* (Supp.), ff. Tr. 24,372, at 12-14; Tr. 28,812-13, 28,818-19 (Rau); Bush and Henriksen, ff. Tr. 25,775, at 7; Bush, Staff Ex. 14, at 25-26; Tr. 26,020, 26,023 (Bush); Tr. 26,020 (Berlinger). LILCO and the Staff have agreed that a scheduled program of monitoring the blocks for circumferential cracks is not required but that LILCO will inspect the block and liner landing area for circumferential cracks in the event a cylinder liner is removed. Bush, Staff Ex. 14, at 26; see Attachment 1. We agree that this is reasonable and adequate.

B-81. We conclude that there is reasonable assurance that the circumferential cracks will not initiate and propagate sufficiently to impair the performance of the EDGs.

H. EDG 103 Replacement Block

B-82. The County would have us find that the evidence is not sufficient to establish that the EDG 103 replacement block is reliable. SC PF, Cylinder Blocks, at 61. LILCO believes the block is capable of performing its intended function. LILCO PF, Cylinder Blocks, at 26. The

County and the State “do not challenge the adequacy of the replacement block for EDG 103, if loads do not exceed 3230 kilowatts, which assumes a maximum instrument error of plus or minus 70 kilowatts.” Tr. 28,800 (Dyner).

B-83. In spite of this statement of lack of challenge, the County proceeds to challenge, regardless of power level, the adequacy of testing of the replacement EDG 103 block. The County accepts that the design changes in the replacement block enhance its strength over EDGs 101 and 102. It complains, however, that LILCO has provided no quantitative analysis upon which it can measure that enhancement. SC PF, at 2. We need no such quantitative analysis, however, since we find both that the EDG 101 and 102 blocks are acceptable and that the EDG 103 replacement block is superior; SC has provided no analysis or other basis for concluding otherwise.

B-84. SC’s stipulation that the replacement block is adequate at 3230 kW is, for all intents and purposes, a recognition that the replacement block is acceptable for nuclear service at the qualified load of 3300 kW. LILCO Exhibit B-30, which plots the principal stresses vs. load recorded by strain gages no. 11-13, demonstrates that the difference in stresses in the block between 3230 kW and 3300 kW is almost imperceptible. See LILCO Ex. B-30. Given that the difference in stresses between 3230 kW and 3300 kW is insignificant even if a 70 kW meter error is assumed and, further, given the evidence that the meter actually provides a reliable mean load, and SC’s stipulation, we conclude that the replacement block is adequate for nuclear service at the 3300 kW qualified load.

B-85. Apart from SC’s stipulation, the evidence demonstrates the replacement block is a proven design that has been adequately tested. FaAA’s review of the replacement block shows that this block is a current production model, not a new design as alleged by SC. The product enhancements incorporated in the replacement block — lengthening the stud bosses, thickening the block top, and increasing the clearance gap — are relatively minor, yet they reduce the stresses in the block top and make the block more resistant to fatigue crack initiation. Johnson *et al.*, ff. Tr. 28,799, at 8; see McCarthy *et al.*, ff. Tr. 24,372, at 68-71. In addition, the use of Class 45 gray cast iron in the replacement block further reduces the possibility of fatigue cracking. McCarthy *et al.*, ff. Tr. 24,372, at 69-70.¹⁰

¹⁰ Tensile tests on the B-bar for the replacement block demonstrated that the cast iron actually meets or exceeds the requirements for Class 50 material. Tr. 24,764-65 (Wachob); Tr. 24,766 (Rau); see also Tr. 24,874-75 (Wells).

B-86. The improved fatigue resistance provided by the product enhancements incorporated in the replacement block has been tested and proven in the TDI R-5 test engine. The R-5 test engine has been operated for more than 5000 hours at loads exceeding the full rated load (3500 kW) of the Shoreham engines. McCarthy *et al.*, ff. Tr. 24,372, at 70-71; Johnson *et al.*, ff. Tr. 28,799, at 8; Tr. 24,879-84 (Wells). Inspections after this operation revealed only one ligament crack, and this crack occurred in a cylinder where an improper cylinder liner had been installed. Tr. 24,885 (Wells); Tr. 25,373-81 (Wachob).

B-87. The adequacy of the design enhancements incorporated into the replacement block has also been demonstrated by operation of the EDG 103 replacement block at Shoreham for more than 849 hours. The block has been operated for more than 577 hours at or above 3300 kW, including more than 70 hours at or above 3500 kW, without developing ligament or stud-to-stud cracks. Johnson *et al.*, ff. Tr. 28,799, at 5-6. This operation confirms that the design enhancements have reduced the possibility of fatigue crack initiation. It is also a direct demonstration that the replacement block has been adequately tested. *Id.* at 8-9.

B-88. FaAA's cumulative damage analysis also demonstrates that the replacement block is capable of performing its intended function. FaAA's conservative analysis of the EDG 101 and 102 blocks at the 3900/3500 kW LOOP/LOCA loads has demonstrated that these blocks, which have known ligament cracks, can withstand 50 consecutive 3900/3500 LOOP/LOCAs. Since the replacement block has superior mechanical properties and has not developed ligament cracks after operating at an approximately equivalent number of hours as the EDG 101 and 102 blocks, it has demonstrated even greater margin against fatigue cracking. *Id.*; McCarthy *et al.*, ff. Tr. 24,372, at 70-71. Thus, the replacement block will perform its intended function at 3300 kW, as well as at loads up to its overload rating (3900 kW) for brief periods of time. Johnson *et al.*, ff. Tr. 28,799, at 11-12; McCarthy *et al.*, ff. Tr. 24,372, at 75; Bush, Staff Ex. 14, at 24-25.

B-89. We conclude that the replacement block for EDG 103 is a proven design, that it has been adequately tested and is acceptable.

I. TDI EDG Block Top Inspections¹¹

B-90. LILCO's commitments and Staff concurrence and recommendations contemplate inspection criteria that would be effective over many fuel cycles. We are approving Shoreham operation for only one

¹¹ See Attachment 1, p. 1679, which describes the agreement reached by LILCO and the NRC Staff.

fuel cycle, but nevertheless agree that certain inspections are required. The presence of ligament cracks between the cylinder counterbore and the stud holes increases the stresses present in the block top between the stud holes (thereby increasing the possibility of stud-to-stud cracking). McCarthy *et al.*, ff. Tr. 24,372, at 59. Since EDGs 101 and 102 already have ligament cracks, close surveillance is necessary. Since EDG 103 has now had extensive operating experience at the qualified load or higher, and no ligament cracks are present, eddy current testing between adjacent cylinder heads of the EDG 103 block is not required during the first fuel cycle. At the first refueling outage, we are requiring the same block top inspection of EDG 103, including removal of two cylinder heads, as for EDGs 101 and 102, to provide further assurance that any ligament cracks will be detected and evaluated.

B-91. We summarize our conclusions on the minimum block top inspections required as follows:

A. During the first fuel cycle:

1. EDGs 101, 102 and 103

a. During any period of continuous operation following automatic diesel generator initiation, LILCO will perform daily visual inspections of the area between adjacent cylinder heads and the general block top. LILCO will also perform visual inspections of the same areas under intense light during the monthly surveillance testing.

b. LILCO will perform a liquid penetrant and, as appropriate, UT inspection of the cylinder liner landing at any time a cylinder liner is removed for any other reason.

2. EDGs 101 and 102

LILCO will perform eddy current testing between adjacent cylinder heads after any operation of EDG 101 or 102 at greater than 1800 kW.

B. Following any LOOP event during the first fuel cycle, and during the first refueling outage, LILCO will inspect the top surface of the block exposed by the removal of two appropriate cylinder heads from each of the three EDG engines. Inspections will be by liquid penetrant, with eddy current for any identified cracks, to determine the presence of new cracks and the depth of any new or old cracks.

C. Following the first fuel cycle, the Staff should reevaluate the TDI EDG block top inspection requirements.

ATTACHMENT 1

BLOCK TOP INSPECTIONS

I. LILCO Commitments

1. During any period of continuous operation following automatic diesel generator initiation, LILCO will perform daily visual inspections of the area between adjacent cylinder heads and the general block top. LILCO will also perform visual inspections of the same areas under intense light during the monthly surveillance testing.

2. LILCO will inspect the top surface of the block exposed by removal of two cylinder heads each from the EDG 101 and 102 engines at each of the first four consecutive refueling outages. Inspection will be by liquid penetrant with eddy current as appropriate. Based on the results of these inspections, LILCO may request such inspections be terminated after the fourth outage.

3. LILCO will perform eddy current testing between adjacent cylinder heads after any operation of EDG 101 or 102 at greater than 1800 kW.

4. LILCO will perform a liquid penetrant and, as appropriate, UT inspection of the cylinder liner landing at any time a cylinder liner is removed for any other reason.

II. NRC Staff Recommendations

1. The foregoing LILCO commitments satisfy NRC Staff recommendations with respect to block top inspections. Thus, there are no NRC Staff recommendations not accepted by LILCO. In addition to the inspections set forth in paragraphs I.2 and I.3 above, the current SER also recommends that two cylinder heads be removed from EDG 103 at each of four consecutive refueling outages for purposes of inspecting the block top areas. The NRC Staff no longer considers this necessary and intends to issue a revised SER to reflect that removal of two cylinder heads each from EDG 101 and 102 at each of four consecutive refueling outages for purposes of inspecting the block top is sufficient.

2. It is also agreed by and between the NRC Staff and LILCO that at the conclusion of the fourth refueling outage, the necessity for further inspections in accordance with paragraph I.2 above, if any, will be reevaluated.

3. It is agreed by and between the NRC Staff and LILCO that because there are no ligament cracks in the EDG 103 replacement block, eddy current testing between adjacent cylinder heads of the EDG 103 block (paragraph I.3 above) is not required.

III. CRANKSHAFTS

A. Summary and Introduction

C-1. As a result of changes in circumstances since the initial litigation (in September and October 1984) of the contention challenging the adequacy of the replacement crankshafts in each of the three TDI EDGs at Shoreham, this once complex issue can now be resolved in a relatively simple and straightforward manner for the first fuel cycle. Rather than seeking approval for a design load of 3500 kW, LILCO now proposes to operate the EDGs at a qualified load of only 3300 kW. Based on the 10E7 cycle (745 hour) endurance run test of the EDG 103 replacement crankshaft at and above 3300 kW, and the stipulation of the County that it does not challenge the adequacy of the crankshafts for continuous operation up to 3300 kW (Tr. 28,417-18 (Dyner) and Joint Report of Parties, dated February 8, 1985), there is no dispute that so long as LILCO operates within the limitations of the 3300 kW qualified load, there is reasonable assurance that the crankshafts will not fail so as to prevent the EDGs from performing their required safety function.

C-2. As set forth in the portion of this decision on the qualified load contention, there is reasonable assurance that the EDGs will not be operated at load levels in excess of 3300 kW in the event they are needed during plant operation due to a loss of offsite power (LOOP), even in the presence of the design basis loss of coolant accident (LOCA). As also set forth in our qualified load findings, the permissible surveillance testing (1 hour per month) load range of 3300 ± 100 kW, will not result in a load which departs by either a significant amount or for a significant time from the 3300 kW load. Moreover, even if we make the highly unrealistic assumption that the operators do not control the load, so that it is actually at 3400 kW throughout all of the tests, this would still result in only approximately 18 hours (about $0.25 \times 10E6$ cycles) of operation before the crankshaft inspection during the first refueling outage.¹² For the reasons discussed in this section, although we do not find the crankshafts acceptable for unlimited continuous operation at 3400 kW, we do find that such additional time of operation at loads between 3300 and 3400 kW that might occur during testing is not likely to lead to failure of the crankshaft in the absence of any prior damage indications.

¹² Due to the flexibility of ± 100 kW which we permit for the surveillance tests, we include EDG 103 in the first refueling outage crankshaft inspections, as set forth at the end of this section.

C-3. In the face of disagreements between LILCO's experts and those for the NRC Staff and the County about whether the crankshafts were acceptable for the originally proposed continuous diesel rating of 3500 kW, we granted LILCO's motion to reopen the record in order to permit LILCO, *inter alia*, to conduct an "endurance run" test of the EDG 103 replacement crankshaft at 10E7 cycles (740 hours). LILCO chose to conduct this test at a "qualified load" of 3300 kW, as described in our findings on the qualified load, taking credit for about 220 hours previously run at 3500 kW or higher, and an additional 525 hours run (between October 8 and November 2, 1984) at approximately 3300 kW. Dawe *et al.*, ff. Tr. 27,153, at 38-39; Pischinger *et al.*, ff. Tr. 28,416, at 5. Inspections of the crankshaft after this endurance run disclosed no indications of damage. Pischinger *et al.*, ff. Tr. 28,416, at 8. This conscious choice by LILCO to conduct the test at 3300 kW limits the qualified load to this value, regardless of any analyses by LILCO which purport to support higher values. LILCO cannot seriously expect the Board, in the face of the conflicting analyses, to be less prudent than LILCO itself and permit a higher qualified load. LILCO PF, Crankshafts (April 4, 1985), 6-7. We do not intend criticism of LILCO's selection of 3300 kW for the qualified load, since it is appropriate for LILCO to have been prudently conservative in selecting a qualified load which we find is as high as is needed for operational purposes through the first fuel cycle, rather than risk crack initiation and cumulative fatigue damage now or in the future due to extensive testing at an unnecessarily high load. We do find, however, that the other analyses provide reasonable assurance that operation for short periods of time, if necessary, up to 3400 kW, will not result in fatigue failure of the crankshafts.

C-4. The replacement crankshafts which are the subject of this decision have a 13 inch diameter main journal and a 12 inch diameter crankpin, with $\frac{3}{4}$ inch crankpin fillet radii. The original crankshafts were 13 x 11 inches, with $\frac{1}{2}$ inch crankpin fillet radii. The original EDG 102 crankshaft severed during testing on August 12, 1983, through the crankpin and rear web under cylinder no. 7. Inspections showed that the original EDG 101 crankshaft was cracked at the no. 5 and 7 crankpins, and that the original EDG 103 crankshaft was cracked at the no. 6 crankpin. McCarthy *et al.*, ff. Tr. 22,610, at 7-8; Anderson *et al.*, ff. Tr. 23,826, at 106-07. The cause of the crankshafts' failure and cracks was determined by LILCO's consultant, Failure Analysis Associates (FaAA), to be high cycle vibratory fatigue. The torsional (twisting) stresses imposed on the crankshafts during operation exceeded their fatigue endurance limit. *Id.* Contrary to TDI's erroneous certification, LILCO and its consultants

determined that the original crankshafts did not meet the LILCO procurement specification that they comply with the Diesel Engine Manufacturers Association (DEMA) standards for allowable crankshaft vibratory stress under even less conservative calculations of such stresses than are now generally performed. LILCO Ex. C-2; Tr. 22,840 (Johnston); Tr. 22,841 (Chen).

B. Adequacy of the Crankshafts for Loads Over 3300 kW Under DEMAs Standards

C-5. The parties had disputed the proper standards against which to judge the adequacy of the replacement crankshaft for loads over 3300 kW. However, all the parties, in effect, take the position that if the crankshafts do not comply with the DEMAs recommendations for torsional vibratory stress, they are not acceptable. DEMAs is a trade association of American diesel engine manufacturers. Berlinger *et al.*, ff. Tr. 23,126, at 10. Albeit in an obscure way, the DEMAs recommendations are the only ones referred to by an NRC regulatory document. NRC Staff Regulatory Guide 1.9, Revision 2 (1979) (LILCO Ex. C-3), which addresses the design of standby diesel generators, states in general that conformance with the requirement of the Institute of Electrical and Electronics Engineers (IEEE) Standard 387-1977, which addresses the same subject as the Regulatory Guide, is acceptable for meeting NRC Staff requirements. In turn, IEEE Std. 387-1977 (LILCO Ex. C-4), Section 4 "Reference Standards," lists, as item [5], the DEMAs Standard Practices as one of the standards to which diesel generators "shall conform to the applicable portions of." McCarthy *et al.*, ff. Tr. 22,610, at 11-12. Although not in evidence, the Board notes that the updated IEEE Std. 387-1984 softens the required adherence to DEMAs (and the other section 4 references) by merely listing them under the label "4. References" with no exhortation of conformance.

C-6. The DEMAs recommendations for allowable crankshaft vibratory stress (LILCO Ex. C-14, at 54-55) state:

* * *

In the case of constant speed units, such as generator sets, the [design] objective is to insure that no harmful torsional vibratory stresses occur within five percent above and below rated speed.

For crankshafts, connecting shafts, flange or coupling components, etc., made of conventional materials, torsional vibratory conditions shall generally be considered safe when they induce a superimposed stress of less than 5000 psi, created by a

single order of vibration, or a superimposed stress of less than 7000 psi, created by the summation of the major orders of vibration which might come into phase periodically.

McCarthy *et al.*, ff. Tr. 22,610, at 20. DEMA last revised its Standard Practices in 1972. Tr. 22,689 (Chen); Tr. 23,238 (Sarsten). However, LILCO's consultant, Dr. Simon K. Chen of Power & Energy International (PEI), testified that these limits were established in 1959 and the "conventional material" referenced (in the standards) would be SAE 1045 steel with an ultimate tensile strength (UTS) of 70,000 psi (Tr. 22,710-11 (Chen)), which is less than the UTS of at least 100,000 psi in the replacement crankshafts. McCarthy *et al.*, ff. Tr. 22,610, at 9. We have no basis to vary the DEMA standards, even if, *arguendo*, "conventional" material has improved in modern times. Obviously, however, stronger material is less prone to failure for the same loading.

C-7. The main dispute over how to apply DEMA standards centers on the phrase "major orders of vibration." The turning moment on the crankshaft is broken into a series of sine waves (harmonics) which vary over the complete engine cycle, called orders, which describe the shape of the torque input (vs. time) to the vibratory motion of the crankshaft. Tr. 23,496-97 (Sarsten). *See also* Tr. 23,301 and 23,304 (Sarsten). As just noted, the DEMA standards limit of 7000 psi for the summation of the major orders is about 25 years old. Modern methods of summation of the complex dynamic actions of the orders utilize the vector summation of the first 24 orders, with each order measured at one-half amplitude, i.e., one-half peak-to-peak amplitude, from the one-half order to the twelfth order (i.e., the sine wave which varies twelve times for each engine cycle of two crankshaft revolutions). This modern approach is the one generally used to assess the crankshaft stress values under other calculational methods. *E.g.*, Tr. 23,326-27, 23,498, 23,250-53, 23,283-86 (Sarsten); Tr. 22,798 (Pischinger).

C-8. LILCO's witnesses maintain that the proper approach is to use the methods in existence when the DEMA value of 7000 psi was established, which, among other differences with more modern methods, would sum only the most significant four or six orders. Tr. 22,729-30, 22,832, 23,018-19 (Chen); Tr. 22,851-53 (Johnston). Dr. Chen, using six orders, calculated that the stress was well below 7000 psi at 3500 kW for the synchronous engine speed of 450 rpm, as well as for the 5 percent underspeed (427.5 rpm) and 5 percent overspeed (472.5 rpm) values, as follows:

Engine Speed (rpm)	Nominal Stress (psi)
427.5	6232
450	5101
472.5	5673

McCarthy *et al.*, ff. Tr. 22,610, at 29-30. Dr. Chen also summed twelve orders at 3500 kW as a further conservatism, in his view, with the calculated stress result of 6020 psi at 450 rpm. LILCO Ex. C-18, at 10.

C-9. We are willing to accept the fact that Dr. Chen is knowledgeable about how compliance with DEMA standards was calculated in the past. However, the DEMA standards' use of "major orders" is vague, the standards are old, the reference to it in the 1977 IEEE Std. 387 was general and not prominent to begin with, and any exhortation of compliance with DEMA standards has been removed in the 1984 IEEE Std. 387. LILCO produced no direct interpretation from DEMA of how it should be applied today, apparently because the nature of the collegial DEMA organization provides no mechanism for giving one. Tr. 22,692-93, 22,701-04 (Chen).

C-10. In the circumstances of this uncertainty, it is reasonably prudent to accept Professor Sarsten's approach at least where, as in the case before us, use of all of the first 24 orders, as opposed to only the first six or twelve orders, would make a significant difference in the result of whether the crankshaft complies with the DEMA limit. Tr. 23,297-99 (Sarsten); *see also* 23,309-10 (Sarsten). Indeed, although emphasizing that his purpose was not to judge compliance with DEMA, FaAA's expert Dr. Paul R. Johnston thought it "prudent to follow up . . . with a more complete analysis" using a summation of the 24 orders. Tr. 22,737 (Johnston).

C-11. The Board observes, in passing, that when the DEMA standards were first issued, computer technology was not yet sufficiently developed to permit easy calculations involving more than a few orders. Tr. 23,018-19 (Chen); Tr. 23,282 (Sarsten); Tr. 22,989-90 (Pischinger). Where the results of calculations exist for 24 orders, there is no reason not to acknowledge those results.

C-12. The experts agree that shaft number 6, the portion of the crankshaft between the crankpins for cylinder numbers 5 and 6, turns out to be the most critical for torsional stress. Staff Ex. 2; LILCO Ex. C-17, at 3-15. The Staff's values for shaft 6 at 3500 kW are:

Engine Speed (rpm)	Nominal Stress (psi)
427.5	7051
450	7096
472.5	7851

Tr. 23,358-59, 23,380-81 (Sarsten). This represents close agreement with FaAA's calculation, using 24 orders, of 7006 psi at the synchronous speed of 450 rpm for 3500 kW (LILCO Ex. C-17, at 3-15; Tr. 22,735, 22,888 (Johnston)), with a similar result of 7000 psi plus or minus 3 percent between the 5 percent underspeed and overspeed values. Tr. 22,834-35 (Johnston); LILCO Ex. C-17, at 2-5. Dr. Franz F. Pischinger's preliminary calculations for 3500 kW, which he would have preferred to have more opportunity to check, resulted in 6240 psi at 5 percent underspeed, 6890 psi at rated speed of 450 rpm, and 7470 psi at 5 percent overspeed. Tr. 22,800-05 (Pischinger, Johnston). Accordingly, the 7000 psi DEMA limit is not met within the five percent below and above rated speed at a load level of 3500 kW based on any of these calculations. Moreover, we note that Professor Sarsten's values were properly adjusted to account for appropriate damping values and to agree with the measured value of free-end amplitude for the TDI EDGs. Tr. 23,307-08, 23,380, 23,442-44 (Sarsten). Professor Sarsten's method of calculation resulted in a free-end amplitude value of 0.690 degrees, which was in closer agreement with LILCO's actual measured free-end amplitude value of 0.693 than those calculated by FaAA (0.662), Dr. Pischinger (0.665) and Dr. Chen (0.59). Tr. 23,443-44 (Sarsten); Tr. 22,815-16 (Pischinger); Tr. 22,858 (Chen). This gives us confidence that it is reasonable and prudent to rely on Professor Sarsten's higher values. Tr. 23,443-44 (Sarsten).

C-13. The remaining purpose in discussing the torsional stress calculations, given our view at the outset (Finding C-3, above) that LILCO's action in selecting the 3300 kW load for its endurance test speaks louder than words as to the prudent permissible load rating for continuous operation, is to ascertain what light Professor Sarsten's conservative approach would shed on possible short term operation of the diesels at loads between 3300 and 3500 kW. Stress levels at lower loads were testified to by Professor Sarsten before the reopened hearing.¹³ No further testimony was offered by any party on compliance with DEMA standards at load levels between 3300 and 3500 kW, at the reopened hearing. Professor

¹³ The untimely death of Professor Sarsten in February 1985 prevented testimony by him at the reopened hearing.

Sarsten testified that based on preliminary calculations, the corrected value for 3300 kW at the synchronous speed of 450 rpm is 6456 psi. Tr. 23,378 (Sarsten). By interpolation (which is an appropriate method, Tr. 23,377 (Sarsten)) between this value for 3300 kW and the value noted above for 3500 kW, we can conclude on the basis of Professor Sarsten's preliminary calculations at least, that for 3400 kW the torsional stress value at the rated speed of 450 rpm would be approximately 6776 psi. However, within the range of the 5 percent overspeed of 472.5 rpm, at around 466 rpm, the 7000 psi is exceeded for even the 3300 kW load level (Tr. 23,382-83 (Sarsten), with an approximate value of 7356 psi, based on the Board's interpolation between the overspeed value of 7108 psi for 3200 kW (Tr. 23,377 (Sarsten)) and the overspeed value for 3500 kW of 7851 psi as noted above. The 5 percent overspeed stress at 3400 kW, based on the above interpolation, would be approximately 7603 psi.

C-14. The DEMA requirement for the torsional stress calculations in the speed range from 5 percent below synchronous speed to 5 percent over rated synchronous speed was not well focused on in the hearing, other than the obvious fact that the DEMA recommendation itself (as quoted in Finding C-6 above) and the IEEE Std. 387-1977 contain this requirement. LILCO Ex. C-4, at 11, § 5.6.1.2. (This requirement remains in IEEE Std. 387-1984, § 5.5.1.2.) Given this requirement, we cannot conclude that the replacement crankshafts meet the DEMA standards for operation above 3300 kW. Indeed, if in the future LILCO would seek to justify a continuous load level higher than the level of 3300 kW which was removed from controversy by stipulation, the appropriate regulators should assess what assurance exists for acceptability over the full range of 5 percent under to 5 percent over rated speed; for example, it may be that an endurance test run by itself would not be informative with respect to underspeed and overspeed conditions.

C. Other Computational Methods

C-15. We have given serious consideration to FaAA's fatigue analysis which utilized the actual experience of the failed original crankshafts as well as measured data from the original and replacement crankshafts, in a dynamic finite element calculational model of the torsional stress. See, for a summary, McCarthy *et al.*, ff. Tr. 22,610, at 32-41. In general, we were favorably impressed with the reasonableness of the approach and the bases for the inputs used to determine the maximum stress which the crankshafts will experience and the endurance limit of the replacement crankshafts. *Id.* at 32. This comparison resulted in a factor of

safety of 1.48 at 3500 kW. *Id.* at 38. Prior to the endurance run, the Staff and the County pointed out that FaAA's reliance on the evidence of the failed crankshafts provides only one limited data point, and also that FaAA relied on limited inputs which nonconservatively determined the endurance limits of the replacement crankshafts, although the County agreed the analysis had some significance. County PF (Nov. 15, 1984), at 66-72; Staff PF (Nov. 27, 1984), at 21-23; *see, e.g.*, Tr. 23,402-06, 23,528-29 (Sarsten).

C-16. Notwithstanding this criticism by those who were then advocating the 10E7 cycles endurance test, we now have the evidence of no fatigue damage after the 10E7 cycles endurance run (Pischinger *et al.*, ff. Tr. 28,416, at 8). This and the fact that the mechanism of concern is high cycle torsional vibration fatigue, which can cause initiation of cracks and subsequent failure over time, but not instantaneously, FaAA's fatigue analysis does contribute to the reasonable assurance that: (1) surveillance testing at 3300 kW \pm 100 kW would not lead to failure of the crankshafts prior to detection of cracks during refueling outage inspections; and (2) allowance of a very small number of hours of operation over 3300 kW but below 3400 kW, in addition to the required surveillance testing, without requiring an earlier inspection than that which will occur during the next refueling outage, is acceptable. For the first fuel cycle, we conservatively set a two-hour limit for cumulative operation of each TDI diesel at loads between 3300 and 3400 kW, in addition to the monthly surveillance tests. If this limit is exceeded, crankshaft inspections required during the first refueling outage must be performed as soon as the plant operating configuration permits the affected diesel to be removed from service. Operation over 3400 kW is not permitted. Any operation over 3400 kW, which is unlikely, based on LILCO's qualified load evidence, triggers the inspection requirement as soon as the affected diesel may safely be removed from service.

C-17. The Staff's metallurgical expert, Dr. Bush, believes that the almost 3 x 10E6 cycles (220 hours) that the replacement EDG 103 crankshaft has been run at loads at or above 3500 kW, followed by 7 x 10E6 cycles at or above 3300 kW (with a small amount of hours slightly below 3300 kW), without any indication of cracks, provide assurance of a probable high cycle fatigue limit at or above 3430 kW. (Dr. Bush uses this value to conservatively account for his assumed plus or minus 70 kW instrument error). Bush and Henriksen, ff. Tr. 28,503, at 4, 16-17. This may be true, but an essential element in Dr. Bush's conclusion is that any cracks caused by exceeding the lifetime torsional fatigue endurance limit of the crankshaft would initiate within 3 x 10E6 cycles, and would propagate (at least to detection, if not failure) within the following

7 x 10E6 cycles at the 3300 kW load. *Id.* We have no problem with the latter part of this proposition. Indeed, other evidence is that there would be a relatively short time (less than 168 hours of operation) from the time of initiation of a crack to failure of the crankshaft. Tr. 23,064 (McCarthy). And Dr. Bush could be correct about the first part of his assumption. However, it is not well supported in the record before us, and therefore not accepted by us.

C-18. Dr. Bush compiled a table showing examples of actual failures of various objects (some of which were aircraft and automobile engine crankshafts) made of various types of ferrite steels. *Id.* at 18. His point was that there was a relatively narrow band of cycles for the “beginning of fatigue limit” reported, many at or below 1 x 10E6 cycles, and only one reported as high as around 3 x 10E6 cycles. *Id.* at 17; Tr. 28,534-35, 28,649 (Bush). However, we agree with the County that the incomplete, almost casual method of compilation of the examples by Dr. Bush (Tr. 28,741-42 (Bush)), and the lack of basis to assure that the examples would be representative of the Shoreham replacement crankshafts (Tr. 28,650-57, 28,739-42 (Bush)), render Dr. Bush’s table inadequate for the purpose it was presented. Indeed, this testimony appears to be inconsistent with the Staff’s insistence that a test to 10E7 cycles was necessary to assure that the crankshaft had been tested past the “knee” of the S-N curve for all steels to show that there would be no significant damage due to high cycle fatigue for unlimited life of the crankshaft. *Berlinger et al.*, ff. Tr. 23,126, at 17; Tr. 23,526, 23,533-35 (Sarsten); Staff PF (November 27, 1984), at 21. If there was a strong basis for Dr. Bush’s conclusion, the Staff could have accepted the already existing 220 hours at a nominal load of 3500 kW, with perhaps a relatively small number of additional hours at the qualified load (about 2 x 10E6 cycles or 148 hours) to assure coverage of the relatively short time from initiation to propagation of any crack to at least a readily detectable level (if not failure).

C-19. In fairness to the Staff, notwithstanding our disagreement that Dr. Bush’s table can support the Staff’s subsidiary conclusion in its proposed findings that the high cycle fatigue limit for the crankshafts is at or above 3430 kW, the Staff’s ultimate conclusion in its proposed findings advocates only permission for LILCO to operate up to 3300 kW, with a plus or minus 100 kW band for the surveillance tests. Staff PF, Crankshafts (April 25, 1985), at 60-61. Both Drs. Bush and Pischinger performed cumulative damage calculations based on the endurance test of EDG 103. Without exploring the details of the calculations, Dr. Pischinger concluded that the replacement crankshafts would have unlimited life at 3505 kW. Similarly, Dr. Bush concluded that the high

cycle fatigue endurance limit would be at least 3430 kW, allowing for a 70-kW instrument error. See LILCO PF, Crankshafts (April 4, 1985), at 3-4; LILCO Reply PF (May 2, 1985), at 26-27; County PF (April 15, 1985), at 8-9; and Staff PF (April 25, 1985), at 57-58. The actual experience during the 10E7 cycles endurance run at a nominal 3300 kW and higher loads certainly provides reasonable assurance that operation between 3300 kW and 3400 kW for the number of hours required by the surveillance tests, and a small number of additional hours, would not lead to torsional fatigue failure of the crankshafts before the next refueling outage inspection for possible indication of cracks in the regions of and between the highest stressed crankpin numbers 5, 6 and 7.

D. License Conditions and Technical Specifications

C-20. License conditions and technical specifications for limitations on the load level during operation and for surveillance test runs, and for the first refueling outage inspection of the crankshaft shall be established which are consistent with the minimum requirements as found in this decision. They shall include items 1 and 2 of LILCO's commitments as set forth in Attachment 2 provided by LILCO and appended hereto (with the addition, to item 2, of EDG 103 and inclusion of the main bearing journals between crankpins 5, 6 and 7). Any necessary detailed conditions or implementing technical specifications for the appropriate conditions, along the lines of those attached to the Staff's proposed findings, shall be included in the license. The commitment that there will be a control room alarm to alert operators in the event an EDG exceeds 3300 kW during times other than the surveillance test runs shall also be a requirement of the license.

IV. QUALIFIED LOAD

A. Introduction

L-1. Intervenors Suffolk County and New York State have contended that:

Contrary to the requirements of 10 C.F.R., Part 50, Appendix A, General Design Criterion 17 — *Electric Power Systems*, the emergency diesel generators (EDGs) at Shoreham with a maximum "qualified load" of 3300 kW do not provide sufficient capacity and capability to assure that the requirements of clauses (1) and (2) of the first paragraph of GDC 17 will be met, in that:

ATTACHMENT 2

CRANKSHAFT INSPECTIONS

I. LILCO Commitments

1. At each refueling outage, LILCO will measure and record hot and cold web deflection readings on each of the diesels.

2. At the first refueling outage, LILCO will inspect the crankpin journals numbers 5, 6 and 7 and associated oil holes in these journals, using LP and ET as appropriate. These inspections will only be performed on EDG 101 and EDG 102.

3. During the second and subsequent refueling outages, LILCO will inspect two of the three crankpin journals subject to the highest stresses (numbers 5, 6 and 7) and associated oil holes in these journals, using LP and ET as appropriate. These inspections will be performed on EDG 101, 102 and 103.

4. At intervals of every 3 refueling outages, LILCO will inspect the main bearing journals and associated oil holes, between crankpin journals numbers 5, 6 and 7, using LP and ET as appropriate. These inspections will be performed on EDG 101, 102 and 103. Based on the results of this first inspection, LILCO may request that such inspections be terminated.

II. NRC Staff Recommendations

1. The foregoing LILCO commitments satisfy NRC Staff recommendations with respect to crankshaft inspections. Thus, there are no NRC Staff recommendations not accepted by LILCO. As opposed to the intervals discussed in paragraph I.4 above, the current SER recommends that inspection intervals for the main bearing journals on EDG 101 and 102 be at the first and all subsequent refueling outages, and for EDG 103, the second and all subsequent refueling outages. The Staff no longer considers this necessary and intends to issue a revised SER to reflect the changes in inspection intervals to those shown in paragraph I.4 above.

2. It is also agreed by and between the NRC Staff and LILCO that at the conclusion of the first, 3 refueling outage interval, the necessity for further inspections in accordance with paragraph I.4 above, if any, will be reevaluated.

- a. LILCO's proposed "qualified load" of 3300 kW is the maximum load at which the EDG may be operated, but is inadequate to handle the maximum load that may be imposed on the EDGs because:
 - (i) intermittent and cyclic loads are excluded;
 - (ii) diesel load instrument error was not considered;
 - (iii) operators are permitted to maintain diesel load at 3300 ± 100 kW;
 - (iv) operators may erroneously start additional equipment.
- c. The EDG qualification test run performed by LILCO was inadequate to assure that the EDGs are capable of reliable operation at 3300 kW because:
 - (iii) operators were permitted to control the diesel generators at $3300 \text{ kW} \pm 100 \text{ kW}$ during the test;
 - (iv) instrument accuracy was not considered;

L-2. GDC 17 requires *inter alia* that electric power systems shall have sufficient capacity and capability to assure that:

- (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents.

Suffolk County contends that a maximum "qualified load" of 3300 kW for the Shoreham EDGs does not provide this assurance.

L-3. The Staff introduced¹⁴ the concept of a "qualified load" as an interim licensing basis for TDI diesel engines. The qualified load is that load which bounds the maximum emergency service load (MESL) for the diesel generator at which certain key components of the engine have been successfully operated for at least $10E7$ loading cycles. The proposed qualified load at Shoreham is 3300 kW. Dawe *et al.*, ff. Tr. 27,153, at 10. The Staff has reached licensing decisions on other nuclear plants with such engines using this approach, but no other engine has been tested this way. Tr. 27,990 (Berlinger).

L-4. The MESL at Shoreham, defined in Amendment 52 to the License Application (FSAR, Revision 34), is the maximum load existing on any EDG during a loss of offsite power (LOOP) in conjunction with a loss of coolant accident (LOCA). The MESL is determined for the EDG by summing individual loads from all equipment which will be connected for more than short periods of time following initiation of a

¹⁴ See NRC Staff's Safety Evaluation Report on the Transamerica Delaval, Inc. Diesel Generators Owners Group Plan, August 1984. Dawe *et al.*, ff. Tr. 27,153, at 9-10.

LOOP/LOCA event. These loads are engineered safety features (ESF) or ESF support equipment which are automatically powered following the start of the EDG in response to LOOP/LOCA initiation signals. Dawe *et al.*, ff. Tr. 27,153, at 8-9. The Staff concluded that the FSAR gives an accurate representation of loads expected to occur in a LOOP/LOCA event. Tr. 27,756 (Berlinger).

L-5. The MESL values at Shoreham were obtained by a combination of actual load measurements and nameplate ratings on components which will be connected to the EDG for more than a short time period following the LOOP/LOCA event. Dawe *et al.*, ff. Tr. 27,153, at 9. LILCO measured 27 loads accounting for 60% of the electrical load calculated for the MESL. It was pointed out that the loads which were not measured were a number of small items of approximately the same value. Tr. 27,515-16 (Youngling).

L-6. LILCO found the nameplate rating to be a reasonable indicator of the loads drawn by the equipment when operating. Of all the loads measured, only one case was found which disagreed with this finding. This case was the emergency switchgear room air-conditioning units whose measured load was 36.4 kW whereas the rated value was 33.9 kW. Tr. 27,202-04 (Youngling). Although the nameplate ratings were higher in all but one case, the MESL was calculated conservatively using measured loads accounting for only 30% of the MESL load and nameplate ratings for all others. Tr. 27,207-08 (Youngling); Tr. 27,212-13 (Dawe).

L-7. The calculated MESL was based on the assumption that all items of equipment would be required to operate simultaneously at their design values. This is a situation not likely to be realized during a LOOP/LOCA event. Tr. 27,201-02 (Dawe). For example, the MESLs for EDG 101 and EDG 102 each include 235 kW for one RBSVS chiller at nameplate rating while the MESL for EDG 103 includes 470 kW for two chillers at full load. Tr. 27,643 (Dawe). These chillers are oversized for the LOCA condition. In addition to being redundant equipment, they were sized for the greater heat load from a pipe break outside of the containment. There will be insufficient heat load in a LOOP/LOCA event to cause the chillers to operate at full load. Tr. 27,668-71 (Dawe). Thus, the 235 kW included for each chiller in the MESL calculations of peak load will be significantly reduced on an EDG following a LOOP/LOCA. Tr. 27,642-44, 27,649-51 (Dawe).

L-8. The MESLs for the Shoreham diesels are set forth in Table 8.3.1-1A of Revision 34 of the FSAR. Their values are 3253.3 kW for EDG 101, 3208.7 kW for EDG 102 and 3225.5 kW for EDG 103. Dawe *et al.*, ff. Tr. 27,153, at 29. These values were obtained by a combination

of actual load measurements and nameplate ratings on components which will be connected to the EDG for more than a short time period following the LOOP/LOCA event. Dawe *et al.*, ff. Tr 27,153, at 9. The Staff concluded that the loads in the FSAR give an accurate representation of loads expected to occur in a LOOP or LOOP/LOCA. Tr. 27,756 (Berlinger).

B. Load Contention (a)(i): The MESL Does Not Include Intermittent and Cyclic Loads

L-9. Suffolk County contends that the qualified load is inadequate because the MESL excludes intermittent and cyclic loads. LILCO reviewed the Staff SER for the TDI Diesel Generator Owners Group Program Plan and concluded that intermittent or cyclic loads should be excluded when determining the qualified load for the EDGs. The Staff agreed. Tr. 27,742 (Berlinger). The County states that such an exclusion is unprecedented. SC PF (April 15, 1985), at L-16.

L-10. Three load groups were excluded by LILCO as intermittent or cyclic loads. They were (a) automatically activated motor operated valves, (b) diesel generator fuel oil transfer pumps and, (c) diesel generator air compressors. Dawe *et al.*, ff. Tr. 27,153, at 12; Knox, ff. Tr. 27,735, at 5. The Staff agreed with LILCO's identification of intermittent loads. Knox, ff. Tr. 27,735, at 5; Tr. 27,764-65, 27,794 (Knox).

Motor Operated Valves

L-11. Automatically actuated motor operated valves are those which receive power from an EDG and operate automatically in the event of a LOOP/LOCA. Dawe *et al.*, ff. Tr. 27,153, at 12-14. Examples of such valves are containment isolation valves, emergency core cooling system injection valves and various system valves used to isolate redundant trains, unnecessary system loads or unwanted flow paths. *Id.* at 13. Not all of these valves would be expected to reposition following a LOOP/LOCA and represent a load on the EDG. Although each receives actuation signals to ensure proper positioning, many will be in their designed post-accident position during normal operation, and thus will not operate even upon receipt of a signal. *Id.* Those that do operate generally do so only once and in such cases operation occurs during the first several minutes after the EDG starts. Not all valves that do operate will do so simultaneously. *Id.*; see also Knox, ff. Tr. 27,735, at 5-6; Tr. 28,195 (Knox). The intermittent loads associated with unrealistically assumed simultaneous operation of these valves are calculated to be 65.7 kW for

EDG 101, 64.3 kW for EDG 102, or 46.7 kW for EDG 103. Dawe *et al.*, ff. Tr. 27,153, at 15.

EDG Fuel Oil Transfer Pumps

L-12. The diesel generator fuel oil transfer pumps transfer oil for the generators from the storage tanks to the day tanks in the diesel generator rooms. Each diesel generator has two associated fuel oil transfer pumps. Only one pump per diesel will operate at a time; the second operates only if the first fails. The preferred pump only operates after the fuel oil level in the day tank has been lowered to a predetermined level by operation of the diesel. The pump will operate for approximately 22 minutes in every 48-minute period during the operation of the diesel in order to maintain the fuel oil level. *Id.* at 16. The diesel generator fuel oil transfer pump load is a negligible 0.2 kW per pump. *Id.*

Diesel Generator Air Compressors

L-13. The diesel generator air compressors are used to recharge the air start receivers. Each generator has two independent, redundant air starting systems. Each compressor will automatically operate after the EDG has energized its associated emergency bus. Following one successful start attempt, each compressor will operate for approximately 15 minutes. Each compressor can recharge its associated air system in 30 minutes following the design capability of five starts. The air compressor load is 12 kW per generator.

L-14. If all intermittent loads, assumed to occur simultaneously, were summed and added to the MESL for each EDG, the predicted loads would be 3331.4 kW for EDG 101, 3285.4 kW for EDG 102 and 3284.6 kW for EDG 103. Dawe *et al.*, ff. Tr. 27,153, at 18.

L-15. LILCO performed an integrated electrical test (IET) with the TDI diesel generators. The IET starts with the introduction of LOOP/LOCA signals and proceeds through the time sequencing and operation of the required loads on the EDGs. Tr. 27,412 (Dawe). The peak loads measured during the IET were 2833.6 kW for EDG 101, 2806.9 kW for EDG 102 and 3072.0 kW for EDG 103. Dawe *et al.*, ff. Tr. 27,153, at 20. These loads are estimated to be within a few percent of the actual loads that would be observed following a LOOP/LOCA (Dawe *et al.*, ff. Tr. 27,153, at 19-20; Tr. 27,219-21 (Dawe)), except that the IET value for EDG 103 is high by a large portion of 358 kW as it included a second reactor building service water pump which is not needed for a LOCA and is no longer automatically connected to the

EDGs. Dawe *et al.*, ff. Tr. 27,153, at 20-21. The significant difference between peak loads observed during the IET and the predicted MESLs is due, in large part, to conservatism introduced into the calculation of the MESL by the use of nameplate loads and the assumption of coincident demand. Tr. 27,461-62 (Dawe).

L-16. The Staff witness testified that the IET was not an accurate model of true plant response to an accident but conceded that the IET would give a better estimate of the loads that the plant would have to support in response to an accident than the MESL. *E.g.*, Tr. 28,273 (Berlinger). However, the Staff noted that it did not consider the IET results in its review. Tr. 28,151 (Knox, Berlinger, Clifford, Buzy, Eckenrode). The County's witnesses questioned whether the IET was representative of actual LOOP/LOCA loads but did not present specific information to support their position. Tr. 27,552-54 (Bridenbaugh).

L-17. Based on the testimony presented during the hearing, the Board is persuaded that the MESL is a conservative estimate of the expected EDG loads following a LOOP/LOCA. The results obtained during the integrated electrical test provide an estimate of this conservatism. We believe that intermittent and cyclic loads have been accounted for. In this accounting, the expected loads on any EDG following a LOOP/LOCA are bounded by the MESL in all cases except for short term (less than three minutes) operation of EDG 101 at 31 kW over the 3300 kW MESL. When the conservatism in the MESL is considered, we believe that the EDGs will perform their intended function when called upon to do so, either because 3300 kW will not be exceeded, or if it is, it would only be by a small amount on one EDG for a negligibly short time. *See also* our crankshaft findings in Section III, *supra*.

C. Load Contention (a)(ii): Diesel Load Meter Instrument Error Was Not Considered (in the Determination of the MESL), and (c)(iv) Was Not Considered in the (Endurance) Qualification Test at 3300 kW

L-18. Suffolk County contends that LILCO failed to consider instrument error in establishing the qualified load and in running the 3300 kW qualification testing of EDG 103 at 10E7 cycles (745 hours). Bridenbaugh and Minor, ff. Tr. 27,500, at 21-23.

L-19. Each EDG at Shoreham has a Weston wattmeter, located in the control room, which has a full scale reading of 5600 kW. Dawe *et al.*, ff. Tr. 27,153, at 27-28. The specified accuracy of this meter is 2% of full scale and the overall instrument accuracy is 2½% of full scale when combined with the instrument loop. *Id.*

L-20. As part of the Shoreham instrument calibration program, each wattmeter is calibrated annually, along with its associated instrument loop. Calibration is performed with a reference standard traceable to the National Bureau of Standards. Dawe *et al.*, ff. Tr. 27,153, at 28-29; Tr. 27,266-68, 27,384 (Youngling); Tr. 27,309-10 (Dawe). Calibration checks performed prior to, and following, the EDG 103 qualification run showed that the wattmeter accuracy ranged from ± 60 to 70 kW. Dawe *et al.*, ff. Tr. 27,153, at 28-29; Tr. 27,265 (Dawe).

L-21. During the confirmatory test performed by LILCO on EDG 103 for 10E7 cycles at 3300 kW, load readings were taken both from the Weston wattmeter and a digital test loop used with a process computer. The accuracy of the test loop is approximately 0.6%. Tr. 27,311-14, 27,423 (Youngling).

L-22. In response to a LOOP/LOCA incident the initial EDG loading is automatic and below the qualified load of 3300 kW. Dawe *et al.*, ff. Tr. 27,153, at 29. The actual load profile following a LOOP/LOCA is bounded by 3200 kW after 12 minutes into the event and by a little over 2600 kW after one hour. This profile includes manual loading of the EDG. *Id.* at 30. Subsequent operator actions will result in load reduction and it is unlikely that additional loads added by an operator would exceed the qualified load. *Id.* See subsection IV.D, below.

L-23. During surveillance testing of the EDGs (one hour per month during the first fuel cycle) at 3300 kW, the actual load on the diesel could differ from that indicated by the amount of instrument error. This does not invalidate the surveillance testing since the testing is representative of actual operation. To the extent the test load may be slightly below 3300 kW due to instrument error, the necessary load carrying capability of the EDG is adequately demonstrated. To the extent the qualified load is slightly exceeded during testing as a result of instrument error, the time duration of such loading is not long. Dawe *et al.*, ff. Tr. 27,153, at 31.

L-24. The Board finds that diesel load meter instrument error has been considered and accounted for in the qualification test. Such errors are small and will have no adverse impact on the EDGs in performing their intended function.

D. Contention (a)(iii) and (c)(iii): Operators Were Permitted to Operate with a Test Band of ± 100 kW During the Qualification Test and Will Be Permitted to Do So During Future Surveillance Testing

L-25. Suffolk County contends that a test band of ± 100 kW used in the 10E7 cycle (total of 745 hours) endurance run and intended for use during future surveillance testing at 3300 kW renders the qualified load and the endurance run test results inadequate. It is also contended that the actual endurance run could only be accurate to 3230 kW which accounts for a ± 70 kW error band.

L-26. During the approximately 220 hour segment of the approximately 745 hour endurance run, EDG 103 was operated at loads of 3500 kW and above. Bush *et al.*, ff. Tr. 28,503, at 16; Tr. 28,635 (Bush); *see also* LILCO Ex. B-15. Review of the operating logs during the approximately 525 hour portion of the endurance run showed 81 hours recorded at loads between 3300 and 3400 kW and 20 hours at loads between 3250 and 3300 kW, with the other approximately 424 hours recorded at 3300 kW. Bush *et al.*, ff. Tr. 28,503, at 11. Dawe *et al.*, ff. Tr. 27,153, at 38. Hence, many more hours of operation were accumulated above 3300 kW than the 20 hours which were at most 50 kW below 3300 kW. Moreover, the fact of a test band of ± 100 kW in the endurance run did not result in the endurance test being run lower than the qualified load of 3300 kW.

L-27. LILCO witnesses testified that testing of the diesel generator at 3300 kW requires it to be connected to the grid. When the diesel generator is connected to the grid it is difficult to maintain a constant load value due to engine response to fluctuations on the grid and an independent pulsation effect on the meter due to the mode of governor operation. Thus, ± 100 kW is necessary to accommodate these phenomena, which have an actual value between 60 and 100 kW. This is only true when the engine is connected to the grid, however, and not when it is operating in a LOOP situation. Tr. 27,316-21 (Dawe, Youngling).

L-28. As a practical matter, a tolerance band is required. If there were no band, whenever the meter read slightly above 3300 kW, the operator would be in violation of the Technical Specifications. Tr. 27,318 (Dawe); Tr. 27,321-22 (Youngling). The Board finds that utilization of a tolerance band of ± 100 kW in future surveillance testing is appropriate. Moreover, as evidenced by the endurance run, through most of the test the operators should be able to control the load close to 3300 kW. Finding L-26, above. Future routine surveillance testing transiently as low as 3200 kW poses little concern for validity of the test; no such

concern was raised by any party or discerned by us. Routine monthly surveillance testing as high as 3400 kW will not result in failure of a crankshaft. See Section III, above.

E. Load Contention (a)(iv): Qualified Load Does Not Encompass Operator Error Load

L-29. Suffolk County asserts in Contention (a)(iv) that the diesels do not comply with GDC 17 because the qualified load of 3300 kW does not possess sufficient margin to accommodate operator errors. Bridenbaugh and Minor, ff. Tr. 27,500, at 28. Essentially, the County's position appears to be that GDC 17 mandates, as a matter of law, the inclusion of a margin within the design load to accommodate potential operator errors. In addition to exploring the relationship of operator actions to GDC 17, the litigation of this contention at the hearing included a lengthy examination of the procedures and training LILCO has developed to protect against operators erroneously attaching loads to the diesels that might result in exceedance of the qualified load of 3300 kW.

L-30. At the outset, one has to assess how compliance with GDC 17 is determined. The Staff testified that such compliance is demonstrated, *inter alia*, by ensuring the plant's design loads do not exceed the capacity and capability of the diesel generators. Knox, ff. Tr. 27,735, at 4. The design load is defined in IEEE 387-1977; this load consists of that combination of electric loads having the most severe power demand from a diesel generator for the operation of engineered safety features and other systems required during and following shutdown of the reactor. *Id.* The design load, as defined in IEEE 387-1977, does not include loads attributable to operator error. Tr. 27,796-97, 28,174 (Knox); Tr. 28,277-81 (Berlinger, Hodges). Thus such error need not be considered in setting the design load for the diesels.

L-31. In addition to possessing sufficient capacity and capability to power the design loads, the onsite AC power system must also be designed to safely withstand a single failure in order to comply with GDC 17. As a general matter, operator errors are not applicable to the single failure criterion. The purpose of the single failure analysis is to gain greater assurance of system reliability through redundancy; operator reliability cannot be assured by such an analysis. Hodges, ff. Tr. 27,735, at 4-6; see also Tr. 27,884-87 (Berlinger). Procedures generally are not relied upon in determining whether the requirements of GDC 17 are met. Tr. 28,274-75 (Berlinger); Tr. 27,882 (Clifford).

L-32. Operator error is included in the single failure analysis to the extent that the cause of any single error can be attributable to operator

action as well as to a passive or a mechanical failure. Tr. 27,891 (Hodges); Tr. 27,954, 28,149 (Berlinger); Tr. 28,350 (Clifford). For GDC 17 purposes, it thus becomes important to know whether any single operator action can result in the failure of more than one diesel because of overloading. The single worst-case load that could be manually added erroneously to each of the three diesels as a result of three separate operator errors following a LOOP/LOCA would result in loads of 3459.4 kW on EDG 101; 3414.8 kW on EDG 102; and 3583.5 kW on EDG 103. Dawe *et al.*, ff. Tr. 27,153, at 32-33. The single worst-case load that could be added erroneously following a LOOP would result in loads of 3839.2 kW on EDG 101; 3627.6 kW on EDG 102; and 3867.3 kW on EDG 103. *Id.* at 33-35.¹⁵ These loads all exceed the qualified load of 3300 kW. However, there is no single operator action that would result in exceedance of the qualified load on more than one diesel. *Id.* at 37. Even if such an overload is conservatively assumed to result in a failure of the diesel involved, the onsite system is designed to accommodate the failure of one diesel. *Id.* Thus only two out of the three diesels are required to safely shut down and maintain the plant. There are three diesels required to be available to meet GDC 17 precisely because of the need for redundancy to meet the single failure criterion. Thus the design of the plant is sufficient to accommodate any single failure attributable to operator error. *See also* Tr. 27,947-49 (Berlinger); Tr. 28,350 (Clifford).

L-33. Operator errors need not be accounted for in the design load and, insofar as they are applicable to the single failure criterion, are adequately accounted for at Shoreham. Operator errors are accounted for in the design of the plant in a number of other ways. Hodges, ff. Tr. 27,735, at 4. First, for actions that must be accomplished on a relatively short time scale and are necessary to mitigate transients and accidents, the Staff policy has been to eliminate the need for operator action by automating the action. *Id.* at 5.¹⁶ By not challenging the operator with an action in a relatively short timeframe, the potential for operator error is greatly reduced, so that it need not be considered in the context of the design. *Id.* For situations in which operator actions are relied upon for event mitigation, the Staff will ensure that procedures and guidelines

¹⁵ It must be kept in mind that the equipment that is needed in the immediate event of a LOOP or LOOP/LOCA will all actuate automatically; it is this equipment that makes up the design load. The equipment that makes up the worst-case load that can be erroneously added by operators is not needed for mitigation purposes. Dawe *et al.*, ff. Tr. 27,153, at 34.

¹⁶ The equipment needed to respond in the event of either a LOOP or a LOOP/LOCA is so automatically activated. *See* note 15, *supra*.

provide the necessary guidance to the operator to take the correct actions, and that the operators have been properly trained in the action. *Id.*

L-34. Much of the hearing was spent on the adequacy of LILCO's procedures and training to minimize the potential for operator overload of the diesels. The question of procedures and training must be kept in context. The question of the design adequacy of the diesels is separate from issues relating to the adequacy of procedures and training. The procedures and training are reviewed to evaluate the capability of plant operators to operate within the design. Procedures thus provide additional assurance, beyond that provided by design, that diesels can be operated safely. Tr. 27,882, 28,343, 28,347, 28,354-55 (Clifford); Tr. 27,885-87 (Berlinger). However, for the Shoreham diesels, procedures are not necessary to demonstrate compliance with GDC 17. Tr. 28,275 (Berlinger).

L-35. Procedures and training can provide this additional assurance through three mechanisms: procedures should not be written in a manner that will result in operators overloading the diesel, they should enable the operators to take corrective actions if an overload should occur, and the training should adequately address the technical concerns associated with the design load limit. Clifford *et al.*, ff. Tr. 27,732, at 5. Substantial written and oral testimony at the hearing examined in detail the adequacy of the procedures and training insofar as they relate to potential overload of the diesels. The Staff was unable at the outset of the hearing to conclude that the procedures and training at Shoreham were adequate. *Id.* at 9-10. Many of the Staff's concerns were, subsequent to a site visit, resolved during the hearing. Tr. 28,829-91 (Clifford and Eckenrode). However, the Staff took the position that the performance of a task analysis would be necessary in order to validate and affirm the adequacy of the procedures. Tr. 28,292 (Clifford).¹⁷ The task analysis was set to be completed in early May; the Staff was to review the analysis in a Supplemental Safety Evaluation Report which was expected to be issued in June 1985. Tr. 28,369-72 (Clifford).

L-36. LILCO's witnesses testified concerning the adequacy of the procedures and training as they relate to maintaining diesel generator loading below the qualified load. LILCO's testimony in this area was provided by witnesses with significant experience related to Shoreham.

¹⁷ A task analysis is essentially a specification of all tasks necessary to accomplish actions for a scenario. The task analysis identifies the equipment to be run, the function to be maintained, the systems to be run to maintain those functions, the tasks necessary to operate the equipment and subtasks necessary for the operator to operate switches, monitor instrumentation or parameters that are necessary. The analysis evaluates whether the plant can be operated within the 3300 kW qualified load or whether the operators are capable of operating within that load by going through various combinations of scenarios. Tr. 28,360 (Clifford).

Dawe *et al.*, Tr. 27,153, at 2-5. These witnesses had participated in the preparation of both the procedures and training. *See, e.g.*, Tr. 27,353 (Dawe); Tr. 27,372 (Notaro). They identified a number of emergency operating procedures and system procedures that had been reviewed and, in some cases, revised as a result of establishing the qualified load. Tr. 27,156-61, 27,252 (Notaro). The changes which have been made are mainly added cautions to highlight the diesel generator load. Tr. 27,263 (Dawe); Tr. 27,367 (Youngling); Tr. 27,372, 27,395, 27,454-55 (Notaro). Also the diesel generator load meters in the control room will be banded at 3300 kW. The operators are trained and knowledgeable in the diesel generator qualified load. Dawe *et al.*, ff. Tr. 27,153, at 33, 35; Tr. 27,297-98 (Youngling). In addition, LILCO has committed to provide a distinctive visual and audible alarm for each diesel generator in the main control room that will be set no higher than 3300 kW for operation, other than possibly during the routine surveillance tests. Tr. 27,298-302, 27,333-35 (Youngling).

L-37. In response to a LOOP/LOCA, four procedures (loss of offsite power, level control, emergency shutdown and containment control) may be entered simultaneously. Tr. 27,277-78, 27,368 (Notaro). LILCO testified that there is no manageability concern with the simultaneous use of these procedures by the operators. The NRC has tested the operators in their ability to use and manage the procedures, and they have been licensed. The operators are not confused or misled by the multiple procedures. Tr. 27,434-35, 27,404-05 (Notaro); *see also* Tr. 27,277 (Notaro). They are typical of the procedures for all BWR plants. Tr. 27,885-87 (Berlinger). The procedures have been verified at the Limerick simulator. LILCO personnel have trained at this simulator for four years. *See* Tr. 27,401-02 (Notaro).

L-38. LILCO witnesses discussed two types of procedures, emergency operating procedures and system procedures, used to guide the operators in the conduct of plant operations. The pertinent emergency operating procedures have been revised to include cautions as a reminder of diesel generator loading conditions when equipment operation is called for. The system procedures direct the "how to" of system operation once the decision to operate has been made. This decisionmaking is guided by the emergency operating procedures which have cautions designed to ensure diesel generator loads are considered before actions that can increase load are taken. *E.g.*, Tr. 27,165, 27,171, 27,473-74 (Notaro); 27,170-72 (Dawe).

L-39. LILCO has incorporated the qualified load into its training program. Classroom and simulator training for the licensed operators is part of a requalification training program. A specific lesson plan related to

the qualified load has been developed for classroom training. At the simulator, the operators will use the revised procedures, thus operating with the (equivalent of the) 3300 kW qualified load. Classroom training related to the qualified load began in mid-February 1985 and was to take six weeks to complete for all six operating crews. The simulator training follows the classroom training in the next six-week cycle. Tr. 27,177-79, 27,262, 27,353, 27,361, 27,373, 27,398 (Notaro); Dawe *et al.*, ff. Tr. 27,153, at 27.

L-40. The LILCO training organization is responsible for certifying that training has been conducted properly and completed satisfactorily. The training is certified by independent reviewers. The NRC reviews and evaluates the requalification training program on an annual basis. General Physics Corporation, which operates the simulator used by LILCO, evaluates the examination process, examination questions, responses and grading as an independent consultant. In addition, the LILCO QA program and the LILCO Nuclear Review Board evaluate the training program. The Nuclear Review Board also includes an independent consultant with extensive training experience. Tr. 27,381-83 (Notaro, Youngling).

L-41. The Staff agreed with the process LILCO used to verify the manageability of the procedures but stated that further information was needed to verify that the operators and supervisors could manage the procedures. Tr. 28,081 (Eckenrode).

L-42. In early January 1985, the Staff commenced a review of procedures and training relating to the qualified load, which included a brief site visit. In the time available prior to the hearings in February 1985, Staff witnesses were unable to obtain all the information necessary to understand the details of plant performance and plant response and the role of procedures and training. Clifford *et al.*, ff. Tr. 27,732, at 7-8; Tr. 27,710-12, 27,895 (Buzy, Clifford, Eckenrode); Tr. 28,219 (Clifford). Given the time available and subsequent revisions by LILCO, the Staff reviewed some procedures only preliminarily and others not at all. See Tr. 27,841-42, 28,062-69 (Clifford).

L-43. As a result of the need for more information, the Staff sent LILCO a request for additional information on a number of matters which were of concern to the Staff. Clifford *et al.*, ff. Tr. 27,732, at 9. A number of these concerns were reviewed in the hearings. See, e.g., Tr. 27,822-23 (Buzy); Tr. 27,877-80, 27,917-18 (Clifford, Hodges); Tr. 28,082-83, 28,095-99 (Clifford); Tr. 27,914-15 (Hodges); Tr. 28,040-41, 28,052-53 (Clifford); Tr. 28,107-08 (Clifford); Tr. 27,901, 27,905-06 (Clifford, Eckenrode).

L-44. In connection with the need for further information, the Staff visited the site a second time during the period February 27 to March 1, 1985. The results of the second site visit are reflected in the Staff's testimony of March 5, 1985. This testimony reflects that many Staff concerns had been resolved. *See, e.g.*, Tr. 28,288-92 (Clifford, Eckenrode). For example, most of the Staff's specific concerns regarding "caution" notes in the procedures were generally resolved with only a small number remaining to be resolved by the job task analysis. Tr. 28,307-08 (Clifford). Further, while the Staff had found in the past that LILCO's overall training program was adequate and appropriate, Tr. 27,822-23, 28,108 (Buzy), the Staff had not had an adequate opportunity to review LILCO's revised lesson plans that addressed the qualified load until the second site visit during the week of February 27. As a result of this further review, the Staff expressed satisfaction with LILCO's approach to training with respect to the qualified load and noted that the classroom exercises implemented by LILCO were well structured. Tr. 28,298-99 (Buzy). Based on the results of this subsequent review, the Staff concurred with LILCO that the training program adequately addressed the 3300 kW qualified load. Tr. 28,299, 28,388 (Buzy). Similarly, the Staff originally expressed a concern regarding restriction of the operators' flexibility to utilize loads in accordance with procedures, but following the second site visit, Staff witness Clifford agreed operators were able to take the actions they were expected to take to operate the plant within its design and avoid loading the EDGs above the qualified load. Tr. 28,290-96 (Clifford). Thus, the Staff also concluded that operators' flexibility to utilize loads in accordance with procedures was not as restricted as thought. Tr. 28,311, 28,356-62 (Clifford).

L-45. During the Staff's second site visit, LILCO presented a program for a job task analysis pertaining to the qualified load to be performed by an outside consultant. The Staff has reviewed the proposed job task analysis program and believes it is appropriate to resolve any remaining concerns. The Staff also believes that LILCO and the contractor are qualified to perform the job task analysis. Tr. 28,290-92, 28,297 (Clifford, Eckenrode). Staff witnesses Clifford and Buzy support LILCO's conclusion that the operators can operate the plant and maintain all safety functions within the design of the plant and the qualified load, but believe that the results of the job task analysis are needed to confirm this conclusion. Tr. 28,295-96 (Clifford, Buzy). Staff witness Clifford believes the job task analysis is appropriately considered as confirmatory. Tr. 28,315 (Clifford). The Staff witnesses do not believe resolution of procedures and training to the Staff's satisfaction is in any way precluded. *See* Tr. 28,295-97 (Clifford, Buzy, Eckenrode).

L-46. Suffolk County provided no specific evidence addressing procedures or training. Their witnesses testified that they had examined the procedures governing operation of the EDG equipment in the emergency situation and found the operations to be relatively complex, offering many opportunities for error. The testimony consisted of a summary description of four procedures. Bridenbaugh and Minor, ff. Tr. 27,500, at 25-28. These witnesses had limited experience with emergency procedures. Tr. 27,504-11 (Bridenbaugh, Minor). Their examination consisted of some review, but not a detailed analysis of the procedures. Tr. 27,562-64 (Bridenbaugh, Minor). Neither has ever been a licensed reactor operator. Tr. 27,513 (Bridenbaugh, Minor). We give their testimony little weight.

L-47. The County believes that to assure that the EDGs have sufficient capacity and capability to perform their function, the qualified load must envelope the operator error load since human error cannot be precluded in the operation of equipment. *See, e.g.*, SC PF, Load, at 16. Furthermore, no procedures and training can ensure that an operator will not erroneously add loads. *Id.* While the County's concern is conservative, the contention fails in that it infers that such assurance is required at Shoreham by 10 C.F.R. Part 50, Appendix A, General Design Criterion 17. Procedures and training cannot guarantee that human error will be prevented. They are intended to minimize the likelihood of such occurrence. Based on the testimony presented, we believe that the current programs of the Staff and LILCO will result in acceptable procedures and training exercises that will minimize the likelihood of operator errors that could result in EDG overload. The Staff will continue to review LILCO's procedures and the task analysis to assure that this result is achieved. The Board finds that it can delegate this responsibility to the Staff, not because the act of reviewing procedures is ministerial in nature, but rather because the review of procedures is not necessary to resolve the matter in controversy between the parties (whether the design load needs to accommodate a margin to account for operator error). Additionally, we believe that litigation is not well suited or necessary for the remaining detailed review and refinement of the procedures and training programs, given the findings we have been able to make regarding the scope and content of the programs.

F. Conclusion on the Qualified Load

L-48. We conclude that the qualified load presents an adequate interim licensing basis for the Shoreham TDI emergency diesel generators. We agree with LILCO and the Staff that there is reasonable assurance

that cyclic and intermittent loads would not result in the qualified load of 3300 kW being exceeded, and in any event, any exceedance would be insignificant with respect to amount and duration. We also agree that the operation of the engines during surveillance testing with a ± 100 kW test band is appropriate. We further agree that compliance with GDC 17 does not mandate consideration of operator error loads in the circumstances of this case; there is no single operator error which can overload (over 3300 kW) more than one TDI diesel.

V. CONCLUSIONS OF LAW

In reaching this decision, the Board has considered all the evidence submitted by the parties and the entire record of this proceeding. That record consists of the Commission's Notice of Hearing, the pleadings filed by the parties, the transcripts of the hearing, and the exhibits received into evidence. All issues, arguments, or proposed findings presented by the parties, but not addressed in this decision, have been found to be without merit or unnecessary to this decision. Based upon the foregoing Findings which are supported by reliable, probative, and substantial evidence as required by the Administrative Procedure Act and the Commission's Rules of Practice, and upon consideration of the entire evidentiary record in this proceeding, the Board, with respect to the issues in controversy before us;

CONCLUDES that the Applicant, Long Island Lighting Company, has met its burden of proof on each of the contentions decided in this P.I.D. As to these issues, there is reasonable assurance that the Shoreham Nuclear Power Station, Unit 1, can be operated without endangering the health and safety of the public.

VI. ORDER

WHEREFORE, in accordance with the Atomic Energy Act of 1954, as amended, and the rules of the Commission, and based on the foregoing Findings of Fact and Conclusions of Law, IT IS ORDERED THAT:

The Director of Nuclear Reactor Regulation is authorized, upon making the findings on all applicable matters specified in 10 C.F.R. § 50.57(a), to issue to the Applicant, Long Island Lighting Company, a license to authorize low power testing (up to 5 percent of rated power) of the Shoreham Nuclear Power Station, Unit 1.

Pursuant to 10 C.F.R. § 2.760 of the Commission's Rules of Practice, this Partial Initial Decision shall become effective immediately. It will constitute the final decision of the Commission forty-five (45) days

from the date of issuance, unless an appeal is taken in accordance with 10 C.F.R. § 2.762 or the Commission directs otherwise. *See also* 10 C.F.R. §§ 2.764, 2.785 and 2.786.

Any party may take an appeal from this decision by filing a Notice of Appeal within ten (10) days after service of this Partial Initial Decision. Each appellant must file a brief supporting its position on appeal within thirty (30) days after filing its Notice of Appeal (forty (40) days if the Staff is the appellant). Within thirty (30) days after the period has expired for the filing and service of the briefs of all appellants (forty (40) days in the case of the Staff), a party who is not an appellant may file a brief in support of or in opposition to the appeal of any other party. A responding party shall file a single, responsive brief *only* regardless of the number of appellants' briefs filed. (*See* 10 C.F.R. § 2.762.)

IT IS SO ORDERED.

THE ATOMIC SAFETY AND
LICENSING BOARD

Lawrence Brenner, Chairman
ADMINISTRATIVE JUDGE

Dr. George A. Ferguson
ADMINISTRATIVE JUDGE

Dr. Peter A. Morris
ADMINISTRATIVE JUDGE

Bethesda, Maryland
June 14, 1985

[The Appendices have been omitted from this publication but may be found in the NRC Public Document Room, 1717 H Street, NW, Washington, DC 20555.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

Charles Bechhoefer, Chairman
Dr. James C. Lamb
Frederick J. Shon

In the Matter of

Docket Nos. STN 50-498-OL
STN 50-499-OL
(ASLBP No. 79-421-07-OL)

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

June 18, 1985

The Licensing Board denies a motion by the Intervenor to reopen the record of Phase I of the proceeding but permits certain questions raised by the motion to be considered under the aegis of a contention previously accepted for litigation in Phase II of the proceeding. The Board determines that the material supporting the motion (other than that accepted for litigation) does not include information which might change the result previously reached by the Board on the issues in question.

**RULES OF PRACTICE: REOPENING OF PROCEEDINGS,
JURISDICTION**

Before an appeal from a PID is filed, the Licensing Board has jurisdiction to consider a motion to reopen the record on which the PID is based. *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-726, 17 NRC 755 (1983).

RULES OF PRACTICE: REOPENING OF PROCEEDINGS, JURISDICTION

When an appeal from a PID has been filed, a motion to reopen the record is within the jurisdiction of the Appeal Board. *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 1), ALAB-699, 16 NRC 1324 (1982).

RULES OF PRACTICE: REOPENING OF PROCEEDINGS, JURISDICTION

When an appeal from a PID has resulted in the Appeal Board's ruling on certain legal and procedural questions but declining to rule on other factual findings and conclusions because they are subject to supplementation or change as a result of further consideration during other phases of the proceeding, the Licensing Board has jurisdiction to entertain a motion to reopen the record on issues in the PID not yet addressed by the Appeal Board.

RULES OF PRACTICE: REOPENING OF PROCEEDINGS, JURISDICTION

A Licensing Board has jurisdiction to consider a motion to reopen the record on issues discussed in a PID where a reasonable nexus is shown between the material upon which the motion is based and the issues remaining to be litigated by the Board. *Virginia Electric and Power Co.* (North Anna Nuclear Power Station, Units 1 and 2), ALAB-551, 9 NRC 704, 707 (1979); *cf. Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-782, 20 NRC 838, 841-42 (1984).

RULES OF PRACTICE: REOPENING OF PROCEEDINGS, JURISDICTION

When an Appeal Board decision on certain aspects of a PID does not forbid the Licensing Board from relitigating, in appropriate circumstances, issues already addressed in the earlier PID but not ruled upon by the Appeal Board, and the Licensing Board is familiar enough with the earlier record to evaluate the newly submitted documents which a motion to reopen the record seeks to add as evidence, a Licensing Board has jurisdiction to consider the motion on the merits.

RULES OF PRACTICE: ATTORNEY CONDUCT

The ABA Code of Professional Responsibility has been applied to attorneys appearing before administrative agencies generally, and the NRC specifically. *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-691, 16 NRC 897, 916 & n.26 (1982).

RULES OF PRACTICE: ATTORNEY CONDUCT

In evaluating an attorney's conduct, the Licensing Board may consider the American Bar Association's Model Rules of Professional Responsibility (adopted by the ABA on August 2, 1983) and also the earlier Code of Professional Responsibility, if the jurisdiction where the attorney is admitted has not ratified the adoption of the ABA Rules.

RULES OF PRACTICE: ATTORNEY CONDUCT

Without sufficient documentation, a Board should not conclude that an attorney's testimony (if he is called to testify by the opposing side as a factual witness) would prejudice his clients.

RULES OF PRACTICE: DISQUALIFICATION

A party may overcome the request for disqualification of its attorney under Code DR 5-102(A) or ABA Model Rule 3.7(a) if substantial hardship would be created for the client if the attorney were precluded from continuing in his or her role as counsel.

RULES OF PRACTICE: DISQUALIFICATION

An attorney consistently involved in the licensing proceedings to obtain a construction permit and/or operating license for a nuclear power plant may become so precious to his client that the forced unavailability of his services would cause substantial hardship to his client.

RULES OF PRACTICE: DISQUALIFICATION

Once the possible prejudice which may accrue from continued representation by an attorney is highlighted to the client, the client is free to make the determination to continue with the same counsel.

RULES OF PRACTICE: REOPENING OF PROCEEDINGS

The legal standards for reopening the record require (1) the motion must be timely filed; (2) the motion must address a significant safety or environmental issue; and (3) if a decision has already been reached on the question for which reopening the record is sought, the motion must demonstrate that the information sought to be added to the record might alter the results previously reached. This latter criterion is the most important of the three.

RULES OF PRACTICE: REOPENING OF PROCEEDINGS

The criteria for reopening a record must be applied separately for each issue for which reopening is sought, regardless of the circumstance that one or more issues may remain to be heard or decided. *See Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 2), ALAB-486, 8 NRC 9, 22 (1978).

RULES OF PRACTICE: REOPENING OF PROCEEDINGS

Timeliness in filing a motion to reopen the record is important, but may be subsumed by the significance of the information in question.

RULES OF PRACTICE: REOPENING OF PROCEEDINGS

A motion to reopen the record is not timely if it is submitted 6 months after the proponent became aware of all the information comprehended by the motion. A claim by the proponent of the motion that the 6-month delay resulted from numerous filing deadlines in the same proceeding is inadequate to excuse the untimeliness.

RULES OF PRACTICE: REOPENING OF PROCEEDINGS

A significant factor in evaluating the timeliness of a motion to reopen the record is the proponent's opportunity to gain access to the information on which the motion is based. *Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2), LBP-83-82, 18 NRC 256, 258 (1983); *see also Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-775, 19 NRC 1361, 1369 (1984).

RULES OF PRACTICE: DISCOVERY

Where a motion to reopen a record is untimely filed, but where a portion of the material supporting the motion is accepted for litigation under another issue, discovery on the accepted material may nevertheless be denied as untimely.

MEMORANDUM AND ORDER (Explanation of Ruling on CCANP Motion to Reopen Phase I Record)

Hearings in this operating license proceeding have been subdivided into three phases. Phase I included, *inter alia*, issues related to the character and competence of the lead Applicant, Houston Lighting & Power Co. (HL&P). The Licensing Board's Partial Initial Decision (PID) of March 14, 1984, LBP-84-13, 19 NRC 659, resolved most of the Phase I issues (but left open a number of questions bearing on those issues for further consideration in Phase II or Phase III).

Citizens Concerned About Nuclear Power, Inc. (CCANP), an Intervenor, appealed many of the rulings in LBP-84-13. In ALAB-799, 21 NRC 360 (1985), the Appeal Board affirmed the legal standards which we adopted in LBP-84-13, together with a number of procedural rulings which CCANP had appealed.¹ The Appeal Board declined, however, to rule on the factual questions raised by CCANP, citing the lack of finality of our rulings on many of those questions.

On April 17, 1985, CCANP filed with this Board a Motion to Reopen Phase I Record ("Motion").² The Applicants and NRC Staff each opposed the Motion.³ In our Sixth Prehearing Conference Order, dated May 17, 1985 (unpublished), as well as in our earlier Memorandum of May 10, 1985 (unpublished), we announced our rulings on various aspects of the CCANP Motion. Specifically, we held that we were denying the Motion in its entirety insofar as it seeks to reopen the Phase I record

¹ CCANP is seeking Commission review of ALAB-799. Petition for Review, dated April 30, 1985. As of the date of this Memorandum and Order, the Commission has not acted upon CCANP's request.

² The Motion was dated April 15, 1985, but was not served until April 17, 1985.

³ Applicants' Response to CCANP Motion to Reopen Phase I Record ("Applicants' Response"), together with Applicants' Memorandum Concerning Counsel's Continued Representation of Applicants ("Applicants' Memorandum"), both dated April 25, 1985; NRC Staff Opposition to CCANP Motion to Reopen Phase I Record, dated May 9, 1985 ("Staff Response"). (During the recent prehearing conference, we had granted the Staff's request for an extension to May 10, 1985, of the time within which to file its response. Tr. 11,012, 11,071.)

but that certain matters raised by one exhibit to the Motion will be litigable under the aegis of CCANP Contention 10, which is to be litigated during Phase II. We also announced our rulings on three procedural questions to which the Motion gave rise.

The Sixth Prehearing Conference Order noted that the reasons for the foregoing determinations would be explained in a subsequent issuance. We here set forth our reasons for these rulings.

A. General Description of Motion

CCANP's Motion seeks to reopen the Phase I record concerning HL&P's character and competence, as to which we made extensive findings in our Phase I Partial Initial Decision. In short, CCANP seeks to establish that HL&P was experiencing difficulties with Brown & Root, Inc. (B&R), its former contractor, far earlier than is reflected in the Phase I record, that the termination of B&R accordingly was not timely, and that HL&P's asserted delay in replacing B&R represents a deficiency in HL&P's character (if not in its competence). Furthermore, CCANP also points to our positive Phase I findings concerning HL&P's candor (an element of character) and claims that the material supporting the Motion establishes that the Applicants provided misleading testimony to the Board in 1981-1982, assertedly representing a lack of candor which reflects adversely on HL&P's character.

The Motion is supported by forty-two exhibits (designated as "A" through "PP"). The first (Exhibit "A") represents portions of the transcript of hearings in October 1984 (*see* Staff Response at 5; Tr. 11,053, 11,054) before the Public Utilities Commission of Texas (PUCT). It is submitted in support of CCANP's claims of lack of candor. The other forty-one exhibits represent documents variously dated from 1972 to February 1980 and introduced into evidence before the PUCT. (Fourteen of these exhibits — "H" through "T" and "OO" — predate the award of construction permits to the Applicants.) They are submitted primarily to establish a lack of timeliness of the replacement of B&R and only incidentally as bearing upon HL&P's candor (i.e., less than full disclosure of HL&P's difficulties with B&R).

Prior to discussing our rulings on each aspect of the Motion, we turn to several related procedural questions.

B. Procedural Questions

Following our receipt of the CCANP Motion, we requested the parties to address at the recent prehearing conference three procedural ques-

tions which we believed to inhere in the Motion. Order dated April 18, 1985 (unpublished). The parties responded to our request.⁴ We provide an explanation for our previously announced rulings on these questions *seriatim*.

1. *Jurisdiction to Consider Motion*

The first procedural question was whether this Board or the Appeal Board has jurisdiction to rule on the CCANP Motion. The question arises because of the somewhat unusual appellate posture which attended this proceeding as of the time the Motion was filed.

Under normal circumstances, jurisdiction to consider a motion to reopen a record on which an initial decision (or PID) has been issued lies with the Licensing Board prior to the filing of an appeal from (or exceptions to) that decision. *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-726, 17 NRC 755 (1983). On the other hand, once an appeal from an initial decision (or PID) has been taken, jurisdiction passes to the Appeal Board. *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 1), ALAB-699, 16 NRC 1324 (1982).⁵

Here we have a situation which, from a jurisdictional standpoint, does not fall precisely within the contours of either *Limerick* or *TMI*. An appeal from our Phase I PID has been filed by CCANP. The Appeal Board has ruled on certain legal and procedural questions raised by CCANP but has declined, for lack of finality, to rule on the factual findings and conclusions on which an appeal had also been taken. The Appeal Board reasoned that our rulings on various substantive issues — including the character and competence issues to which the Motion to Reopen is directed — are subject to supplementation or change as a result of further consideration in Phase II and/or III of the proceeding. ALAB-799, *supra*, 21 NRC at 368-70.

All parties assert that we have jurisdiction to consider the Motion, although for somewhat differing reasons. CCANP claims that the Appeal Board, in ALAB-799, “essentially remanded” the various factual questions back to us (Motion at 7). The Applicants regard the jurisdiction question as a “close one” (Response at 28), pointing to several decisions

⁴ Tr. 10,869-914, 10,950-11,074. The Applicants’ written response to the Motion, as well as their Memorandum on the representation matter, treated these questions. The Staff’s response did so to a limited extent. CCANP’s Motion raised and discussed certain aspects of these questions.

⁵ From the standpoint of when jurisdiction passes from the Licensing Board to the Appeal Board, it makes no difference whether the Licensing Board’s decision is an Initial Decision or a PID. *Limerick*, ALAB-699, *supra*, 17 NRC at 757 n.4.

which depart from the strict dichotomy discussed above and noting (correctly) that the situation in this proceeding differs from those which have been the subject of the *Limerick* and *TMI* decisions cited above. The Applicants claim that, given the conflicting authority, a prudent approach would be for this Board to rule on the Motion, given our likely greater familiarity with the Phase I record than would have been attained thus far by the Appeal Board (a general approach endorsed by the Appeal Board in *Limerick*) (Response at 30). The Staff finds jurisdiction to lie with this Board “in view of the conclusion of proceedings before the Appeal Board and the Appeal Board’s recognition that further proceedings would be conducted before the Licensing Board before an initial decision on HL&P’s character and competence would issue” (Staff Response at 2 n.1).

Although we express no opinion as to whether the Appeal Board also has jurisdiction to consider the Motion, we conclude that, in the circumstances of this proceeding, we do have such jurisdiction. The question is indeed a close one. The Appeal Board has an appeal from our character and competence determinations pending before it; and, contrary to CCANP’s position, it has not remanded those determinations for us to reconsider. In fact, the Appeal Board observed that its decision to defer appellate review of our substantive rulings on HL&P’s character and competence “does not signal an opportunity for *de novo* relitigation of matters disposed of by the Licensing Board.” ALAB-799, *supra*, 21 NRC at 385.

Nonetheless, the character and competence issues remain before us, and there is a “reasonable nexus” between those issues and the material upon which CCANP seeks to reopen the record. *Virginia Electric and Power Co.* (North Anna Nuclear Power Station, Units 1 and 2), ALAB-551, 9 NRC 704, 707 (1979); *cf. Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-782, 20 NRC 838, 841-42 (1984). Indeed, much of the information in Exhibit “A” to the Motion is directly material to Phase II issues. Moreover, although the Appeal Board in ALAB-799 did not sanction the relitigation of Phase I issues, neither did it preclude us from doing so in appropriate circumstances. Furthermore, we have sufficient familiarity with the Phase I record to be able to evaluate the import of the documents which the Motion seeks to add to the record.

In these circumstances, we agree with all parties that we have jurisdiction to entertain the Motion. We are thus proceeding to consider it.

2. Inclusion of Certain Aspects of Motion to Reopen Within Scope of CCANP Contention 10

The next procedural question was whether certain aspects of the Motion were comprehended by CCANP Contention 10, which is to be litigated in Phase II. If so, the standards for reopening a record would not be applicable to those aspects of the Motion.

Contention 10 questions whether, shortly after its release, the Quadrex Report should have been reported to the Licensing Board pursuant to the *McGuire* rule (see *Duke Power Co.* (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-143, 6 AEC 623, 625-26 (1973)), and whether HL&P's failure to do so reflects adversely on its character and/or competence. LBP-85-6, 21 NRC 447, 463 (1985). The Applicants agree with CCANP that issues regarding the termination of B&R in 1981 (as related to the candor of HL&P's testimony in the Spring and Summer of 1981) can be considered under issues framed for Phase II. The Applicants would include portions of Exhibit "A" but would exclude the remainder of "A" and all of Exhibits "B"- "PP" of the Motion. Applicants' Response at 31. The Staff would have us read Contention 10 strictly, limited to the reportability of the Quadrex Report itself (Tr. 10,977-84). As set forth in our Prehearing Conference Order, however, we consider this contention as broad enough to include not only the reportability of the Quadrex Report but also of the replacement of B&R as an outgrowth of the Quadrex Report.

We noted that we consider as relevant only the portion of the PUCT transcript (Exhibit "A" to the Motion) which may bear on the accuracy of the information previously supplied to this Board, together with possible obligations to advise this Board under the *McGuire* rule of the potential replacement of B&R. We here add that we see no necessary connection of Exhibits "B"- "PP" to this contention (as amended) (although we are not now so ruling as a matter of law). We also add that events which might constitute the basis for a claim that B&R was not replaced on a timely basis do not constitute in our view the type of information concerning the replacement or potential replacement of B&R which we view as potentially encompassed under *McGuire* rule obligations.

3. Representation of Applicants by Their Present Counsel

In its Motion, CCANP asserts that several of the statements made and actions taken by Applicants' lead counsel, with respect to HL&P's eventual decision to replace B&R, were improper (Motion at 4, 5, 6, 10, 43, 44, 46-47). The Motion alleges, *inter alia*, that "Applicants' counsel,

involved directly in the replacement discussions, did not notify the Board of said discussions” (*id.* at 43); and that he “participated in manipulating” and “apparently tried to orchestrate the replacement to have the minimum impact on the case Applicants had already prepared for the Board” (*id.* at 4, 43; *see also* Tr. 11,041, 11,044-46). CCANP contends that in June 1981, HL&P had arrived at the decision to replace B&R but did not notify the Board of the proposed change until late September of that year (Motion at 4; Tr. 11,051). The Intervenor claims that the lapse from June until September is evidence that Applicants’ counsel purposefully withheld information from the Licensing Board and misled the Board in an effort to encourage a less careful investigation into the licensing ramifications of replacing B&R (Motion at 4, 46-47).

The Board was concerned that these allegations potentially raise factual questions which, if resolved through adjudicatory hearings, might require the testimony of Applicants’ lead counsel. CCANP’s allegations portray the role of Applicants’ lead counsel in the selection of the B&R replacement as involving other than legal advice. As a result of the allegations, therefore, the Board in its April 18, 1985 Order asked the parties to provide their opinions on the “propriety of continued representation of a party by an attorney who may have participated *other than as counsel* in factual matters potentially at issue before an adjudicatory tribunal” (emphasis supplied).⁶

The Applicants claim CCANP’s assertions are meritless because (1) Applicants’ counsel, Mr. Jack Newman, was acting in his legal capacity in advising HL&P of the likely ramifications which would ensue if B&R were replaced (Applicants’ Memorandum at 8-9) and (2) Mr. Newman did not suggest an untimely or tardy announcement of the replacement decision at all, much less for the reasons asserted by CCANP (*id.* at 6-7). The Applicants also claim that, even if Mr. Newman were to appear as a factual witness on the issues raised by CCANP, neither they nor CCANP would be prejudiced by such continued representation. Finally, they assert substantial hardship if Mr. Newman (and his firm) were not permitted to continue to represent the Applicants in this proceeding.

Our April 18, 1985 Order referenced the standards for judging an attorney’s conduct set out in the American Bar Association Model Rules

⁶ The parties were notified that oral argument would be heard on three procedural questions, including this one, at the April 30, 1985 prehearing conference. The Board also provided the parties with an opportunity to submit written responses. The Applicants filed their April 25, 1985 Memorandum (*see* note 3, *supra*) to address the Board’s representation question.

of Professional Conduct, adopted by the ABA on August 2, 1983. Those rules represent the evolutionary development of standards by which the conduct of attorneys is evaluated. However, the District of Columbia, where Mr. Newman is a member of the Bar, continues to adhere to the earlier Model Code of Professional Responsibility, as the Model Rules have not yet been ratified for adoption in the District. Thus, Code provisions DR 5-102(A) and (B) are the standards which are to be applied to Mr. Newman. The ABA Code has been applied to attorneys appearing before administrative agencies generally, and the NRC specifically.⁷ In evaluating the potential disqualification of Mr. Newman, we will consider the application of both the Code and the Model Rules.

DR 5-102(A) applies to the possibility of a client calling its attorney as a witness on its behalf. That disciplinary rule states:

If, after undertaking employment in contemplated or pending litigation, a lawyer learns or it is obvious that he or a lawyer in his firm ought to be called as a witness on behalf of his client, he shall withdraw from the conduct of the trial and his firm, if any, shall not continue representation in the trial, except that he may continue the representation and he or a lawyer in his firm may testify in the circumstances enumerated in DR 5-101(B) (1) through (4).

The exception applicable to the circumstances of this case is DR 5-101(B)(4). It permits an attorney to continue representation even if he were to testify,

if refusal would work a substantial hardship on the client because of the distinctive value of the lawyer or his firm as counsel in the particular case.

Thus, the prohibitive portion of DR 5-102(A) makes prerequisite that Mr. Newman learn, or it becomes obvious, that he or a lawyer in his firm will be called to testify as a witness for his client. Although at this point Mr. Newman clearly is aware of the possibility that he could be called as a witness to explain his participation in and knowledge of the process of replacing B&R, HL&P, Mr. Newman's client, in both its written Memorandum and at the prehearing conference, unequivocally stated that the company would not call Mr. Newman as its witness⁸ (Memorandum at 11 and Tr. 10,963-64).

If CCANP were to call Mr. Newman or a member of his firm to testify, DR 5-102(B) would come into play. That rule would allow him to

⁷ *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-691, 16 NRC 897, 916 & n.26 (1982).

⁸ Mr. Newman and his firm are represented on the continued representation question by Mr. William H. Allen, an attorney with the firm of Covington & Burling. It was Mr. Allen who signed the Memorandum submitted on this issue and appeared at the prehearing conference on behalf of Mr. Newman.

“continue the representation until it is apparent that his testimony is or may be prejudicial to his client.” At this point we do not have sufficient documentation to lead us to conclude that Mr. Newman’s testimony would prejudice HL&P’s case in any meaningful way.

The proposed ABA Model Rule relevant to the circumstances before us is 3.7(a)(3). That rule and its exception provide that

A lawyer shall not act as advocate at a trial in which the lawyer is likely to be a necessary witness except where: . . . (3) disqualification of the lawyer would work substantial hardship on the client.

We hold in abeyance the issue of whether Mr. Newman may be a witness “necessary” for a complete record. Mr. Newman could become a necessary witness to testify to factual matters if other evidence were to lead to a reasonable inference that Mr. Newman held some unique, factual and material information not known by others involved in the replacement discussions. The Applicants argue that this is not the case (Applicants’ Memorandum at 11). For now, we accept Applicants’ representation of Mr. Newman’s role during the replacement process as remaining within the boundaries of providing legal advice, although there must necessarily have been issues, factual in nature, to which he was privy. We will not immediately leap, as CCANP would have us do, from the premise that because Mr. Newman was actively involved in a selection process which may be categorized as a corporate management decision, he was not providing legal advice or services. The demands upon a licensee in a highly regulated field such as nuclear power generation could well mean that a company views it as only prudent to confer with its attorneys on many diverse aspects of the licensing process. Some of these questions may be legal in nature, but not specifically related to pending litigation.

The exception to DR 5-102(A) of the Code, as well as to Model Rule 3.7(a), necessitates a discussion of whether a “substantial hardship” would be created for Applicants if Mr. Newman were precluded from continuing his role as lead counsel. While we do not imply that another attorney familiar with the case could not replace Mr. Newman under extraordinary circumstances, a showing of substantial hardship is the standard to be met under both the Code and the Model Rule. (Under the Code, such hardship must be premised upon the “distinctive value” of the lawyer in the particular case.) The Board reviewed several of the factors Applicants highlighted in their Memorandum. We agree that the ongoing nature of a nuclear licensing proceeding gives intrinsic value to an attorney (and his firm) consistently involved since the litigation

began. Mr. Newman has maintained the position of lead counsel for HL&P's STP licensing activity for 12 years. We do not doubt that the knowledge accumulated by Mr. Newman, of both technical matters and administrative procedure in the unique administrative forum of the NRC, makes his counsel precious to Applicants. We were adequately convinced by the arguments propounded in their Memorandum and during the prehearing conference that Mr. Newman's services are of "distinctive value" to the Applicants and that the Applicants would endure substantial hardship if they were forced to seek new counsel at this point in the proceeding (Tr. 10,971; Applicants' Memorandum at 18-19).

Further, the Applicants argue that the disqualification rules for an attorney/witness are not meant to encroach upon a client's right to the legal representative of its choice (Memorandum at 13, 15). We agree that once the possible prejudice which may accrue is highlighted to the client, the client is free to make the decision to continue with the same counsel in the face of such information. Particularly significant is the sophistication of the client where, as here, the client makes an informed decision with a complete understanding of the possible consequences and implications of retaining its counsel. The company has represented to the Board that it is completely at ease with the decision to waive counsel's possible disqualification (Memorandum at 17-18).

Finally, the comment on Model Rule 3.7 indicates that combining the roles of advocate and witness "can prejudice the opposing party" and "[t]he opposing party has proper objection where the combination of roles may prejudice that party's rights in the litigation."⁹ Upon specific inquiry from this Board, CCANP indicated that it would not be prejudiced by Mr. Newman's continued representation of the Applicants were Mr. Newman to appear as a witness (Tr. 11,057-59, 11,064-65).

For these reasons, we conclude that, even if Mr. Newman were to appear as a witness, his disqualification (and, *per force*, the disqualification of other members of his firm) from continuing to represent the Applicants would amount to a substantial hardship to the Applicants. Absent any showing of prejudice to CCANP, we conclude that Mr. Newman (and members of his firm) should not be disqualified from con-

⁹The ABA Code does not appear to take into account prejudice to the opposing party. But the rationale for considering such prejudice (as expressed in the comment on the Model Rule) would appear as applicable to the Code as to the Model Rule, in evaluating the substantiality of claimed hardship.

tinued representation of the Applicants, even if it were necessary or appropriate for Mr. Newman to appear as a witness in this proceeding.¹⁰

C. Ruling on Motion

1. Legal Standards

The standards for reopening a record are well established and not disputed by any party here. As we have previously observed, the proponent of a motion to reopen a record bears a heavy burden. LBP-84-13, *supra*, 19 NRC at 716; *see also Kansas Gas and Electric Co.* (Wolf Creek Generating Station, Unit 1), ALAB-462, 7 NRC 320, 338 (1978); *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-359, 4 NRC 619, 620 (1976). Three criteria must be satisfied:

1. The motion must be timely filed;
2. It must address a significant safety (or environmental) issue; and
3. Where, as here, a decision has already been reached on the question for which reopening the record is sought, the motion must demonstrate that the information sought to be added to the record might alter the result previously reached.

LBP-85-13, *supra*, 19 NRC at 716; *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 1), ALAB-774, 19 NRC 1350, 1355 (1984); *Louisiana Power & Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-753, 18 NRC 1321, 1324 (1983); *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-598, 11 NRC 876, 879 (1980).¹¹

The criteria for reopening a record must be applied separately to each issue for which reopening is sought. Thus, the circumstance that one or more issues or questions remain to be heard or decided does not alter the necessity for satisfying the reopening criteria for issues already decided. *See Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 2), ALAB-486, 8 NRC 9, 22 (1978).

Finally, the criterion of timeliness, while important, may be subsumed in circumstances where it is outweighed by the significance of the infor-

¹⁰ We previously announced this conclusion in our Memorandum of May 10, 1985. Given the conclusion we have reached, we need not treat Applicants' argument that the lawyer-witness disqualification rule need not be applied, or need not be vigorously applied, in administrative proceedings such as this.

¹¹ As the Staff points out, the Commission has proposed to codify these standards in its regulations. 49 Fed. Reg. 50,189 (Dec. 27, 1984). The Commission stressed that it was proposing to codify "current reopening criteria" but that it was considering adding certain documentation requirements. *Id.* We are not basing any of our conclusions on a failure to abide by such proposed documentation requirements (e.g., affidavits).

mation in question. The Appeal Board has long recognized that "a matter may be of such gravity that the motion to reopen should be granted notwithstanding that it might have been presented earlier." *Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-138, 6 AEC 520, 523 (1973).¹²

2. *Positions of Parties*

The CCANP Motion is opposed by both the Applicants and Staff for failing to satisfy the criteria for reopening a record. No party disputes that the character and competence questions to which the Motion is addressed are significant safety issues, although the Applicants and Staff do challenge the relevance to those issues (and thus the significance) of much of the information proffered by the Motion. Nonetheless, there appears to be no dispute that the second reopening criterion has been satisfied.

The Applicants and Staff each claim that the Motion was not submitted in a timely fashion. Each also asserts that even if the Motion were considered timely, the documents and transcript of testimony sought to be included in the record would not have changed the result which we reached in our earlier Partial Initial Decision. They regard the documents as either cumulative or as not material.

CCANP asserts that its Motion was timely. It claims that it became aware of these documents and testimony excerpts through the participation of its primary representative in the PUCT proceeding, and that it did not have the documents in its possession prior to October or November 1984, when they were admitted into evidence in that proceeding (Motion at 40; Tr. 10,997). CCANP also states that the PUCT Final Order was entered on January 11, 1985, and was subject to rehearing until late February 1985.

On the merits, CCANP spells out the relevance of some (although not all) of the documents proffered. It also specifies certain of our findings and conclusions which, it claims, would be altered by the "new" evidence. Most particularly, CCANP focuses on our conclusion that, prior to the 1980 Show-Cause Order, HL&P was "not sufficiently knowledgeable to realize that major corrective actions were needed or to ascertain what those corrective actions should be" (LBP-84-13, *supra*, 19 NRC at 688). CCANP claims that the documents upon which the

¹² The Commission's proposed regulations would qualify the timeliness criterion to the extent that "an exceptionally grave issue may be considered in the discretion of the presiding officer even if untimely presented." 49 Fed. Reg. at 50,190.

Motion is based demonstrate that “HL&P had extensive knowledge of B&R’s failures” long before issuance of the Show-Cause Order — indeed, even prior to the award of construction permits to HL&P. It seeks to reopen the record “to determine whether the timing of HL&P’s replacement of B&R was consistent with the character and competence necessary for operation of a nuclear power plant.” Motion at 3-4, 7-8, 25-39. CCANP also charges that counsel for the Applicants participated in “manipulating” the replacement decision (and its announcement to us) “with an eye toward minimizing its impact” on this proceeding, and this manipulation reflects upon HL&P’s candor (one of the elements of character) (*id.* at 4-5). (*See* discussion, pp. 1715-20, *supra.*) CCANP also seeks discovery on matters raised by its Motion.

3. Discussion

As described above, of the three criteria for reopening a record, no party appears to question the significance of the character and competence issues to which the Motion is directed. We agree and conclude that CCANP has satisfied the second criterion for reopening a record; hence we will limit our discussion to the other two criteria.

(a) As for the first of the criteria, timeliness, the *latest* time when CCANP became aware of *all* of the information comprehended by the Motion was October (or possibly November) 1984, when the documents and testimony covered by the Motion were entered into evidence in the PUCT proceeding.¹³ The Motion was not filed until April 17, 1985, almost 6 months later. That period in itself is excessive. We note that CCANP advised the Appeal Board in December 1984 that it planned to file a motion covering at least some of the material which was incorporated in the Motion before us (12/13/84 App. Bd. Tr. 10, 36). Not until 4 months later was the Motion in fact filed.

Moreover, most of the information underlying the Motion was available much earlier — some of it, in fact, predating the award of construction permits. To the extent relevant to Phase I issues, such information could have been obtained through discovery. (Neither CCANP nor the Applicants could state whether or not any of the documents, or at least certain key documents, had been obtained or at least requested by CCANP (or CEU, the other Intervenor in Phase I) as a part of Phase I discovery. Tr. 11,001-02 (CCANP); Tr. 10,891 (Applicants).)

¹³ CCANP has not explained, and we fail to perceive, the relevance from a timeliness standpoint of the January 1985 date when the PUCT reached its decision or the February 1985 date within which the PUCT decision was subject to reconsideration.

CCANP asserts that it was afforded inadequate discovery opportunities in Phase I (Tr. 11,002) and that between October 1984 and April 1985, it was faced with numerous filing deadlines in this proceeding which made it impossible for CCANP to have filed its Motion earlier (Motion at 41). We do not view these grounds as legally adequate to justify filing the Motion as late as April 17, 1985 (for information which became known *no later than* October or November 1984, and should have been available to CCANP earlier, either in this proceeding or the PUCT proceeding). For, as another Licensing Board has held, it is the opportunity to gain access to information which is significant in determining whether a motion based on such information is timely filed. *Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2), LBP-83-52, 18 NRC 256, 258 (1983). *See also Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-775, 19 NRC 1361, 1369 (1984).¹⁴

For the foregoing reasons, we find that CCANP's Motion was not timely filed. Nonetheless, because untimeliness is subsidiary to the significance to the proceeding of the information sought to be added to the record, we are relying on untimeliness only for the limited purpose of ruling on CCANP's discovery request (*see* p. 1730, *infra*). We are not basing our decision not to reopen the Phase I record on the Motion's untimely filing. Rather, we are denying the Motion to reopen on the ground that the documents and information proffered (to the extent not material to issues already being litigated in Phase II) are not susceptible of changing the conclusions which we earlier reached on character or competence.

(b) The final — and in our view most important — criterion for reopening a record is whether the new information is significant enough that it might change the result which we previously reached. For this evaluation, the information in Exhibit "A" to the Motion (the PUCT transcript excerpts) must be differentiated from the remainder of the information supporting the Motion.

To the extent that the Exhibit "A" PUCT transcript is utilized to support a claim that the Licensing Board should have been informed earlier than September 24, 1981, of the change or proposed change in project contractors, we have concluded that the information is relevant to CCANP Contention 10, which is to be litigated in Phase II. *See* discussion *supra*, § B.2, p. 1715. For that information, no motion to reopen a record is required, and the criteria for reopening do not apply. On the

¹⁴ The numerous filing deadlines to which CCANP refers (Motion at 41) might have been grounds for an extension of time within which to file the motion. CCANP did not seek such an extension.

other hand, to the extent that the PUCT transcript relates to the selection of one contractor *vis-a-vis* another, it does not appear relevant either to Contention 10 or to the Phase I issues sought to be reopened.

The remaining documents are claimed mainly to support the proposition that HL&P's asserted delay in replacing B&R reflected adversely on HL&P's character and/or competence. In support of its thesis that our PID would be changed by the newly proffered evidence, CCANP provides several examples of findings or conclusions which it believes would be modified. We discuss them *seriatim*.

Example "a" (Motion at 26-27) questions our findings that the history of nonconforming or noncomplying conditions at STP (including incidents of harassment of QC inspectors) reflected inexperience rather than lack of corporate character. CCANP cites excerpts from 1977 and 1978 reports to HL&P by Management Analysis Corp. (MAC), a consultant, which state that HL&P management was inexperienced; it argues that since HL&P knew it had inexperienced management, the non-compliances and nonconformances at STP were attributable to lack of character rather than experience.

The MAC reports on which CCANP relies for this example (Exhibits "D," "F") were not themselves introduced into evidence in Phase I, but their general content was discussed (*e.g.*, Tr. 1235-36, 5119-20 (Oprea)). We considered evidence as to HL&P's knowledge of, and attempts to correct, its lack of experience in our PID. LBP-84-13, *supra*, 19 NRC at 687-88, 691-93; FOF 59-60, 19 NRC at 740-41; FOF 99-104, 19 NRC at 752-53. Having now examined the reports, we do not perceive that they might change any conclusions which we reached.

Example "b" (Motion at 27-28) relies on a draft of a 1979 MAC report concerning HL&P personnel (Exhibit "HH") and in effect claims that, since HL&P knew of the deficiencies of its personnel, its continued reliance on them demonstrated poor character.

We have already looked at the competence of the employees named by CCANP. LBP-84-13, *supra*, 19 NRC at 689, 692-93; FOF 101-103, 19 NRC at 752. The new evidence would not significantly affect our evaluation that at least certain of the employees (Messrs. R.A. Frazar and E.A. Turner) lacked nuclear experience. CCANP's claim that HL&P failed to implement the advice of its consultant is not supported by evidence. *See, e.g.*, FOF 208-209, 211-213, 215-216, 19 NRC at 777-79. Perhaps HL&P did not act as quickly as CCANP (or we) might have preferred — *i.e.*, prior to issuance of the Staff's Show-Cause Order. We specifically found that HL&P "tolerated deficiencies in personnel for too long a period of time." 19 NRC at 689. But changes eventually occurred. The lack of timeliness of particular changes — if proved —

would not cause us to find a character deficiency sufficient to disqualify HL&P from receiving operating licenses. Indeed, we have already rejected this same claim of CCANP. *Id.* at 689-90.

Example “c” (Motion at 28-29) asserts that several MAC reports or other documents (Exhibits “D,” “E,” “F,” “G” and “Z”) undermine the Board’s earlier conclusion concerning HL&P’s asserted abdication of responsibility for the STP to B&R. But as the Staff and Applicants each point out, the Phase I record is replete with testimony concerning HL&P’s assumption or lack of assumption of responsibility for the project (Staff Response at 14-15; Applicants’ Response, Appendix A, at 4-5). We concluded then that HL&P did abdicate some responsibility for the STP to B&R at lower levels of responsibility but we attributed that failure to a lack of competence rather than character. The “new” documents proffered by CCANP are not identical to — but are largely cumulative of — evidence already in the record. They emphasize that HL&P management was advised by a consultant as early as 1977 to 1979 that too much responsibility had been turned over to B&R (or, alternatively, that HL&P was not exercising responsibility effectively). But these documents do not contradict any of the findings to which CCANP alludes.

Indeed, the “new” documents can as easily be read not as advocating replacement of B&R (as CCANP asserts) but rather as supporting a conclusion that HL&P should take steps to improve B&R’s performance — exactly the course of action which HL&P initially followed. For example, Exhibit “F,” a draft MAC report dated October 16, 1978, concludes (at 15) that

There are many good people within the Brown & Root organization and the corporation has the capability of performing well on the South Texas Project from here on in. Changes in attitude and organization at all levels are called for. At this stage of the project, MAC feels the *only* alternative is to make B&R a success. [Emphasis in original.]

Exhibit “G,” a MAC report dated January 1979, recognizes some of the management problems to which CCANP alludes but indicates MAC’s then-current approbation of the corrective actions being undertaken by HL&P. The report states (at 1):

Prior to October, 1978, serious deficiencies in Project Management and Project Controls had been evidenced and major changes in organization and operation of the STP were warranted. . . . Several specific action items were recommended by MAC and implementation of those recommendations deemed appropriate have been in process since mid-November, 1978.

In short, we do not perceive any of the documents relied on by CCANP in example "c" (individually or collectively) to be susceptible of significantly changing our findings or conclusions on HL&P's assumption of responsibility for the STP. *See, e.g., CLI-84-13, supra*, 19 NRC at 688-90; FOF 115-116, 19 NRC at 756; FOF 151-152, 19 NRC at 764-65; FOF 185-187, 19 NRC at 771-72.

Example "d" (Motion at 29-30) also challenges the responsibility of HL&P management for not dismissing B&R earlier. It questions our conclusion that HL&P upper-level management did not abdicate responsibility to B&R for the QA/QC program, and that the lack of effective control at lower levels was attributable to inexperience as well as excessively long lines of communication. For its basis, CCANP cites Exhibits "F," "P," "Q," "Z" and "CC" to the effect that HL&P knew during 1977-1978 that it was having QA/QC problems with B&R.

This information is not "new" but rather is cumulative. We made specific findings on this very subject. The topics covered by the exhibits cited by CCANP were the subject of testimony or documents previously presented to the Board. *See* Staff Response at 15-16 & n.6. Moreover, as set forth under example "c," the documents relied on by CCANP do not necessarily advocate the replacement of B&R at an earlier date, the result for which CCANP advances them.

In example "e" (Motion at 30-32), CCANP claims that our conclusion that "friction between QC personnel and construction personnel" was attributable to inexperience on the part of both HL&P and B&R rather than a character deficiency (LBP-84-13, *supra*, 19 NRC at 692, 712) would be modified by Exhibit "AA," as well as "D" and "P," which are said to demonstrate that HL&P knew of such friction as early as 1977 and continued to "tolerate" it for several years.

The documentation of HL&P's knowledge of incidents of harassment during 1976-1978 is not new information. We made specific findings and conclusions concerning such incidents, together with HL&P's attempts to deal with them. 19 NRC at 687, 710-13; FOF 62, 64, 19 NRC at 741-42; FOF 75, 19 NRC at 744; FOF 376-378, 19 NRC at 820-21; FOF 381-399, 19 NRC at 821-26. No "new" evidence is provided which would significantly change the foregoing findings or conclusions. Moreover, the exhibits cited do not reflect that HL&P "tolerated" such incidents, as claimed by CCANP. Nor do they cast doubt on our earlier conclusions concerning corrective action taken by HL&P to prevent such incidents. 19 NRC at 686-87, 692, 711-13. We note that the affidavits submitted by the Staff and Applicants in conjunction with the Phase II examination of the competence of HL&P and its new contractors, as

well as underlying Staff inspection reports, appear essentially to support our earlier expectations of improvement in this area.

Example "f" (Motion at 32-36) concerns HL&P's knowledge of the need for corrective action prior to the issuance of the Staff's Show-Cause Order in 1980. CCANP cites Exhibits "D," "F," "G," "P," "V," "Z," "AA," "CC" and "JJ" to the effect that HL&P had early warnings concerning B&R deficiencies and accordingly should have taken steps earlier to remove B&R. None of these documents is inconsistent with our previous conclusion that HL&P had early warning of B&R deficiencies but lacked the experience at that time to recognize the need for major corrective action. *See* LBP-84-13, *supra*, 19 NRC at 687-88.

Moreover, the major thrust of most of those documents was not that B&R should be dismissed but rather that HL&P should take steps to improve both its own and B&R's performance — a course of action which HL&P attempted to follow. *See, e.g.*, Exhibit "D" (at IV-2); "F" (at 15, quoted *supra* at p. 1725); "G" (at 1, quoted *supra* at p. 1725) and at 22-23); "P"; and "Z." CCANP concludes that "Quadrex should have been hired in 1978, not 1981" (Motion at 33). We do not necessarily disagree. But HL&P's failure to act earlier than it did does not, in our view, constitute such a significant character (or competence) deficiency as to alter the general conclusions which we reached in our PID.

In example "g" (Motion at 36), CCANP claims that Exhibits "D," "E," "F" and "G" (various MAC reports) would cause us to change FOF 93-112, 19 NRC at 750-55, concerning "Evaluation of Root Causes of Noncompliances." CCANP would have us conclude that HL&P was knowledgeable of the root causes earlier than we found and should have undertaken corrective action earlier. However, although the reports themselves were not in the record, testimony about them was earlier provided to us and we in fact made findings very comparable to that which CCANP now urges upon us — i.e., that HL&P should have taken earlier action to correct problems at STP. LBP-84-13, *supra*, 19 NRC at 687-90. We stress again that the documents cited by CCANP (particularly "F" and "G") did *not* conclude that B&R should have been replaced.

Example "h" (Motion at 36-38) criticizes our FOF 125, 19 NRC at 758, for giving credit to HL&P (in terms of assumption of responsibility) for the dismissal of B&R. CCANP relies on Exhibits "B," Appendix 1 to "B," "C," "D," "H," "P," "Q," "U," "X," "BB" and "FF," to show that B&R was demonstrating engineering inadequacies at an early date. CCANP would have us rewrite FOF 125 to give credit only to Mr. Jerome H. Goldberg (who became an HL&P employee late in 1980) but to fault HL&P for not taking action earlier. However, FOF 125 was predicated on the discharge of B&R as being an assumption of responsibility

by HL&P (for whom Mr. Goldberg was acting). The cited documents do not necessarily indicate that the discharge action should have been taken earlier. But to the extent they do, they would only derogate from — not eliminate — the responsibility we perceived HL&P to have undertaken. Lack of timeliness on the part of HL&P — to the extent not already proved — would not in our opinion be sufficient to cause us to modify our earlier conclusions and determine that HL&P was so lacking in character or competence that it should be denied operating licenses.

The final example, “i” (Motion at 38-39) summarizes the various reasons why CCANP believes the record should be reopened but provides no additional example of “new evidence” or findings which should be changed. As the Staff points out, the subjects listed were extensively dealt with in our PID, on the basis of record evidence (Staff Response at 18-19). We agree with the Staff that “all matters which CCANP sets out in this example as a matter it wishes to add to the record are already in the record.” Thus these matters could not be said to have even the potential for changing the results which we already reached.

We have reviewed the examples set forth by CCANP in its Motion in some detail and have concluded that none of them include new information which might change the result which we previously reached. We have reached the same conclusion with respect to all material supporting the motion (other than portions of Exhibit “A”). This is not to say that, if offered in Phase I, some of the documents (“B”-“PP”) would not have been accepted into evidence or that some findings in our PID might not have been altered to some degree — if only to reflect the presence of additional information in the record. Except with respect to “A,” however, the documents either individually or collectively would not have changed the result which we reached. Even if we were to determine that B&R should have been discharged 2 or 3 years earlier than 1981, we would not judge HL&P’s failure to take that action more expeditiously, to the extent indicated by the documents provided us, as significant enough to deprive HL&P of the opportunity to be awarded operating licenses.

As for Exhibit “A,” we view portions of that PUCT transcript as bearing importantly upon HL&P’s obligations to keep the NRC (including this Board) informed of significant events and hence as potentially affecting our earlier conclusions on HL&P’s candor — in our view, one of the most significant aspects of character. In any event, the transcript, insofar as it bears on those obligations to inform NRC of significant events on a

timely basis, is relevant to an already admitted contention and hence need not be evaluated against the strict criteria for reopening a record.¹⁵

D. Discovery

In its Motion (at 47-48), CCANP seeks additional discovery on “the precise role played by counsel for Applicants in the replacement process for B&R and in advising or otherwise influencing the decision of Applicants not to inform the Board of the replacement plans or to testify about such plans.” CCANP also seeks broad discovery “on any matter where [Phase I] testimony is questionable” (citing as precedent the Memorandum and Order (Reopening Discovery; Misleading Statement), dated December 18, 1984, in *Texas Utilities Electric Co. (Comanche Peak Steam Electric Station, Units 1 and 2)*, LBP-84-56, 20 NRC 1696). For the latter request, CCANP asks that an “independent special master” be appointed to reduce the workload of CCANP or the Board “in order to identify the possible areas where credibility is questionable and discovery is necessary” (Motion at 48). Both the Applicants and Staff oppose any further discovery by CCANP (Applicants’ Response at 26-27; Staff Response at 19-21).

At the outset, we must point out that, in a proceeding such as this one, discovery may relate only to “matters in controversy” — i.e., accepted issues or contentions. 10 C.F.R. § 2.740(b)(1). We have declined to reopen the Phase I record on the character and competence issues. Moreover, there already has been extensive discovery on those issues. Thus, new discovery on the activities of B&R or HL&P covered by Exhibits “B”-“PP” would not be appropriate or warranted. Nor, as applied to matters raised by those exhibits, would the broad discovery requested by CCANP be cognizable. We see no basis in the materials presented to us for invoking the type of far-reaching discovery permitted by the *Comanche Peak* Board. For as we have set forth, we do not regard Exhibits “B”-“PP” as necessarily or even likely being inconsistent with testimony previously presented to us.¹⁶

With respect to Exhibit “A,” however, we are permitting certain aspects of that exhibit relative to the status of B&R during the Summer of

¹⁵ We do not presently believe that documents “B”-“PP” bear on HL&P’s obligation to inform NRC of significant relevant information, but at this time we are not so ruling as a matter of law.

¹⁶ For that reason, we need not consider CCANP’s request for us to appoint an “independent special master.” We question, however, whether an “independent special master” could be appointed to perform many of the tasks outlined by CCANP, particularly conducting discovery on behalf of a party. See 10 C.F.R. § 2.722. As the Staff observes (Staff Response at 20-21) the appointment of a “special master” for that purpose would constitute financial aid to an intervenor, which is prohibited.

1981, and HL&P's advice to the NRC (including this Board) of that status, to be litigated under CCANP Contention 10. When that contention was strictly limited to the reporting of the Quadrex Report, we ruled that CCANP had forfeited its right to further discovery on that question. LBP-85-6, *supra*, 21 NRC at 466. At the same time, however, we directed the Applicants to provide the Board and parties with copies of certain records relevant to that subject. *Id.* at 463-64. (The Applicants have complied with that direction.)

We earlier determined that CCANP was untimely in waiting until April 17, 1985, to advise us of PUCT testimony presented in October 1984 (*see supra*, pp. 1722-23). To the extent that CCANP seeks further discovery on matters derived from the PUCT testimony, its request is similarly untimely. Although we did not deny CCANP's request to litigate matters derived from the PUCT testimony on untimeliness grounds, it is clear to us that further discovery on those questions could operate to delay the hearing, as to which testimony is scheduled to be filed in the near future. CCANP's untimeliness in filing the Motion in effect makes meaningful discovery on the matters from Exhibit "A" to be litigated inconsistent with following the schedule which we generally adopted over 3 months ago, prior to the filing of the Motion (LBP-85-6, *supra*, 21 NRC at 463). Since we do not believe that CCANP's untimeliness should be permitted to disrupt the hearing schedule, we are denying further discovery to CCANP.

Further, the only specifically identified topic of CCANP's discovery (the activities of Applicants' counsel) is not the primary focus of the matters to be litigated in Phase II and is likely to involve much privileged material. For reasons set forth earlier in this Memorandum and Order, we do not at this time perceive any "manipulation" efforts by Applicants' counsel sufficient to identify him as a "necessary" witness with respect to CCANP Contention 10. For this reason, that particular discovery requested by CCANP is not appropriate at this time.

Nonetheless, the development of an adequate record on CCANP Contention 10 (as modified) suggests that certain background information would be relevant. Thus, as in the case of LBP-85-6, we conclude that the Applicants should furnish the Board and parties (to the extent not already furnished) copies of internal documents or other records (in any form, including drafts), or correspondence or other communications with outside persons (including but not limited to consultants), concerning (1) the decisions to seek replacement of and, thereafter, to replace B&R, including the dates when those decisions were made; (2) the reportability of either of those decisions to NRC (including this Board); and (3) discussion (if any) of the discharge or potential discharge of

B&R between Mr. George Oprea and other corporate officers or officials. These records should cover the timeframe from April 1, 1981, through September 24, 1981, except that, for topic (3), the documents may be limited to the period April 1, 1981-June 29, 1981. If the Applicants claim attorney-client privilege or work-product protection (as defined by 10 C.F.R. § 2.740(b)(2)) for any record, they should so advise us, setting forth an identification of the particular record (sender, recipient, date, general subject matter).

The foregoing records or advice on privileged or protected documents should be in the hands of the Board and parties by Wednesday, July 3, 1985.¹⁷

For the reasons set forth above, and reaffirming conclusions set forth in our Sixth Prehearing Conference Order (Further Definition of Phase II Issues), dated May 17, 1985, it is, this 18th day of June 1985,

ORDERED

1. That CCANP's Motion to Reopen Phase I Record, dated April 15, 1985 (but filed April 17, 1985), is *denied*.

2. That material included in Exhibit "A" to CCANP's Motion is *accepted* for litigation under CCANP Contention 10, to the extent described in our Sixth Prehearing Conference Order (at 3-4) and in this Memorandum and Order (at 8-9).

3. Further discovery requested by CCANP in conjunction with its Motion is *denied* as untimely and, in certain respects, outside the scope of issues accepted for litigation in Phase II.

4. The Applicants are *directed* to provide the Board and parties with records as described in this Memorandum and Order (at 34). These records are to be provided by July 3, 1985 (except that Judge Lamb's copies need not reach him until July 8, 1985).

FOR THE ATOMIC SAFETY AND
LICENSING BOARD

Charles Bechhoefer, Chairman
ADMINISTRATIVE JUDGE

¹⁷ Dr. Lamb's copies need not reach him until Monday, July 8.

Through a telephone conference call on June 10, 1985, the parties were notified of this ruling on document production. Later that day, the Applicants advised that they would produce the specified documents on the schedule set forth herein.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

**Lawrence Brenner, Chairman
Dr. A. Dixon Callihan
Dr. Richard F. Cole**

In the Matter of

**Docket Nos. 50-456
50-457**

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

June 21, 1985

The Licensing Board admits a late-filed quality assurance contention which was originally rejected in a Special Prehearing Conference Order "SPCO" (LBP-85-11, 21 NRC 609, 627-38 (1985)) because it lacked bases and specificity. In the SPCO, the Board ruled that if Intervenor filed a new QA contention, it must meet specific pleading requirements and must raise potentially significant QA issues. The Board finds that the amended contention substantially complies with the directives of the SPCO, and that with the exception of allegations related to harassment, intimidation and retaliatory action against Braidwood site employees, the contention is acceptable as an issue in controversy. However, with regard to the portion of the contention alleging harassment by supervisors of site QC inspectors employed by the electrical contractor, the Board defers its ruling pending Intervenor's submission of an elaborated pleading setting forth the specific examples of harassment and retaliation, including those witnesses Intervenor will present, and the subject of each witness's testimony to support each alleged incident which Intervenor claim constitutes the harassment.

RULES OF PRACTICE: DISCRETIONARY INTERVENTION

It is within a Licensing Board's discretion to permit the amendment of a petition to intervene at any time. A Licensing Board may, in its discretion, provide intervenors with an opportunity to file an amended contention after rejecting the contention as it was originally filed, provided the amended contention is acceptable under a balancing of the factors governing late filings as well as the bases and specificity requirements applicable to all contentions. 10 C.F.R. § 2.714(a)(3); *see also* 10 C.F.R. § 2.714(b).

RULES OF PRACTICE: DISCRETIONARY INTERVENTION

Action by a Licensing Board rejecting a contention, but allowing an intervenor to file an amended contention, is not tantamount to admitting the contention conditionally. *See Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-687, 16 NRC 460, 466-67 (1982).

INTERVENTION: CONSIDERATION OF ISSUES ASSERTED BY UNTIMELY INTERVENOR

When an intervenor has been given the opportunity to refile an amended late contention, the Licensing Board does not have to draw the final balance of 10 C.F.R. § 2.714(a)(1)(i-v) factors until the amended contention is filed.

RULES OF PRACTICE: INTERVENTION PETITION PLEADING REQUIREMENTS

A Licensing Board may set out, in advance, more stringent standards for an intervenor to meet if circumstances such as lateness and the broad subject matter of the contention require a more precisely pleaded contention. Because of the inherently broad nature of most QA contentions, the basis and specificity requirements must be rigorously applied. *See Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), LBP-83-39, 18 NRC 67, 89 (1983).

RULES OF PRACTICE: INTERVENTION PETITION PLEADING REQUIREMENTS

A contention which identifies and summarizes the incidents relied upon, and appends specific portions of documents in support of interve-

nor's position, does not contravene the *Browns Ferry* ruling that a contention may not incorporate massive documents by reference in an effort to support a basis for the alleged proposition. *Tennessee Valley Authority* (Browns Ferry Nuclear Plant, Units 1 and 2), LBP-76-10, 3 NRC 209, 216 (1976).

RULES OF PRACTICE: PRECEDENTIAL EFFECT OF BOARD DECISIONS

The *Callaway* case (noting that a nuclear plant is bound to contain isolated instances of imperfect workmanship due to imperfect QA supervision) is not to be used as a shield by applicants who wish to protect against litigating the merits of QA/QC allegations, particularly where the contention is pleaded with specificity and bases. *Union Electric Co.* (Callaway Plant, Unit 1), ALAB-740, 18 NRC 343, 346 (1983).

RULES OF PRACTICE: CONTENTIONS

An intervenor is required to plead its contention with specificity in order that issues which will be subject to subsequent discovery and proof in an evidentiary hearing will be clearly framed for the other parties. *Commonwealth Edison Co.* (Byron Nuclear Power Station, Units 1 and 2), LBP-80-30, 12 NRC 683, 687 (1980). When the parties are provided sufficient notice so as to have general knowledge of what they must defend against or oppose, a Licensing Board may rule that the contention meets the specificity standard. See *Philadelphia Electric Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 20-21 (1974).

RULES OF PRACTICE: INTERVENTION PETITION PLEADING REQUIREMENTS

A harassment/intimidation contention containing bare allegations that site employees have contacted intervenors, in confidence, to express concerns regarding quality deficiencies, retaliatory action and inaction by applicant in addressing those complaints, fails for not informing the Board or parties of the specific issues intervenor seeks to litigate.

**RULES OF PRACTICE: INTERVENTION PETITION
PLEADING REQUIREMENTS; CONSIDERATION OF ISSUES
ASSERTED BY UNTIMELY INTERVENOR**

Even if the Licensing Board has suggested in an earlier order that it would be helpful to the Board in evaluating a contention to know the identity of intervenor's expected witnesses and the subject of their testimony, it is not an absolute requirement for intervenors to identify their witnesses prior to admission of a late contention. If an intervenor does not identify its witnesses, it will not necessarily preclude a Licensing Board from finding for an intervenor on the contribution to the record factor of 10 C.F.R. § 2.714(a)(1).

RULES OF PRACTICE: CROSS-EXAMINATION

A party can attempt to make its case solely through cross-examination. *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1096 n.30 (1983); *Tennessee Valley Authority* (Hartsville Nuclear Plant, Units 1A, 2A, 1B and 2B), ALAB-463, 7 NRC 341, 356 (1978); *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant), ALAB-137, 6 AEC 491, 504-05 (1973); *accord, Commonwealth Edison Co.* (Zion Station, Units 1 and 2), ALAB-226, 8 AEC 381, 389 (1974).

RULES OF PRACTICE: DISCRETIONARY INTERVENTION

When an intervenor has participated beneficially in another proceeding where the litigation focused on issues closely aligned to those currently proposed for adjudication, and the applicant in both cases is the same, the Licensing Board is entitled to infer that intervenors will contribute to the record. 10 C.F.R. § 2.714(a)(1)(iii).

RULES OF PRACTICE: WITNESSES

A Licensing Board may require an intervenor to name its witnesses by a specific date, if not doing so would impede the discovery process and the filing of summary disposition motions.

**RULES OF PRACTICE: NONTIMELY INTERVENTION
PETITION**

The significance of a proposed issue may counterbalance the potential delay which litigation of the issue may cause in the proceeding. 10 C.F.R. § 2.714(a)(1)(v).

**RULES OF PRACTICE: NONTIMELY INTERVENTION
PETITION**

Applicant will not avoid its share of responsibility for delay under 10 C.F.R. § 2.714 (a)(1)(v), by claiming that a late-filed contention which concerns applicant's corrective action programs will delay the proceedings, where the delay stems from the corrective actions employed by Applicant to remedy past problems, and not from the lateness of the contention.

**MEMORANDUM AND ORDER ADMITTING
ROREM *ET AL.* AMENDED QUALITY ASSURANCE
CONTENTION**

INTRODUCTION

By motion submitted to the Board on May 24, 1985, Intervenors Rorem *et al.* requested the admission of an amended quality assurance (QA) contention addressing various alleged QA deficiencies in the Braidwood Nuclear Power Station. This is the second time Intervenors have filed a QA contention in this proceeding. The initial QA contention was late filed on March 7, 1985. In a Special Prehearing Conference Order (SPCO), the Board rejected the original proposed QA contention, essentially for lack of bases and specificity. LBP-85-11, 21 NRC 609, 627-38 (1985).

In an exercise of our discretion, we gave the Intervenors an opportunity to file an amended contention. In doing so, we set forth certain criteria against which we would measure the admissibility of any amended contention. SPCO, 21 NRC at 636-37. These criteria, which we discuss later in this order, were designed to make clear the requirements for the bases, specificity and significance of Intervenors' late-filed QA contention.

We now have before us the above-referenced Intervenor's Motion proposing its amended QA contention, and Applicant's and the NRC Staff's Responses in opposition to admission of the contention, both dated June 7, 1985. Also before us is Applicant's April 29, 1985 Objections (at 9-13) to the SPCO ruling which permitted Intervenor to file an amended contention and the Staff's May 6, 1985 Objections to the SPCO which agree with Applicant's. We have considered the objections, and see no basis to reconsider and change our conclusion and reasoning set forth at length in the SPCO. We find that the amended QA contention, with the exception of part 2, substantially complies with the requirements set forth in the SPCO, raises potentially significant QA issues, and clearly meets the bases and specificity requirements of 10 C.F.R. § 2.714. Therefore, we admit the amended contention as an issue in controversy in this hearing, with the exception of parts 2A and B, which we reject, and part 2C on which we defer a ruling.

SPCO RULING

To the extent still pertinent to our ruling later in this Order admitting the amended QA contention, we discuss some of the objections to the SPCO in the context of that ruling. However, at the outset we note from the parties' objections that portions of the SPCO appear to have led to some misapprehension of our ruling on the admissibility of the original QA contention. The SPCO clearly rejected the Rorem QA contention as it was originally filed. We did, however, provide Intervenor with an opportunity to submit a separate, specific and well-based amended QA contention after deposing NRC Staff Region III Administrator James G. Keppler.¹

In response to the SPCO, both Staff and Applicant objected to the route the Board permitted Intervenor to pursue.² The primary thrust of each party's objections was their characterization that our ruling was tantamount to a conditional admission of a contention, such as was prohibited by the Appeal Board decision in the *Catawba* operating license proceeding. *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2),

¹ For reasons elaborated upon in the SPCO, the Board allowed Intervenor to depose Mr. Keppler prior to submitting their contention because Mr. Keppler's statements, in large part, formed a strong basis for our interest in and concern with the QA problems to which he had alluded. We also recognized that the NRC Staff might wish to have Mr. Keppler accompanied by another NRC Staff member who was familiar with the specifics of the QA program at the Braidwood facility. Mr. Robert F. Warnick was deposed with Mr. Keppler on May 20, 1985. Mr. Warnick is a Reactor Projects Branch Chief in Region III, where Braidwood is located.

² Staff's Objections, at 5-7; Applicant's Objections, at 9-13.

ALAB-687, 16 NRC 460, 466-67 (1982). We disagree with the parties' characterization.

Our ruling on the QA contention should not be misconstrued as an effort to effect a conditional admission. The contention was rejected. Had Rorem not refiled a contention substantially complying with the stringent requirements we set forth in the SPCO, no Rorem QA contentions would be admitted for litigation in the Braidwood operating license proceeding. Our SPCO explained that the Board would review a QA contention and judge it anew on the admissibility criteria of basis, specificity and significance of the issues, and our further requirements for organization of the contention in order to meaningfully apply these criteria. SPCO, 21 NRC at 636-37. Our ruling did not require Intervenors to replead their case under the factors governing late contentions. 10 C.F.R. § 2.714(a)(1)(i-v). The Board had analyzed these factors in the SPCO. As part of that analysis, we had indicated that our views on some of these factors depended on the quality of the amended contention. SPCO, 21 NRC at 629-30, 631, and 632-33. Accordingly, we withheld making the final balancing among the factors until we were provided with a new QA contention against which the final balancing governing late contentions could be applied. A primary reason undergirding the Board's earlier decision not to draw the final balance among the factors was our belief that if the newly submitted contention was of inferior quality, it would provide the Board with *prima facie* evidence compelling us to review our expectation that the QA issues were apparently significant and that Intervenors would meaningfully contribute to building the Braidwood record. As discussed below, we have not found the amended QA contention to be materially deficient.

At bottom, Applicant and Staff wish we had not followed our ruling to reject the original QA contention with the conclusion in the SPCO to grant Intervenors an opportunity to attempt to file an amended QA contention which meets the requirements for admission as an issue in controversy. It may well have been within our discretion to forever bar the Intervenors at that point. Apparently Applicant and the Staff have little desire to permit Intervenors an opportunity to put the apparent QA problems at Braidwood under the lens of a contested litigation. However, our decision to exercise our discretion as we did manifestly does not tear asunder the fabric of NRC jurisprudence, as one might conclude from Applicant's and Staff's complaints. Indeed, apparently overlooked by the Applicant and Staff is the express recognition in 10 C.F.R. § 2.714(a)(3) of the Board's discretion to permit the amendment of a petition to intervene at any time, provided the amended contention is acceptable under a balancing of the factors governing late filings as well as the bases and

specificity requirements applicable to all contentions. *See also* 10 C.F.R. § 2.714(b). Even in the absence of this specific regulation, inherent in a trial board's duty to conduct a fair hearing and regulate the course of such a hearing, there must lie the power to exercise the discretion to permit amendments to defective initial pleadings when the ends of justice, or, as in this case, the integrity of the hearing process and reasonable assurance of the health and safety of the public would be better served by doing so. *See, e.g.*, 10 C.F.R. § 2.718.

It is the Board's conclusion, having reviewed the arguments in both Applicant's and Staff's Objections, that the QA contention rulings, explained at great length in the SPCO, were manifestly within the Board's judicial discretion. We continue to adhere to the propriety of our SPCO rulings, as we are unpersuaded by the allegations that the QA rulings contravened the precepts set out in *Catawba*. We see no reason to refer our SPCO ruling to the Appeal Board pursuant to 10 C.F.R. § 2.730(f), contrary to the passing suggestion in Applicant's Objections (at 13) that we do so.

THE AMENDED QA CONTENTION

As noted above, on May 24, 1985, Intervenor took the opportunity afforded by the Board's SPCO to submit a new QA contention. "Motion to Admit Amended Quality Assurance Contention," hereafter "Rorem Motion" or "QA contention." Rorem's Motion includes a lengthy explanation of the alleged breakdown of quality assurance at Braidwood (Rorem Motion, at 1-8), the corrective action programs currently pending at the plant (*id.* at 8-12), and other assorted points, some relating to the Board's suggestion that Intervenor designate the potential witnesses who will offer testimony to establish the elements of their claim. *Id.* at 12-15. The QA contention itself is organized to track most of the 10 C.F.R. Part 50, Appendix B criteria, setting forth a group of alleged violations of each specified criterion.³

We find that as a general proposition Rorem has substantially complied with the directives we set out in the SPCO. As discussed herein, we reject only paragraphs A and B and defer a ruling on paragraph C of group 2, addressed to harassment, intimidation and retaliatory action

³ We view the actual contention itself to be the preamble at page 16 through the second line of page 17, the last two lines of page 18, and pages 19-47. The limits of the contention are controlled by the specific alleged occurrences of deficiencies set forth in the lettered paragraphs, despite broad language in the preamble and the numbered paragraph which introduces each of the 14 Appendix B criteria groupings of alleged violations.

against Braidwood site employees. The items we do not admit are not intertwined with the remainder of the contention; we have no difficulty separating these portions from our admission of the rest.

On June 7, 1985, Applicant and Staff responded in opposition to Rorem's motion to admit its amended QA contention.⁴ These parties expressed similar concerns about the form and content of the QA contention. They requested that the Board deny the contention's admission into the proceeding because, they claim, the contention lacks the necessary basis and specificity, there is no pattern to be construed from the list of deficiencies, the corrective action programs should not be included in the litigation of quality assurance issues, and Intervenors did not re-address the arguments on why they should prevail under the five criteria of 10 C.F.R. § 2.714(a)(1) applicable to admission of late-filed contentions. The SPCO set out what our method of evaluating the Intervenors' amended QA contention would be if they chose to file one by the deadline we set. SPCO, 21 NRC at 636. The Board adheres to our obligation pursuant to § 2.714(b) to determine whether the QA contention meets the basis and specificity requirements, as well as applying our own more demanding standard that Intervenors "must submit a highly detailed petition tailoring their allegations and the underlying data so we may adjudicate a carefully focused, well-reasoned contention." SPCO, 21 NRC at 631.

Bases and Specificity of the QA Contention

The basis and specificity requirements are long-standing in NRC practice. Intervenors must set forth the basis for the asserted contention, 10 C.F.R. § 2.714(b), although the evidence on which the assertion is grounded is not necessary at the pleading stage. *Commonwealth Edison Co.* (Byron Nuclear Power Station, Units 1 and 2), LBP-80-30, 12 NRC 683, 688 (1980), quoting *Mississippi Power and Light Co.* (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-130, 6 AEC 423, 426 (1973). At the very least, Intervenors can provide sufficient basis by a reference to a source and an assertion drawn from that reference. *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542, 548-49 (1980). See also *Commonwealth Edison Co.* (Byron Nuclear Power Station, Units 1 and 2), LBP-80-30, 12 NRC 683, 687 (1980), and cases collected therein. However, because of the

⁴ Applicant's Response in Opposition to Intervenors' Motion to Admit Amended Quality Assurance Contention; NRC Staff Response to Bridget Little Rorem, *et al.* Motion to Admit Quality Assurance Contention.

inherently broad nature of a QA contention, the basis (and specificity) requirement must be rigorously applied in these circumstances. See *Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), LBP-83-39, 18 NRC 67, 89 (1983).

Here, Rorem asserts that Applicant's QA program is deficient to the extent that there is significant doubt that the safety-related components, structures and systems will perform satisfactorily in service. Rorem Motion, at 16. Intervenors provide, as the bases for their claim, statements made by Mr. James Keppler when he testified in the *Byron* operating license proceeding and during his more recent deposition (Rorem Motion, at 17), as well as extracts from various NRC Staff inspection reports. Rorem Motion, at 19-47. Particular items are highlighted by Intervenors as the foundation predicate to their overall thesis that Braidwood's QA program has been inadequate. Rorem's contention does not run afoul of the Licensing Board's ruling in the *Browns Ferry* proceeding that a contention may not incorporate massive documents by reference in an effort to supply a basis for an intervenor's proposition; the contention clearly identifies and summarizes the incidents being relied upon, and identifies and appends the specific portions of documents (mostly NRC inspection reports) in support of its position. *Tennessee Valley Authority* (Browns Ferry Nuclear Plant, Units 1 and 2), LBP-76-10, 3 NRC 209, 216 (1976). In any case, it is not appropriate for the Board to judge the validity of Rorem's specific, well-based assertions at this point in the proceeding. A licensing board is not to judge the merits of the contention, which is exactly what Applicant and Staff would have us do if we were to evaluate now the facts surrounding the incidents Intervenors claim combine to comprise an overall QA failure. *Grand Gulf, supra*, 6 AEC at 426.

The Applicant and Staff have seized upon the Board's reference to the language contained in the *Callaway* case which notes that in any construction project of the magnitude and complexity of a nuclear plant there are bound to be isolated instances of inadequate workmanship due to imperfect quality assurance supervision. *Union Electric Co.* (Callaway Plant, Unit 1), ALAB-740, 18 NRC 343, 346 (1983), cited in SPCO, 21 NRC at 636. Our purpose in citing *Callaway* was to put Intervenors on notice that we would not accept vague, frivolous and isolated claims of inadequate construction to support their general thesis. We did not, however, intend the Applicant or Staff to create a shield in those words, wielding the *Callaway* holding as a threshold protection against reaching the merits of any of Intervenors' QA concerns, where the alleged in-

stances of QA deficiencies are, as here, pleaded with specificity and bases and do not appear at this point to be frivolous in the aggregate.⁵

With regard to the parties' complaints that Rorem's contention does not meet the standards for specificity, we remind both Applicant and Staff that the specificity requirement "is for the purpose of framing the issues which will be the subject of subsequent discovery and proof in an evidentiary hearing." *Commonwealth Edison Co.* (Byron Nuclear Power Station, Units 1 and 2), LBP-80-30, 12 NRC 683, 687 (1980). Neither party can reasonably allege that the contention is vague. Clearly, the parties are "sufficiently put on notice so that they will know at least generally what they will have to defend against or oppose." *Philadelphia Electric Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-216, 8 AEC 13, 20-21 (1974). Indeed, due to the requirements imposed by our SPCO, this contention puts the Board and parties on very specific notice of what will be litigated, with the exception of part 2.⁶

Intervenors' second grouping of QA deficiencies alleges incidents of harassment, intimidation and retaliatory action against Braidwood site employees who expressed safety and quality concerns, in violation of 10 C.F.R. § 50.7 and Criterion I of Appendix B. We agree, in part, with Applicant's objections (Response, at 21-22). Paragraphs A and B of part 2 of the contention (Motion, at 22-23) are too vague in bases and specificity even for a timely contention. They are also fatally deficient in meeting our requirement that Intervenors set forth the specific instances which form the bases of each of their allegations of a pattern of QA deficiencies. Certainly at this late date, the bare allegations that site employees

⁵ Applicant (Response, at 10) does not dispute that NRC Staff inspection reports referenced by Intervenors found deficiencies in the implementation of QA programs by several Braidwood site contractors which required extensive corrective action programs (which are still in progress). Applicant adds:

It is the nature of an effective QA program, however, to remedy identified deficiencies and to right itself if it has begun to go off course. This is what happened at Braidwood.

Id. This may be correct. However, now that Intervenors have met the bases and specificity requirements and our additional SPCO requirements (which we imposed both because this was a late contention and because of the nature of QA issues), they are entitled to try to prove on the merits that, contrary to Applicant's view, the QA program has not been "righted" and adequate corrective action has not been taken.

⁶ As mentioned above (p. 1739), Intervenors have organized their contention into 14 groups of violations, with each group alleging a violation of one of the criteria of 10 C.F.R. Part 50, Appendix B. Intervenors claim that they list each violation under only a single criterion to avoid duplication. Rorem Motion, at 18. However, they state that "many of these deficiencies constitute violations of multiple criteria and Intervenors hereby allege each such deficiency to be a violation of each and every applicable criteria." *Id.* This is contrary to the requirements for the amended contention we explicitly set forth in the SPCO. There the Board made plain its interest in holding Intervenors to a high standard of pleading, including the delineation of the exact basis for each allegation, a precise specification of each alleged deficiency, the underlying data in support of the deficiency, the patterns created when the deficiencies are aggregated and why each specified deficiency supports the overall unacceptable pattern. SPCO, 21 NRC at 636. In light of the foregoing, we do not approve of the Intervenors' approach and will not allow them to pursue a course of attempting to demonstrate patterns of inadequacies beyond the specific instances set forth under each alleged pattern in the contention as it now stands.

have contacted Intervenors in confidence to express concerns regarding quality and retaliation, and that Applicant has not taken effective action to address or correct such unspecified complaints, do not inform the Board or the parties of the specifics which Intervenors would seek to litigate, or whether there is any basis to pursue such litigation.

Accordingly, we do not admit paragraphs A and B. We defer our ruling on paragraph 2C (Motion, at 23-24), which relates to alleged harassment by supervisors of site quality control inspectors employed by the electrical contractor, the L.K. Comstock Company. The August 17, 1984 letter by one of the inspectors (Intervenors' Exhibit 15) does provide specific allegations of intimidation and harassment, contrary to the summary in NRC Inspection Report 50-456/84-34, at 4. Intervenors' Exhibit 16. We will also permit Intervenors to include the other alleged examples of harassment of and retaliation against L.K. Comstock inspectors which are only vaguely alluded to in paragraph 2C of the contention and in the referenced inspection report and deposition of Mr. Warnick (at 177-78). All other such instances to be included must be set forth by Intervenors, with bases and specificity, by a received date of July 12, 1985.

In addition, unlike our general finding below that it is not essential for admission of the QA contention for Intervenors to provide witnesses, we find they must do so with respect to paragraph 2C. The nature of the allegation of harassment of L.K. Comstock inspectors requires Intervenors to prepare testimony and present witnesses who can support the allegation with factual testimony. Otherwise, there will be no contribution to a sound record and no hope of Intervenors' prevailing on the merits of this part of the contention. Accordingly, also by a received date of July 12, Intervenors must specify the witnesses they will present and the subject of each witness' testimony to support each particular specified instance of alleged harassment of L.K. Comstock inspectors. Applicant and Staff shall respond to any such filing by a received date of July 19, 1985. We will defer ruling on paragraph 2C of the contention until we can consider any such further filings.

The second major objection articulated by the parties in opposition to Rorem's QA contention is that each of the groupings of individual incidents do not create a cognizable pattern of deficiencies to support the claim of a pervasive QA breakdown. The Board itself harbors some concern that Intervenors have not expressly elucidated the way in which each occurrence fits with all the others in the grouping to formulate a pattern of similar violations of the cited Appendix B criterion. However, there is substantial compliance with the SPCO in that now the alleged instances are set forth quite specifically under a rational approach by Inter-

venors to grouping them, viz.: under an Appendix B criterion alleged to be applicable and violated. Moreover, we can see the possibility that the cumulative effect of the alleged deficiencies, if proven to exist without adequate corrective action, could lead us to reasonably conclude that the Braidwood QA program was not functioning effectively during the plant's construction. We do not intend to stymie Intervenor from their attempt to prove circumstances they believe will help us in determining whether the Braidwood plant was built so as not to compromise their health and safety. To the extent Intervenor are proven incorrect in their allegations that each aggregation collects deficiencies which are sufficiently similar to form a pattern of essentially the same recurrent problem, Applicant will have an easier time of succeeding on the merits of the contention. Also, through discovery, Applicant can learn more particularly why Intervenor believe all the deficiencies in the same grouping are sufficiently similar so as to represent a recurrent problem.

As a third proposition Staff, and to a degree Applicant, urge us to accept their view that the corrective action programs currently underway at Braidwood are not to be part of the record in this proceeding. Staff Response, at 10. The Board questions how thoroughly the parties have considered their opposition to consideration of these programs, as we expect they will want to present evidence on these programs to buttress *their* cases; i.e., even if Braidwood did experience the QA deficiencies alleged, effective corrective and remedial action has been taken.

Late-Filed Contention Criteria

As we recognized in the SPCO, two of the 10 C.F.R. § 2.714(a)(1)(i-v) factors were somewhat incompletely discussed, and we did not draw a final conclusion based on the overall balancing of the five factors. Now that the amended contention has been filed, we weigh the contention in the context of the factors relating to ability of Intervenor to contribute to the record (factor iii), and the significance of the issue balanced against possible broadening or delay of the proceeding (factor v).

Both Applicant and Staff argue in their responses to the amended QA contention that Intervenor have not demonstrated (in either of the QA contention pleadings) their ability to assist in developing a sound record. Applicant Response, at 39-41; Staff Response, at 7-11. Our initial discussion in the SPCO of this factor noted the somewhat speculative nature of determining the extent to which an intervenor may "reasonably be expected to assist in developing a sound record." § 2.714(a)(1)(iii). To enable us to better make such a determination, the Board suggested to

Intervenors that they identify their witnesses and the subjects which would be addressed in their testimony. SPCO, 21 NRC at 637. Intervenors have not done so. Instead, they offer to name witnesses by the time of the July 23, 1985 prehearing conference. Rorem Motion, at 13.

When we previously requested Intervenors to identify witnesses, we did not have the advantage of having the amended contention before us. Our review of the amended contention has not altered our original inclination to view the contribution to the record factor as weighing in Intervenors' favor. SPCO, 21 NRC at 629-30. While it certainly would have been prudent for Intervenors to have more conscientiously assisted us in making this determination, the Board does not view the identification of Intervenors' witnesses prior to now as essential in the circumstances of this case. It was proposed as a tool for us to better evaluate factor iii. We are in full accord with Appeal Board Judge Edles⁷ who captures with clarity our position that despite NRC precedent extolling the value of identifying witnesses and outlining their proposed testimony,⁸ it is not an absolute requirement which, if not met, will in all circumstances preclude a Board from finding for an intervenor on factor iii. If Intervenors went so far as to sponsor no witnesses at all, they could still enter the proceedings, as parties are entitled to attempt to make their case solely based on the evidence adduced by cross-examination of their opponent's witnesses. *Tennessee Valley Authority* (Hartsville Nuclear Plant, Units 1A, 2A, 1B, and 2B), ALAB-463, 7 NRC 341, 356 (1978). *Wisconsin Electric Power Co.* (Point Beach Nuclear Plant, Unit 2), ALAB-137, 6 AEC 491, 504-05 (1973); accord, *Commonwealth Edison Co.* (Zion Station, Units 1 and 2), ALAB-226, 8 AEC 381, 389 (1974). The precept that "cross-examination can be an especially valuable tool in the development of a full record" has been more recently emphasized. *Louisiana Power and Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1096 n.30 (1983).

Furthermore, in the SPCO we drew attention to the WPPSS decision for its precedential value and its potential relevance to the case at hand. SPCO, 21 NRC at 637. But, while the issue of the weight to be given certain facts in evaluating an intervenor's contribution to the record is similar in both cases, the specific facts upon which the Appeal Board relied

⁷ *Washington Public Power Supply System* (WPPSS Nuclear Project No. 3), ALAB-747, 18 NRC 1167, 1182-83 (1983) (concurring opinion of Judge Edles).

⁸ *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-743, 18 NRC 387, 399-400 (1983); see also *Mississippi Power & Light Co.* (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-704, 16 NRC 1725, 1730 (1982); *South Carolina Electric and Gas Co.* (Virgil C. Summer Nuclear Station, Unit 1), ALAB-642, 13 NRC 881, 894 (1981); *Detroit Edison Co.* (Greenwood Energy Center, Units 2 and 3), ALAB-476, 7 NRC 759, 764 (1978).

to vacate the Licensing Board's decision and remand the case for further inquiry are clearly distinguishable. The intervenor in WPPSS claimed their participation would advance that proceeding because they had previously participated in other NRC proceedings, and because they had contacted other intervenors to identify expert witnesses in subject areas of concern in the WPPSS proceeding. *WPPSS, supra*, 18 NRC at 1177. The Appeal Board found these representations "manifestly inadequate" to demonstrate intervenor's ability to contribute to the record. Based on a slightly earlier decision in the *Shoreham* case (*supra*, 18 NRC at 400-01), the Appeal Board determined that there was no indication that the WPPSS intervenor's previous participation in other NRC proceedings had made a substantial contribution to the development of a sound record, nor did the issues which the WPPSS intervenor earlier litigated bear any relationship to those in the WPPSS proceeding. *WPPSS, supra*, 18 NRC at 1178.

As we noted in the SPCO (21 NRC at 629-30), the *Braidwood* facts are precisely opposite. Rorem's representatives, BPI, were counsel to intervenors in the *Byron* operating license proceeding where the litigation focused on quality assurance issues closely aligned to those currently proposed for adjudication in *Braidwood*. The Applicant, Commonwealth Edison Company, is the same in both the *Byron* and *Braidwood* cases, and both these nuclear plants are very similar "replicates." Thus, there is a distinct relationship between the concerns earlier litigated by BPI in *Byron* and those at issue here. Also, as noted in the SPCO (*id.*), and below in this Order, this Board knows that the same law firm had contributed materially to the development of a sound record on the QA issues in the *Byron* proceeding.

We do not find Intervenors' inaction in response to our suggestion to be fatal to their showing on factor iii (except for paragraph 2C of the contention as discussed above). However, to avoid any delay caused by the lateness of the contention, it is necessary that Rorem name their QA contention witnesses, if they choose to present any, and outline the subjects of the testimony of each, by a received date of July 12, 1985. For obvious reasons related to conducting discovery and the possible submission of summary disposition motions, we now *require* this information by that date. And, except for extremely good cause shown, the Board will not permit any witnesses to testify for Rorem other than those named by this deadline, nor do we expect to grant a motion for an extension of time for Intervenors to complete this specification of witnesses.

Another gauge for determining an intervenor's potential contribution to the record is its past performance in NRC hearings. We were willing

to take into account Rorem's law firm's participation in the *Byron* proceeding when we reviewed factor iii initially (*id.*), but Applicant's response urges us to reconsider our position. Applicant directs our attention to a statement made by the Chairman of the *Byron* Licensing Board concerning BPI's presentation in that proceeding of long lists of issues for adjudication without focused litigation to follow up on the asserted claims. Applicant's Response, at 39. But, while Judge Smith may have articulated his frustration at the *Byron* intervenors' attorneys, we do not think that this negates the service they performed in pointing up what were ultimately found to be serious QA/QC deficiencies at Byron. This Board intends to manage this case so that the litigation will have a meaningful direction and purpose. The requirements we have imposed on the specification of the contention will limit the problem of unfocused litigation which arose in *Byron*.

The second factor which the SPCO left for further examination was whether the Intervenor's participation will substantially delay the proceedings. 10 C.F.R. § 2.714(a)(1)(v). In the SPCO, the Board found that despite the fact that the QA issue had the potential to be a large and complex one, a counterbalancing was effected by the issue's significance in the context of our consideration of Braidwood's operating license. SPCO, 21 NRC at 632-34. The amended contention reinforces that view. Moreover, the Board has not changed its position that October 1, 1985 will not be abandoned as the approximate date for commencing the hearings as a result of the late filing of the QA contention. We note, however, that Applicant states that its corrective action programs currently underway will not be complete (and reviewed by the NRC Staff) in time to meet the October date for litigation. At least some of these programs, as Applicant acknowledges, are highly pertinent to parts of the QA contention. Such corrective programs likely will be a necessary part of Applicant's case in response to Rorem's allegations. But these programs were not initiated in response to the QA contention and Applicant cannot blame Rorem for the delay the completion of the programs will cause. Any such delay stems from Applicant's need to remedy past problems it acknowledges needed attention. Applicant's Response, at 10.

Applicant's submission of the affidavit of Mr. Michael J. Wallace, Project Manager for the Braidwood plant, is an attempt to persuade the Board that Applicant should not be held responsible for any delay in the hearing caused by the progress of its corrective action programs. Mr. Wallace tries to assign blame to the lateness of Intervenor's contention by asserting that if he had known as recently as six months ago (i.e., December 1984) that there would be a QA contention, he could and would have scheduled these corrective action programs for completion

in time for an October 1, 1985 hearing. Affidavit, at 4-5. We view this bare assertion with skepticism. We have substantial difficulty in understanding why Applicant, if it really had flexibility to do so, would not in the first instance have scheduled the completion of the corrective action programs on the more expeditious schedule in light of the cumulative significance and scope of these programs, the need for NRC Staff review, and Applicant's goal of loading fuel in April 1986. It strains credulity that Applicant would believe it could schedule these programs for completion as late as mid-February and March 1986 (Affidavit, at 3), and believe it could count on NRC Staff review and approval by April 1986.⁹

The Board also is skeptical of Mr. Wallace's assertion because it necessarily implies that Applicant was totally unaware as recently as six months ago that Intervenor might seek to litigate QA deficiencies at Braidwood. To the contrary, as Applicant itself has noted, one reason Intervenor could not demonstrate good cause for filing its contention as late as March 7, 1985, is because Intervenor Rorem and Neiner Farms, based on Mr. Keppler's August 1, 1984 testimony in the *Byron* hearing and other matters at that approximate time, had stated they would move to have a late-filed QA contention admitted as an issue in the case. Neiner Farms (Report on) Status of Contentions, at 2 (July 5, 1984); Letters to Board from Counsel for Rorem, Ms. Whicher (August 6, 1984) and Mr. Cassel (October 17, 1984). See Applicant's "Answer to Intervenor's Motion for Leave to File Additional Contention," at 20 n.* (March 25, 1985).

The Board now turns to the ultimate balancing of the five factors of 10 C.F.R. § 2.714(a)(1). For the reasons given in the SPCO (21 NRC at 628-29), we adhere to our conclusion that good cause was not shown for Intervenor's tardiness in not submitting the QA contention until March 7, 1985, and thus, this factor weighs against our admitting the contention into the proceeding. We are also unchanged in our determination that there are no other means of protecting Rorem's interest (factor ii) and

⁹ We note that Applicant, with commendable candor, is now less firm in its belief that Braidwood Unit 1 will be ready for fuel loading in April 1986. Wallace Affidavit, at 5-6. Although this is still the "planning purpose" date and Mr. Wallace believes "it is possible" that it can be achieved (if no QA contention had been admitted), it is clear that this is Applicant's most optimistic earliest possible schedule. A number of activities must be accelerated in order for Applicant to meet this date. *Id.* "Unforeseen events" (apparently unrelated to admission of the QA contention) "may lengthen the construction process and accordingly the fuel load date could be extended beyond April by several months." *Id.* at 6. Our analysis in the SPCO and this Order has focused on delay in the *proceeding* as mandated by 10 C.F.R. § 2.714(a)(1)(v). If it were necessary for us to predict now the date by which Applicant would have Unit 1 ready for fuel loading, we would not predict a date as early as Applicant's optimistic "planning purpose" date of April 1986, based on the affidavit.

that the existing parties do not adequately represent Rorem's interest (factor iv). *Id.* at 629. Although factors ii and iv are admittedly of lesser importance than the other factors (*id.*), we find they weigh in Intervenor's favor.

As expressed earlier in this Order, *infra* at pp. 1744-47, we can surmise with relative confidence that Intervenor will conduct their case so as to affirmatively contribute to the development of a sound record. The organization, bases and specificity of the contention, as we have admitted it, support this forecast. However, Intervenor's showing on this factor was not as strong as it would have been had Intervenor listed their witnesses and summarized their planned testimony. Nevertheless, as we explained above, the identification of Intervenor's witnesses, though potentially helpful to the Board, was not an essential requirement in the circumstances of this case. The circumstances concerning factor iii persuade us to find this factor to be in Intervenor's favor.

With regard to factor v, any delay to the proceedings would not be the fault of Intervenor, based on Applicant's own representation that the corrective action programs will not be completed in time to meet the scheduled hearing date of approximately October 1, 1985. In addition, the overriding significance of the aggregated QA issues, pointed up by Intervenor's amended contention, also induces the Board to find the delay factor should not be resolved in Applicant's favor.

On balance, only the first factor of good cause for failure to file on time, found against Intervenor, is to be weighted against the other four determined to be in Intervenor's favor. Therefore, the Board concludes that the likelihood Intervenor will contribute materially to the record, coupled with our determination that responsibility for possible delay in the proceeding is not borne by Intervenor, and the potential significance of the QA issues raised by the amended contention, dominantly favors Intervenor. We find the amended contention admissible under the criteria applicable to late-filed contentions.

DISCOVERY AND FURTHER SCHEDULING

Discovery on the admitted QA contentions shall be completed by a received date of July 30, 1985. As before, "completed" means that all answers to interrogatories, and requests for admissions and documents, are received by that date by the requester, and that all depositions are completed. Requests for discovery therefore have to be made by a time and mode sufficient to assure that the due date for responses is no later than July 30, 1985. Also, as before, the parties are free to reach mutually agreeable minor accommodations of this schedule, with notice to the

Board, but without the need for prior Board approval. Informal, mutually cooperative discovery is strongly encouraged. As ordered above, Intervenor must identify their witnesses, and the subjects of their testimony, by a received date of July 12, 1985.

The parties shall confer and attempt to agree on the further prehearing and hearing schedule for the QA contention. The parties shall also begin attempts to settle or narrow parts of the contention and to find ways of making the litigation efficient, e.g., by stipulations of fact. The Board will hear and rule upon the schedule proposals of the parties at the July 23, 1985 prehearing conference. The Board is prepared to adhere to the schedule outlined in the SPCO (21 NRC at 637), which leads to commencement of the hearing on or about October 1, 1985, for those QA issues on which the Applicant and NRC Staff can be ready for hearing.

IT IS SO ORDERED.

**FOR THE ATOMIC SAFETY AND
LICENSING BOARD**

**Lawrence Brenner, Chairman
ADMINISTRATIVE JUDGE**

Bethesda, Maryland
June 21, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:

**Ivan W. Smith, Chairman
Sheldon J. Wolfe
Gustave A. Linenberger, Jr.**

In the Matter of

**Docket No. 50-289-SP
(ASLBP No. 79-429-09-SP)
(Restart Remand on
Management-Training)**

**METROPOLITAN EDISON COMPANY,
*et al.***

**(Three Mile Island Nuclear
Station, Unit No. 1)**

June 24, 1985

In this Memorandum and Order the Licensing Board approves Licensee's plan for the evaluation of the effectiveness of its training program, as required by the Board in its Partial Initial Decision of May 3, 1985 (LBP-85-15, 21 NRC 1409).

**MEMORANDUM AND ORDER APPROVING PLAN
FOR REVISING LICENSED-OPERATOR
TRAINING PROGRAM**

I. BACKGROUND

On May 3, 1985, in the partial initial decision on the training issue (LBP-85-15, 21 NRC 1409), the Board found that the training program

for TMI-1 licensed reactor operators was fundamentally sound but required improvement in one respect. We concluded that:

To provide assurance in the long term that TMI-1 can be operated without endangering the health and safety of the public, it is necessary that Licensee implement a plan to evaluate the performance of trained reactor operators and senior reactor operators in the job setting for revision of its TMI-1 licensed-operator training program. Licensee will have demonstrated reasonable progress toward the completion of this requirement if it begins immediately to satisfy this requirement as provided in the order below. *See* CLI-79-8, 10 NRC 141, 148-49 (1979).

LBP-85-15, 21 NRC at 1536.

The Board directed Licensee to implement a plan for the evaluation of its trained operators in the performance of their duties in the job setting under normal and abnormal operation. Licensee was required to present its plan to the NRC Staff and active parties within 30 days and to the Board within 45 days with the approval or disapproval of the other parties. *Id.* at 1537.

Licensee acted promptly by submitting a proposed plan (Rev. 0) to the interested parties on May 28. Licensee hosted a discussion meeting of the parties on June 11, and submitted its final plan (Rev. 1) to the Board on June 17. The record before the Board consists of an explanatory letter of June 17 from Licensee's counsel, Ms. Deborah B. Bauser, to the Licensing Board; the Proposed Evaluation Plan (Rev. 1); nine attachments to the plan.¹ The NRC Staff supports Revision 1 of the plan.² The Union of Concerned Scientists (UCS) filed comments to the effect that the evaluation plan is inadequate.³

Preliminarily, the Board finds that the Licensee has made reasonable progress toward satisfying the Board's order by its timely action in preparing and submitting the plan for Board approval. *See* CLI-79-8, 10

¹ Attachments to the plan:

1. Technical Functions Procedure 1000-ADM-7370.04, "Analysis of GPUN Plant Transients (Post Trip Review)"
2. TMI-1 Administrative Procedure AP 1044, "Event Review and Reporting Requirements"
3. TMI-1 Administrative Procedure AP-1029, "Conduct of Operations"
4. TSD Procedure 6200-ADM-2682.10, "Trainee Evaluation Once Back On-The-Job," Rev. 0, 4/15/85
5. Proposed Attachment to Initial and Requalification RO Training Program Descriptions
6. Proposed Attachment to Initial and Requalification SRO Training Program Descriptions
7. Proposed Change to TMI-1 Operator Training Program Descriptions
8. TSD Procedure 6200-ADM-2682.03, "Technical Content Review & Interface Process," Rev. 0, 4/15/85
9. TSD Procedure 6200-ADM-2682.01, "Training and Education Department Training System Development Process," Rev. 0, 4/15/85

² NRC Staff Response to CLI-85-15, June 17, 1985.

³ UCS' Comments on Licensee's Plan for Post-Training Evaluation, June 17, 1985.

NRC 141, 148-49 (1979). The remaining issue is whether the plan itself satisfies the condition imposed by the LBP-85-15 partial initial decision.

The Plan

The implementation steps of the plan are distributed throughout relevant procedures which were, for the most part, already in existence. There is no discrete performance evaluation plan as such.

As the Board suspected, the Licensee already had a system which would provide for evaluating the performance of individuals under off-normal circumstances. LBP-85-15, 21 NRC at 1501, ¶ 257. It was a relatively simple step to clarify that, in the post-trip review of GPU Nuclear plant transients, the performance of personnel will be specifically evaluated. Proposed Evaluation Plan (Rev. 1), Attachment 1. The post-trip analysis procedure had already provided for an analysis of the effect of transients on training needs. *Id.* at 11.0. Similarly, a short amendment to the existing procedure respecting the evaluation of events which may require notification to the NRC or company management clarified that training concerns must be described. *Id.*, Attachment 2, at 33.0.

Licensee points out that, under the basic conduct-of-operations procedures, even for incidents which may not require reporting, the review process provides for sending copies of the incident reports to training officials. *Id.*, Attachment 3 and Attachment 1 thereto. With respect to routine operations, Licensee developed a procedure for "Trainee Evaluation Once Back on-the-Job," *Id.*, Attachment 4. Curiously, this procedure, very relevant to the "feedback-to-training" subissue, was developed during March 1985 and became effective on April 15, a few weeks before the May 3 partial initial decision. Its purpose was "to establish a process to evaluate training program effectiveness by collecting feedback data from trainees and their supervisors when training is completed and they are back on the job." *Id.* at 2.0. The original emphasis of the "back-on-the-job" procedure was on the *trainee's* evaluation of the effectiveness of training. Following the Board's order, the procedure was enlarged to provide for specific actions by supervisory personnel to assess the effectiveness of training as perceived through performance observed on the job. *Id.* The supervisors' initial evaluation of performance will be conducted approximately 6 months after an operator has received his or her license. Formal and thorough checklists will be employed to evaluate training-related performance in the areas listed for evaluation of reactor operators and senior reactor operators. *See* Exhibit 2 to Attachment 4, Attachment 5, and Attachment 6. Subsequent formal evaluations will be done on an annual basis as part of the requalification process. The

completed evaluations will be forwarded to the Manager of Plant Operations TMI-1 for review and comment. Upon completion of this phase of the review, the documents will be transmitted to the Operator Training Manager who will also review and comment as appropriate.

The documents will then be transmitted to the Supervisor of Licensed-Operator Training who will prepare a summary report of all of the observations and recommendations made by the supervisory personnel. When the report is complete, the Supervisor Licensed-Operator Training, Operator Training Manager, and Manager of Plant Operations TMI-1 will meet to review the scope of the summary report and determine an appropriate course of action for each of the recommendations. Plan at 6-7.

The Board believes that the procedure for conducting evaluations 6 months after licensing and annually thereafter is well thought out and constitutes a very good response to the Board's order. However, it falls just short of satisfying all of our concerns, as we discuss below against the background of UCS' criticisms of the evaluation plan.

As noted above, the NRC Staff finds the evaluation plan acceptable overall. In particular, Dr. Julius Persensky, who testified in and monitored the hearing on training, submitted his affidavit to that effect. Several changes recommended by Dr. Persensky were incorporated into the evaluation plan.

II. UCS' COMMENTS⁴

Adequacy of Detail

UCS leads off with the general comment that, while the plan states *what* Licensee will do, it fails to detail *how* Licensee will do these things. For example, UCS faults the failure to state how the review of abnormal events will be performed or on what basis judgments will be made. UCS Comments at 2. The Board however is satisfied with the amount of detail in the plan. With respect to abnormal events, we believe it is adequate to allow the event itself to fashion additional bases for judgments and the methods of review. With regard to the periodic evaluations under routine operations, as set out in Attachments 4, 5, and 6, we flatly disagree with UCS. The procedure for evaluation is quite detailed. We see nothing left uncovered for routine evaluations, nor does UCS identify an uncovered area.

⁴ Counsel for the Commonwealth did not attend the June 11 meeting. He had but one question on the plan which appears to be resolved. June 17 Letter at 2. TMIA, too busy to comment in writing, generally endorses UCS' position. *Id.* at 9-10.

Aptitude Testing

UCS believes that an adequate evaluation plan would require that the individual operator be tested initially for aptitude so that observed poor performance can be assessed in terms of training deficiencies compared to insufficient aptitude. UCS Comments at 5. The Board believes that UCS' proposal is impractical. First, we are not aware of any aptitude testing which would permit so fine a measurement. Second, UCS' comments overlook the fact that all licensed operators will have demonstrated a minimum aptitude for the job by virtue of successful relevant experience, having passed written and oral examinations, plant drills and simulator exercises. Moreover, as UCS recognizes, the number of operators involved is relatively small. The evaluators will know the operators well. Careful observation should reveal the areas where aptitude is the problem compared to training. We observed this process with regard to the training needs of Messrs. Olive, Walsh, and Moore. PID, LBP-85-15, 21 NRC at 1491-95.

Frequency of Evaluations

UCS complains that the first periodic, routine evaluation, performed 6 months after licensing, is too late and that annual evaluations thereafter are too infrequent. UCS Comments at 5-8. The difficulty, according to UCS, is that the 6-month delay following licensing would afford on-the-job learning which might mask training deficiencies. The first interval and annual intervals would depend too much on the evaluator's memory, which, in turn, would also allow too much subjectivity. *Id.* at 7. UCS suggests more frequent evaluations using checklists of items drawn from the job task analyses. *Id.* at 8.

Licensee counters by explaining that evaluations at the 6-month/1-year frequencies would be composite reviews over the respective interval and that those intervals provide the opportunity for the supervisors to observe performance in the prescribed areas of evaluation. Licensee also notes that evaluations too early would permit intensity of training to have an undue influence. June 17 Letter at 7. The Board agrees with Licensee's reasoning as far as it goes, but we believe that some sort of interim evaluation might be desirable. We return to our view of evaluation intervals below in § III.

With regard to the recommendation that the supervisors employ checklists from the job task analyses, we understand UCS to be advocating a discrete demonstration by the evaluated operator of his or her ability to perform certain tasks. It would seem then that those tasks would

need to be performed for the purpose of the evaluation, not for operational purposes. This is not what the Board had in mind nor what the Commission Policy Statement envisioned when it endorsed operational feedback for training program revision. UCS' proposal would be closely related to on-the-job testing, much akin to the oral walk-throughs. See PID, 21 NRC at 1486-90. In short, UCS' proposal would enlarge the testing scheme for licensed operators, a matter over which we have lost jurisdiction.

The Board has already considered UCS' concern that too much subjectivity influences the relationship between evaluators and evaluated personnel. *Id.* UCS' concern that the length of the interval before evaluation might afford learning opportunities (thereby masking training deficiencies) is really not a problem in that there is, in fact, learning.

Simulator Evaluations

UCS revisits Dr. James J. Regan's testimony to the effect that simulators provide the best opportunity to measure operator competence because there are not enough emergencies or abnormal events to permit reliable performance evaluations. UCS Comments at 10. No one has disagreed with UCS on this point, but the argument is irrelevant to the consideration before us. First, we have already rejected Dr. Regan's view that simulator evaluations be used instead of actual oral walk-throughs. PID, 21 NRC at 1525. But now UCS proposes some other use of full-scale simulators, separate from the training program, but the Board does not understand UCS' argument. Clearly UCS is not referring to an evaluation of the use of simulators as operational tools. Therefore UCS is calling for increased use of simulator exercises as training or testing methods. UCS has had its opportunity to litigate that premise. Jurisdiction has passed from us. In any event, Licensee points to the frequent use of simulators in the existing training program as a realistic evaluation of operator performance. June 17 Letter at 8-9.

Job Design

Poor performance on the job might not reflect poor training. It could be a matter of poor job design. UCS Comments at 11. The evaluation plan is defective, according to UCS, because it does not take this factor into account. The Board could add that poor performance could also be caused by poor equipment design. Both considerations — plant procedures and plant design — as UCS well knows, were thoroughly litigated some 4 years ago. UCS skirts the jurisdiction problem by pointing to the

interface between training and job design. Licensee responds to the criticism by observing that the reopened proceeding covered a variety of mechanisms whereby inconsistencies between training and procedures are addressed. This is true, as the partial initial decision demonstrates. UCS, however, seems to ignore this large body of information, and its criticism is, therefore, not helpful.

III. THE BOARD'S VIEW OF THE PLAN AND ORDER

The Board approves almost every aspect of the evaluation plan as either well thought out, or well within Licensee's prerogative to formulate. There are, however, two areas of concern which the Board shares with UCS. UCS expresses doubt that the evaluating supervisors can reliably depend upon memory during the 6-month/1-year evaluation intervals. This could be a problem and the plan is silent on the details of how the evaluating supervisors will record their respective observations so that they will be preserved until the evaluations. But it would be inappropriate for the Board to prescribe how this mechanical detail should be implemented. There will be differing situations, differing capabilities and varied personnel groups. Some evaluators may need to keep logs on the individual operator's performance. Others may not. The Board will leave the matter at rest with the observation that our approval of the plan with regard to the 6-month/1-year evaluating intervals depends upon Licensee's assurance, implicit in the plan, that the evaluations will be effective. Whatever is required to make them effective must be done.

Our second concern with the length of the evaluation intervals pertains to any need to revise training from observed performance during normal operation before or between formal evaluations. Licensee suggests that this would be handled by "the regular exchange of information between Operations and Training personnel, described in detail during the remanded proceeding" June 17 Letter at 8. True, the regular exchange of information between Training and Operations was a subject of discussion during the hearing, but the Board found the record to be inadequate in the "feedback" area. PID, 21 NRC at 1499-1500, ¶ 251. While we assume that the plan intends to require that any need for training revision identified before or between formal periodic evaluations be satisfied, we believe the plan should be definite on that score. Therefore we will require that there be an express provision in the appropriate procedure which covers any need for training revision identified from operator performance in the job setting under normal operation before or between the formal, periodic evaluations. The Board noted with favor Dr. Persensky's active participation in revising the evaluation plan, even

down to rather fine details. We will leave it to the NRC Staff to approve the additional requirement.

IV. APPEALS

This is an appealable order. The Board's jurisdiction over the training issue terminates with this order in accordance with regular NRC practice. Unless the Appeal Board sets a different schedule, parties may appeal this order in the same manner and intervals set out for the partial initial decision. PID, 21 NRC at 1537.

THE ATOMIC SAFETY AND LICENSING BOARD

**Sheldon J. Wolfe
ADMINISTRATIVE JUDGE**

**Gustave A. Linenberger, Jr.
ADMINISTRATIVE JUDGE**

**Ivan W. Smith, Chairman
ADMINISTRATIVE LAW JUDGE**

Bethesda, Maryland
June 24, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

James M. Taylor, Director

In the Matter of

Docket Nos. 50-413
50-414
(10 C.F.R. § 2.206)

DUKE POWER COMPANY, et al.
(Catawba Nuclear Station,
Units 1 and 2)

June 4, 1985

The Director of Inspection and Enforcement grants in part and denies in part requests filed by the Palmetto Alliance and the Government Accountability Project for enforcement action against the Duke Power Company on the basis of violations of NRC regulations and alleged harassment and intimidation of quality control inspectors.

RULES OF PRACTICE: PETITIONS UNDER 10 C.F.R. § 2.206

Where factual matters are common to a licensing proceeding and to a petition under 10 C.F.R. § 2.206, the Staff will consider the facts raised in the § 2.206 petition only to the extent that the facts bear on whether the Staff should exercise its independent responsibility for enforcement of NRC requirements.

DISCRIMINATION AGAINST EMPLOYEES

Under the NRC's employee protection regulations, including 10 C.F.R. § 50.7, adherence to procedures and reporting of safety concerns to management can constitute "protected activities." Contact with representatives of the Commission is not necessary to establish a violation.

DISCRIMINATION AGAINST EMPLOYEES

The finding of a violation of the Commission's employee protection rules is not dependent on an initial finding by the Department of Labor that the employer has discriminated against the employee in violation of § 210 of the Energy Reorganization Act.

COLLATERAL ESTOPPEL EFFECT OF LICENSING DECISION ON ENFORCEMENT ACTION

A conclusion of no violation by the Board in a licensing proceeding does not bar the Staff from finding a violation and taking enforcement action where the Board's conclusion was not necessary to its decision and the Board was not empowered to take enforcement action for violations of NRC requirements.

HARASSMENT OF QUALITY ASSURANCE WORKERS: 10 C.F.R. PART 50, APPENDIX B

Whether a harassment incident constitutes a violation of the requirement of Criterion I of Appendix B to maintain sufficient authority and organizational freedom for quality assurance personnel depends on such factors as the nature of the incident, the persons involved in the incident, and the actions of management and supervisory personnel in response to the incident.

NRC ENFORCEMENT POLICY: 10 C.F.R. PART 2, APPENDIX C

Sanctions for violations of NRC requirements are not automatic, but their choice rests with the sound discretion of the Commission based on consideration of such factors as the significance of the underlying violations and the effectiveness of the sanction in securing lasting corrective action.

NRC ENFORCEMENT POLICY: CIVIL PENALTIES

The legislative history of § 210 of the Energy Reorganization Act provides no support for the Licensees' suggestion that the Commission lacks authority to impose civil penalties for violations of NRC regulations related to employee protection against discrimination. Civil penalties for such violations, as well as for other violations of NRC requirements, are appropriate if a civil penalty may positively affect the conduct

of the licensee or other similarly situated persons and are not grossly disproportionate to the gravity of the offense.

RULES OF PRACTICE: PETITIONS UNDER 10 C.F.R. § 2.206

The Director will not institute enforcement proceedings in response to a § 2.206 petition where the petition merely seeks to relitigate matters that were properly before the Licensing Board in the licensing proceeding.

DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

I. INTRODUCTION

On June 27, 1984, Robert Guild, counsel for the Palmetto Alliance, filed a request for action pursuant to 10 C.F.R. § 2.206 with the Director of the Office of Inspection and Enforcement. The Palmetto Alliance asked the Director to institute proceedings pursuant to 10 C.F.R. § 2.202 to modify, suspend, or revoke the construction permits for Duke Power Company's (the Licensee) Catawba Nuclear Station and to take other appropriate action on the basis of violations of Appendix B to 10 C.F.R. Part 50 and instances of harassment and intimidation of quality control inspectors. The Palmetto Alliance, which had intervened in the Catawba operating license proceeding, bases its request primarily on its disagreements with the Atomic Safety and Licensing Board's Partial Initial Decision in the proceeding. Although the Board found some problems in the Licensee's implementation of its quality assurance program, the Board did not believe that these problems indicated a "pervasive failure or breakdown" of the quality assurance program and, hence, the Board authorized issuance of an operating license for Catawba Unit 1. *See* LBP-84-24, 19 NRC 1418, 1434 (1984). The Board reaffirmed its view in a supplemental decision on other related quality assurance matters. *See* Partial Initial Decision Resolving Foreman Override Concerns and Authorizing Issuance of Operating Licenses, LBP-84-52, 20 NRC 1484, 1506-08 (1984). An operating license for Catawba Unit 1, which limited operation initially to 5% of full power, was issued by the Commission on December 6, 1984. 49 Fed. Reg. 48,395 (Dec. 12, 1984). A full-power license was issued on January 17, 1985. 50 Fed. Reg. 3435 (Jan. 24, 1985). Appeals from the Licensing Board's decision are currently pending before the Atomic Safety and Licensing Appeal Board.

A notice was published in the *Federal Register* indicating that the Palmetto Alliance's request was under consideration. 49 Fed. Reg. 30,813 (Aug. 1, 1984). On September 27, 1984, the Government Accountability Project (GAP) filed an "Enforcement Action Request" with the Office of Inspection and Enforcement in which GAP asked that the Commission impose \$250,000 in civil penalties for alleged acts of harassment and intimidation by Duke Power Company of employees at Catawba. Because GAP's request concerns the same issue of enforcement action for discrimination and harassment as is raised in the Palmetto Alliance's request, this decision responds to both requests.¹ Duke Power Company filed a response to GAP's request on April 22, 1985. Letter to James M. Taylor from W.H. Owen, Exec. Vice President (hereinafter "DPC Response").

My decision in this matter has been delayed by an intervening event. On December 10, 1984, the U.S. Court of Appeals for the Fifth Circuit overturned a Secretary of Labor determination concerning application of § 210 of the Energy Reorganization Act of 1974, as amended (ERA). *Brown & Root, Inc. v. Donovan*, 747 F.2d 1029 (5th Cir. 1984). Since the Commission's employee protection rule in 10 C.F.R. § 50.7 is derived from § 210 of the ERA, I elected to delay my decision until the Staff could assess the effect, if any, of the Fifth Circuit's decision on the NRC's application of 10 C.F.R. § 50.7. The results of that assessment are discussed in this Decision.

For the reasons stated in this Decision, I have determined that a violation of § 50.7 has occurred. Thus, to the extent that GAP and the Palmetto Alliance ask that I find violations of NRC requirements on the basis of discrimination against Mr. G.E. Ross, their requests have been *granted*. To the extent that the Palmetto Alliance requests initiation of show-cause proceedings and GAP asks for imposition of a civil penalty in an amount of \$250,000, their requests are *denied*.

¹ In considering these petitions under § 2.206, the issue before the Staff is not, of course, whether the Licensing Board's decision to authorize issuance of an operating license was a correct one. If that were the issue, the petitions could be dismissed without regard to their merits in view of the long-standing principle that § 2.206 is not a permissible avenue for relief with respect to matters that may be raised appropriately before the presiding officer in a pending proceeding. See *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-81-6, 13 NRC 443 (1981); *Consolidated Edison Co. of New York* (Indian Point, Units 1, 2, and 3), CLI-75-8, 2 NRC 173, 177 (1975); *General Public Utilities Nuclear Corp.* (Three Mile Island Nuclear Station, Units 1 and 2; Oyster Creek Nuclear Generating Station), DD-85-1, 21 NRC 263, 265 (1985), *aff'd*, CLI-85-4, 21 NRC 561 (1985). The facts raised in the instant petitions, however, have a bearing not only on the question of whether operating licenses should have issued, but also on the question of whether the Staff should exercise its independent responsibilities to enforce the conditions of the NRC's regulations and construction permits. For this reason, the Staff has considered the substantive merit of the petitions to determine whether enforcement action is appropriate in accordance with Subpart B and Appendix C of 10 C.F.R. Part 2. See also *infra* pp. 1768-69.

I want to emphasize that my decision in this matter, including the severity level and proposed sanction for the violation involving the discrimination against Mr. Ross, are based on the findings of fact contained in the Atomic Safety and Licensing Board's Partial Initial Decision. The remainder of this Decision details the particular facts on which the Staff has relied.

II. THE VIOLATION OF 10 C.F.R. § 50.7

On one matter the Staff agrees with the Petitioners that enforcement action should be taken. In fact, even prior to receipt of the petition the Staff was considering escalated enforcement based on the Board's decision. The Palmetto Alliance and GAP contend that Duke Power Company violated § 50.7 in its treatment of G.E. "Beau" Ross, a supervisor of welding inspectors. Mr. Ross claimed he was given a low performance rating by his supervisor for expressing safety concerns. This issue was explored in some detail during the operating license hearings and is described in the Board's Partial Initial Decision. LBP-84-24, *supra*, 19 NRC at 1513-20.²

On its consideration of the Ross matter, the Board concluded:

Based on our review of the testimony and exhibits, the setting in which the events occurred, and the credibility of the witnesses, the Board finds that the 1981-82 evaluation, the November 1982 interim evaluation, and the 1982-83 evaluation of Mr. Ross, all at the "fair" or "2" level, were unfair and in retaliation for Mr. Ross' and his crew's strict adherence to QA procedures and expression of safety concerns. The persons directly responsible for the discriminatory evaluations of Mr. Ross were Mr. Davison, Mr. Allum (as to the interim and 1982-83 evaluations), and Mr. Grier (as to the 1982-83 evaluation, which he should have overruled). Mr. Grier and Mr. Davison occupy senior level supervisory positions. Therefore, these actions are fully attributable to the Duke Power Company.

LBP-84-24, *supra*, 19 NRC at 1518-19 (footnote omitted). However, despite the urging of the Palmetto Alliance, the Licensing Board declined to find a violation of § 50.7:

That provision prohibits discrimination against an employee for engaging in certain "protected activities," as defined in section 210 of the Energy Reorganization Act of 1974. Since there is no clear evidence in the record indicating that Mr. Ross himself voiced concerns to the NRC prior to the evaluation in question, we find no violation of 10 C.F.R. § 50.7. *But see* Ross, Tr. 6777. However, the evaluations did constitute

² The Board adopted the Staff's proposed findings of fact as a substantial part of its discussion of this incident.

discrimination against Mr. Ross on account of his voicing safety concerns. They therefore violated the spirit of section 50.7, if not its letter.

LBP-84-24, *supra*, 19 NRC at 1518 n.27.

Under 10 C.F.R. § 50.7(a), the Commission has prohibited discrimination by a Commission licensee, permittee, applicant, or others against an employee for "engaging in certain protected activities." Section 50.7(a) states, "Discrimination includes discharge and other actions that relate to compensation, terms, conditions, and privileges of employment." Unfair performance evaluations for reporting safety concerns can constitute discrimination within the meaning of § 50.7 because such evaluations constitute an adverse mark in the employee's personnel file and can be used as a basis for demoting or firing the employee. In determining whether Duke Power Company violated § 50.7 in giving Mr. Ross discriminatory performance ratings, the key question is whether Mr. Ross' activities were "protected." As noted above, the low performance ratings were in retaliation for Mr. Ross' strict adherence to procedures and expressions of safety concerns. Adherence to procedures and reporting of safety concerns to management can constitute protected activities within the meaning of § 50.7.

The Commission's current employee protection rules, including § 50.7, are derived from § 210 of the Energy Reorganization Act of 1974, as amended, 42 U.S.C. § 5851. Section 50.7 itself states, "[t]he protected activities are established in Section 210." Section 210 provides employees who have been the victims of impermissible discrimination with a direct means of obtaining a remedy against their employer, including obtaining job reinstatement and back pay. The responsibility for administration of the employee remedies under § 210 rests with the Secretary of the United States Department of Labor. See 42 U.S.C. § 5851(b). The Secretary has held consistently that employees are protected under § 210 from retaliation and discrimination for purely internal safety activities that involve no contact with representatives of the Commission.³

³ See *Wells v. Kansas Gas & Electric Co.*, 83-ERA-12 (June 14, 1984) (internal quality control complaints are protected), *appeal pending sub nom. Kansas Gas & Electric Co. v. Donovan*, No. 84-2114 (10th Cir.); *Mackowiak v. University Nuclear Systems, Inc.*, 82-ERA-8 (April 29, 1983), *remanded on other grounds*, 735 F.2d 1159 (9th Cir. 1984) (internal quality control complaints are protected); *Pennsyl v. Catalytic, Inc.*, 83-ERA-2 (Jan. 13, 1984) (refusal to work can be a protected activity); *Landers v. Commonwealth Lord Joint Venture*, 83-ERA-4 (Sept. 9, 1983) (filing of nonconformance report is protected; no contact with NRC until after termination); *Atchison v. Brown & Root, Inc.*, 82-ERA-9 (June 10, 1983) (filing of nonconformance report is protected), *vacated and remanded sub nom. Brown & Root, Inc. v. Donovan*, 747 F.2d 1029 (5th Cir. 1984); *Consolidated Edison Co. v. Donovan*, 673 F.2d 61 (2d Cir. 1982) (employee made complaints to plant management about safety conditions).

The Staff recognizes, of course, that the Secretary's construction of the remedial provisions of § 210 is not accepted universally. Notwithstanding the Ninth Circuit's opinion in *Mackowiak v. University Nuclear Systems, Inc.*, 735 F.2d 1159, 1162-63 (9th Cir. 1984), the Fifth Circuit has held that, absent contact with the NRC, a quality control inspector has not engaged in a "protected activity" for purposes of § 210 by identifying safety deficiencies to his management. *Brown & Root, Inc. v. Donovan*, 747 F.2d 1029 (5th Cir. 1984). The Fifth Circuit decision is, however, at odds with the remedial purposes of § 210. As the Ninth Circuit explained,

Quality control inspectors play a crucial role in the NRC's regulatory scheme. The NRC's regulations require Licensees and their contractors and subcontractors to give inspectors the "authority and organizational freedom" required to fulfill their role as independent observers of the construction process. 10 C.F.R. Part 50, Appendix B, at 413. In a real sense, every action by quality control inspectors occurs "in an NRC proceeding," because of their duty to enforce NRC regulations. At times, the inspector may come into conflict with his employer by identifying problems that might cause added expense and delay. If the NRC's regulatory scheme is to function effectively, inspectors must be free from the threat of retaliatory discharge for identifying safety and quality problems.

Mackowiak, supra, 735 F.2d at 1163. The rationale of *Brown & Root* could force quality control inspectors to make a difficult choice. They could follow their employer's chain of command and the procedures contemplated by the NRC's quality assurance and control requirements and raise their safety concerns initially to plant management. Under this approach, the inspectors essentially lose the protections of § 210. Alternatively, they can obtain the protections of § 210 by ignoring management's reporting procedures and raising their safety concerns directly to the NRC. This dilemma does not enhance public health and safety. To ensure that public safety is served by encouraging the reporting of defects, an inspector should not be subject to discrimination for bringing safety issues to his employer's attention.⁴

Thus, the Ninth Circuit has stated the better view of "protected activities" under § 210 and this view, which is consistent with the words of the statute and congressional intent, should be followed in the application of the Commission's employee protection regulations, such as 10

⁴ This is not to say that employees can expect adverse action for reporting safety matters or that employers routinely discriminate against employees in such a fashion, but, unfortunately, such discrimination does sometimes occur. Without the protection of § 210, the incentive for employees to report defects is weakened.

C.F.R. § 50.7.⁵ When it adopted § 50.7, the Commission stated, “[e]mployees are an important source of such information [concerning regulated activities] and should be encouraged to come forth with any items of potential significance to safety without fear of retribution from their employers.” 47 Fed. Reg. 30,452 (July 14, 1982). This same principle is equally valid whether employees raise safety concerns to the NRC or to their employers who are ultimately responsible for safe construction and operation of their facilities. The Commission recently endorsed this view when it authorized the filing of an *amicus curiae* brief before the Tenth Circuit in support of the Department of Labor’s position in the *Kansas Gas & Electric Co. v. Donovan* case. Accordingly, I find that discrimination against employees for voicing safety concerns internally is prohibited under 10 C.F.R. § 50.7(a) and subjects the licensee employer to the sanctions identified in 10 C.F.R. § 50.7(c).

In its response to GAP’s “Enforcement Action Request,” Duke Power Company suggests that “the Commission never intended to place itself in the position of determining in the first instance” whether a violation of § 50.7 has occurred and, thus, the Commission would find a violation of § 50.7 “only in consequence of findings adverse to an employer initially made by the Department of Labor.” DPC Response at 17, 18. Duke Power Company bases its view on isolated sentences from the Statement of Considerations that accompanied issuance of § 50.7 and on remarks in a Staff paper to the Commission supporting provisions in legislation that ultimately evolved into § 210 of the Energy Reorganization Act. If I were to adopt Duke Power Company’s view and apply it to this case, I could not find a violation of 10 C.F.R. § 50.7 because the Department of Labor did not receive and then act favorably on a complaint from Mr. Ross under § 210 of the Energy Reorganization Act.

⁵ It should be noted that the Department of Labor continues to support the broad remedial construction of § 210 in its brief before the Tenth Circuit in *Kansas Gas & Electric Co. v. Donovan*, No. 84-2114. Furthermore, *Brown and Root* is wrong as a matter of law. In *Mackowiak*, the Ninth Circuit followed the reasoning of the District of Columbia Circuit in a case holding that the filing of internal safety complaints was a protected activity under the Federal Coal Mine Health and Safety Act. *Phillips v. Interior Board of Mine Operations Appeals*, 500 F.2d 722 (D.C. Cir. 1974), cert. denied, 420 U.S. 938 (1975). In *Brown and Root*, the Fifth Circuit rejected the Ninth Circuit’s analysis on the ground that the Ninth Circuit’s decision was predicated in part on provisions of the Mine Safety Act that were substantially different from § 210. The Fifth Circuit found that the Mine Safety Act, unlike § 210, had express provisions protecting internal complaints. However, the court failed to recognize that these provisions were from amendments to the Act enacted after the *Phillips* decision. In fact, the original statutory language of the Federal Coal Mine Health and Safety Act construed by the D.C. Circuit in *Phillips* and relied on by the Ninth Circuit in *Mackowiak* is virtually identical to § 210. In 1977, the Federal Coal Mine Health and Safety Act was amended to ensure the continued broad construction of the employee protection provisions. See S. Rep. No. 181, 95th Cong., 1st Sess. 36, reprinted in 1977 U.S. Code Cong. & Ad. News 3436. The legislative history of § 210 indicates that it was patterned after the original version of the Federal Coal Mine Health and Safety Act, Pub. L. No. 91-173, § 110, 83 Stat. 758 (1969). See S. Rep. No. 848, 95th Cong. 2d Sess. 29 (1978).

Duke Power Company misperceives the complementary, yet independent, authorities and responsibilities of the Department of Labor and the Nuclear Regulatory Commission in protecting employees from discrimination and retaliation for raising matters pertaining to nuclear safety. Although § 210 assigns authority to grant employee remedies to the Department of Labor, enactment of that statute did not limit the Commission's preexisting authority under the Atomic Energy Act to investigate alleged discrimination and take appropriate action against its licensees to combat it. *Union Electric Co. (Callaway Plant, Units 1 and 2)*, ALAB-527, 9 NRC 126, 132-39 (1979). In urging his colleagues to adopt § 210, Senator Hart, the Senate floor manager, said

[§ 210] is not intended to in any way abridge the Commission's current authority to investigate an alleged discrimination and take appropriate action against a Licensee-employer, such as a civil penalty, license suspension or license revocation. Further, the pendency of a proceeding before the Department of Labor pursuant to new Section 210 need not delay any action by the Commission to carry out the purpose of the Atomic Energy Act of 1954.

124 Cong. Rec. S15318 (daily ed. Sept. 18, 1978). When the Commission amended its regulations in 1982 to expand the scope of its employee protection regulations (regulations which pre-dated enactment of § 210) the regulations did not specify that findings by the Department of Labor were a prerequisite to finding a violation of § 50.7.

The comments cited by Duke Power Company from the Statement of Considerations were made only in the context of (1) emphasizing that employee discrimination could result in Commission sanctions as well as the Department of Labor's award of a direct remedy to an employee and (2) rejecting a proposal that the Commission provide in its rules for imposition of civil penalties against individuals who made frivolous complaints to harass an employer. To be sure, the Department of Labor and the Commission are aware of the need to coordinate their efforts and cooperate in the effective administration of employee protection provisions under § 210 and the Commission's regulations and to this end the Department and Commission have entered into a Memorandum of Understanding. 47 Fed. Reg. 54,585 (Dec. 3, 1982). To limit the Commission's power in the fashion Duke Power Company suggests overlooks the reality that an aggrieved employee may decline to file a complaint or may settle a complaint for personal reasons. The Commission's responsibility goes beyond immediate remedial action to the person affected. The Commission must ensure that licensees correct conditions that have resulted in improper discrimination that could affect other employees and prevent the recurrence of such discrimination. This power must

be available to the Commission whether or not a particular employee has exercised his or her rights under § 210.

In view of the Board's finding that the November 1982 interim evaluation and 1982-1983 evaluation of Mr. Ross' performance "were unfair and in retaliation for Mr. Ross' and his crew's strict adherence to QA procedures and expression of safety concerns," Duke Power Company violated 10 C.F.R. § 50.7.⁶ The Staff believes that the Board incorrectly included contact with the NRC as a necessary element of a "protected activity" under § 50.7 and that the Board erred in finding no violation. Although Duke Power Company has sought reversal of the Board's findings regarding improper attempts by Mr. Grier to influence Mr. Ross' testimony, the Licensee has not sought to reverse the Board's conclusions regarding the unfair performance evaluations and does not contest them in its response to GAP. See DPC Response at 7, 13. In light of the Board's findings that the performance evaluations were discriminatory, a violation of § 50.7 has been established and enforcement action should be taken.

III. THE BOARD'S DECISION DOES NOT BAR ENFORCEMENT ACTION FOR THE VIOLATION

Although the Board said that it did not believe § 50.7 had been violated, the Board's remarks on § 50.7 are not binding and the Staff is not estopped from taking enforcement action. Under the doctrine of collateral estoppel, a prior determination in an adjudicatory proceeding will bar a party from further litigation of an issue if: (1) the issue was determined by a valid and final judgment; (2) the issue sought to be precluded is the same as that involved in the prior action; (3) the issue was actually litigated; and (4) the determination on the issue was essential to the prior judgment. *Houston Lighting and Power Co.* (South Texas Project, Units 1 and 2), LBP-79-27, 10 NRC 563, 566 (1979), *aff'd*, ALAB-575, 11 NRC 14 (1980). These criteria are not met here.

Apart from brief references in the parties' proposed findings of fact, the question of whether the discriminatory evaluations constituted a § 50.7 violation was not briefed or litigated as a specific contention.⁷ The Board's decision is not, as yet, a "final judgment," because an

⁶ See LBP-84-24, *supra*, 19 NRC at 1518. The Board also concluded that the 1981-1982 evaluation was unfair and retaliatory. This evaluation would not be covered by § 50.7 because it occurred prior to October 14, 1982, the rule's effective date.

⁷ The Staff's proposed findings suggested that the Board did not need to reach the question of whether § 50.7 had been violated. See NRC Staff's Proposed Findings of Fact and Conclusions of Law in the Form of a Partial Initial Decision, at 122 (Mar. 8, 1984).

appeal has been taken in the case.⁸ But even if it were a final judgment, the Board's remarks regarding § 50.7 were unnecessary to its decision in the operating license proceeding and are not controlling here. The Board's primary responsibility was to determine whether the requisite "reasonable assurance" determinations could be made to permit licensing of the plant. See 10 C.F.R. § 50.57(a). For purposes of making these determinations, the underlying facts regarding the handling of Mr. Ross have significance in assessing the adequacy of the quality assurance program, whether or not they represent a specific violation of § 50.7. The Board seemed to acknowledge the collateral nature of the § 50.7 question by relegating its treatment of the issue to a brief footnote and by suggesting that the more important inquiry was whether Duke's conduct would preclude the "reasonable assurance determinations necessary for licensing." See LBP-84-24, *supra*, 19 NRC at 1518 n.27; 10 C.F.R. § 50.57(a) (3).

Initiation of enforcement action here does not contradict the Commission's policy against initiating enforcement proceedings to grant relief on matters that are within the jurisdiction of the presiding officer in a licensing proceeding. See *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-81-6, 13 NRC 443, 444 (1981). Even if the Licensing Board had agreed in this case that the discrimination against Mr. Ross constituted a § 50.7 violation, the Board was not empowered to impose civil penalties, suspend the construction permits, or apply any other sanction, except to deny or condition the grant of an operating license — a step the Board did not find warranted here. See *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit 1), CLI-82-31, 16 NRC 1236, 1238 (1982); *Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-674, 15 NRC 1101, 1102-03 (1982). For the foregoing reasons, the Staff is not barred from taking enforcement action here. The Staff has concluded that a violation of § 50.7 has occurred and enforcement action should be taken.

IV. VIOLATIONS OF 10 C.F.R. PART 50, APPENDIX B

Before turning to an analysis of the appropriate enforcement sanction for the § 50.7 violation, the other violations alleged by the Petitioners

⁸ See 10 C.F.R. § 2.760(a). The Staff has not appealed the Board's conclusion regarding § 50.7 because it agrees with the Board's ultimate decision finding that the plant meets the licensing standards of the Atomic Energy Act and the Commission's regulations. See *Duke Power Co.* (Cherokee Nuclear Station, Units 1, 2, and 3), ALAB-478, 7 NRC 772, 773 (1978). As the Staff has indicated in its brief (at 26 n.23) in the Catawba appeal before the Appeal Board, the correctness of the Board's interpretation of § 50.7 does not bear on the correctness of its findings on the significance of the Ross incident.

should be discussed. Both GAP and the Palmetto Alliance argue that multiple instances of harassment and intimidation in violation of 10 C.F.R. Part 50, Appendix B, occurred that warrant enforcement action. The Palmetto Alliance refers to "43 violations" of quality assurance requirements for which, it believes, the Board took no effective action. Guild Letter at 2. These forty-three violations are derived from a report of the task force initiated by Duke Power Company to review the welding inspectors' concerns. The welding inspector task force was the subject of substantial litigation before the Board. See LBP-84-24, *supra*, 19 NRC at 1446-1505. A few of the items identified by the task force had been previously identified by NRC Region II and were the subject of Notices of Violation. The remainder, though they represented non-compliance with NRC requirements, were of Severity Level IV or V significance under the enforcement policy. In accordance with the policy, Region II did not formalize these noncompliances in a Notice of Violation because they were identified and corrected by the Licensee. See 10 C.F.R. Part 2, Appendix C, § IV.A (1984), *as revised*, § V.A, 49 Fed. Reg. 8583, 8589 (Mar. 8, 1984); see LBP-84-24, *supra*, 19 NRC at 1499. As the Licensing Board and the previous Director of this Office also concluded, the Region's actions appear to conform with the enforcement policy and no further action is warranted on my part to overturn the Region's judgment. See LBP-84-24, *supra*, 19 NRC at 1498-99; DD-84-16, 20 NRC 161, 180-81 (1984).

The Palmetto Alliance and GAP also ask for enforcement action on the basis of certain harassment incidents. Not every harassment incident warrants the finding of a violation under Criterion I of Appendix B to 10 C.F.R. Part 50. Whether a harassment incident constitutes a violation of the requirements in Criterion I to maintain sufficient authority and organizational freedom for quality assurance personnel depends on such factors as the nature of the incident, the persons involved in the incident, and the actions of management and supervisory personnel in response to the incident. The available evidence does not suggest that the Licensee condoned or encouraged intimidation or harassment of quality control supervisors or was irresponsible in reacting to such incidents. As the Board noted, 19 NRC at 1444, "the cases of serious harassment were relatively few in number" and, in most cases, the Licensee "acted in a reasoned manner to discourage repetition." *Id.* at 1532. The Board did find that the Licensee could have done more to publicize its actions or to communicate "in a more supportive way" with the quality control inspectors, *see id.*, but as described more fully in § V of this decision, these facts have been taken into account in determining the appropriate enforcement sanction for the violation of 10 C.F.R. § 50.7.

In its "Enforcement Action Request" (at 8), GAP refers to reports by Duke Power Company and Region II as "new evidence of an atmosphere of harassment and intimidation." The references are apparently to reports concerning foreman overrides that were the focus of the "Welder B" issue that the Licensing Board had left open in its June 22nd Partial Initial Decision. See LBP-84-24, *supra*, 19 NRC at 1585. Contrary to the implication in GAP's "Enforcement Action Request," few of the 200 persons interviewed during the Duke investigation claimed harassment or intimidation. The reports and related information were the subject of further hearings that commenced on October 9, 1984, before the Licensing Board. The Board recently issued its decision regarding this matter and concluded that instances of foreman overrides were isolated, did not compromise plant safety, did not indicate pervasive harassment and intimidation, and did not represent a significant breakdown in quality assurance at Catawba. See LBP-84-52, *supra*, 20 NRC at 1506-07. The Staff agrees with those findings.

Region II did issue a Notice of Violation to the Licensee for failure to follow procedures related to the "Welder B" issue. See NRC Inspection Report No. 50-413/84-88 & 50-414/84-39 (Aug. 31, 1984). No further enforcement action for violations of 10 C.F.R. Part 50, Appendix B is appropriate.

V. PROPOSED ENFORCEMENT ACTION

The Palmetto Alliance urges the Staff to initiate show-cause proceedings to modify, suspend, or revoke the Catawba construction permits on the basis of the alleged violations of 10 C.F.R. § 50.7 and Part 50, Appendix B. GAP contends that a civil penalty of \$250,000 should be proposed and that civil penalties should be "automatic" in such cases to "punish" employers for harassment. However, not every violation of NRC requirements warrants initiation of show-cause proceedings or imposition of civil penalties. See *Petition for Emergency and Remedial Action*, CLI-78-6, 7 NRC 400 (1978). Sanctions are not "automatic." The choice of enforcement sanctions for violations of NRC requirements rests within the sound discretion of the Commission based on consideration of such factors as the significance of the underlying violations and the effectiveness of the sanction in securing lasting corrective action. See General Statement of Policy and Procedure for NRC Enforcement Actions, 10 C.F.R. Part 2, Appendix C, §§ I and VII (1985). The Commission's policy on the application of enforcement sanctions, which was applicable at the time of the violation, is set forth in 10 C.F.R. Part 2, Ap-

pendix C, 47 Fed. Reg. 9989 (Mar. 9, 1982). The policy classifies different types of violations by their relative severity and describes the circumstances in which formal sanctions, including orders, civil penalties, and notices of violation are appropriate.

Under this policy, the violation fits most closely the example of a Severity Level II violation under the severity categories in Supplement VII because the discriminatory evaluations involved action by management above first-line supervision. In its decision the Board found:

The persons directly responsible for the discriminatory evaluations of Mr. Ross were Mr. Davison, Mr. Allum (as to the interim and 1982-83 evaluations), and Mr. Grier (as to the 1982-83 evaluation, which he should have overruled). Mr. Grier and Mr. Davison occupy senior level supervisory positions. Therefore, these actions are fully attributable to the Duke Power Company.

LBP-84-24, *supra*, 19 NRC at 1519. Since Mr. Ross as a foreman was a first-line supervisor, the discriminatory action by Mr. Allum and Mr. Grier involved management above first-line supervision. It is recognized that the examples of severity levels in the supplements to Appendix C are just that and, therefore, neither controlling nor exhaustive. However, in view of the Board's finding, a classification of the violation at Severity Level II appears appropriate and departure from the guidance of the policy is not warranted.

The base civil penalty for a Severity Level II violation was \$64,000 at the time this violation occurred. The enforcement policy then in effect, as well as the present policy, provides for mitigation or escalation of the base civil penalty on the basis of several factors including the adequacy of corrective actions, poor prior performance in an area of concern, prior notice of similar events, and multiple occurrences. Duke Power Company has removed the unsatisfactory performance appraisals from the Beau Ross personnel file and inserted a statement that his performance was satisfactory during those periods. In addition, Duke has taken certain other corrective actions including: (1) establishment and implementation of a QA Department Harassment Resource Procedure; (2) retention of an employee relations specialist; (3) amplification of the construction department instructions involving intimidation and coercion; and (4) implementation of a quality awareness program. Thus, escalation of the penalty for inadequate corrective actions does not seem appropriate. However, Duke has maintained Mr. Ross's adverse performance appraisals in a separate file and has included in that file a letter which states that they do not concur with the Board's findings. These actions indicate that Duke has not fully acknowledged the seriousness of this violation. Furthermore, the Board identified additional corrective actions that

Duke was required to take. These circumstances suggest that mitigation of the civil penalty for unusually prompt and extensive corrective actions is not appropriate.

With regard to prior notice of similar events and multiple occurrences, the record did not contain evidence of prior notice of other similar events or other violations of the same significance. Thus, a civil penalty of \$64,000 will be proposed.⁹

Initiation of further proceedings, as the Palmetto Alliance suggests, is not warranted.¹⁰ The request stems primarily from their apparent disagreement with the Board's conclusion with respect to the significance of instances of harassment of welding inspectors; i.e., "harassment was not a widespread phenomenon at Catawba." LBP-84-24, *supra*, 19 NRC at 1532. Although the Board found from the record that "some welding inspectors were subjected to harassment by craft workers and craft foremen for doing their job," the Board concluded that "[t]he few incidents described did not deter these inspectors from performing their duties, nor was the freedom of the QA program restricted." *Id.* at 1531. The Staff agrees with these conclusions and the Petitioners have not provided any new information which would suggest a different result.¹¹

⁹ Although Duke Power Company will have a full opportunity to contest the proposed civil penalty in accordance with 10 C.F.R. § 2.205, a brief response is warranted here to the Licensee's arguments that civil penalties are not available or should not be used for violations of § 50.7. As noted earlier, the legislative history of § 210 provides no support for the suggestion that the Commission lacks authority to impose civil penalties for violations of duly promulgated regulations related to employee protection against discrimination. No such limitation exists in § 210 of the Energy Reorganization Act or in § 234 of the Atomic Energy Act. The civil penalty provision "spurned" in the Staff paper cited by the Licensee referred to an extension of such sanctions to *nonlicensed* employers. The same Staff paper acknowledges the Commission's existing authority to impose civil penalties on its licensees.

The Licensee also suggests that the Commission should not impose civil penalties for violations of § 50.7, at least where the Department of Labor has awarded the employee a remedy, because the civil penalty would not likely have any additional remedial effect. However, the Commission expressly provided for possible imposition of civil penalties in § 50.7(c) for violations of § 50.7(a). Civil penalties for violations of § 50.7, as well as for violations of other NRC requirements, are appropriate if a civil penalty may positively affect the conduct of the licensee or other similarly situated persons and are not grossly disproportionate to the gravity of the offense. *Atlantic Research Corp.*, CLI-80-7, 11 NRC 413, 421 (1980).

¹⁰ Because an operating license has been issued, suspension or revocation of the construction permit for Unit 1 would be essentially meaningless. Enforcement action may still be appropriate, however, for violations that occurred during construction even after an operating license has been issued. Quality assurance is important in both construction and operation of a nuclear plant. The violation of § 50.7 discussed in this decision can also occur during operation and, thus, enforcement action is appropriate to discourage similar violations by this Licensee in the future as well as to discourage similar violations by other licensees. *See id.*, 11 NRC at 420-21.

¹¹ Mr. Guild points to the discussion of harassment incidents in the Licensing Board's decision as the basis for the Palmetto Alliance's § 2.206 request. Without specific attribution, GAP lists a number of alleged harassment incidents which, it believes, establishes "a pattern of harassment, intimidation and discrimination." GAP Enforcement Action Request at 5. These incidents appear to be derived primarily from the incidents discussed in the Licensing Board's decision. *Compare* GAP Enforcement Action Request at 3-5 with LBP-84-24, *supra*, 19 NRC at 1479-92, 1504-32, 1541-48.

In his letter on behalf of the Palmetto Alliance, Mr. Guild also takes issue with the Licensing Board's conclusion that the evidence in the operating license proceeding did not demonstrate a pervasive quality assurance breakdown at Catawba. Mr. Guild's letter is little more than an appeal of the Licensing Board's adverse ruling on the Palmetto Alliance's quality assurance contention (Contention 6) in the operating license proceeding. Mr. Guild now wants the Director to initiate show-cause proceedings "to fully probe the significance of this serious misconduct by Duke Power Company and take needed remedial measures to insure that the full scope of Quality Assurance deficiencies are identified and corrected prior to operation of the Catawba Nuclear Station." Guild Letter at 2. The significance of quality assurance problems at Catawba on which Mr. Guild relies and their impact on plant operation have been fully examined by the Licensing Board and, unlike the Board's remarks about § 50.7 discussed above, were a critical part of its inquiry to determine whether the requisite "reasonable assurance" determinations under § 50.57 could be made to permit licensing. *See generally* LBP-84-24, *supra*, 19 NRC at 1432-46. If the Palmetto Alliance disagrees with the Licensing Board's decision to issue an operating license, it should pursue its appeal before the Appeal Board, not ask the Staff to institute show-cause proceedings to go over the same issues that were properly before the Licensing Board and which formed the basis for the Board's decision.¹² 10 C.F.R. § 2.762; *see Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-81-6, 13 NRC 443 (1981); *cf. Rockford League of Women Voters v. NRC*, 679 F.2d 1218, 1222 (7th Cir. 1982).

Moreover, the Staff has considered the same basic allegations as were before the Licensing Board — in fact in response to a petition filed on behalf of the Palmetto Alliance — and determined that no enforcement action was warranted. At the time Mr. Guild's letter was received, the Director had just issued a decision under § 2.206 that responded to an earlier petition filed on behalf of the Palmetto Alliance by GAP. *See* DD-84-16, 20 NRC 161 (1984). That petition raised many of the same issues and relied substantially on much of the same evidence that was presented in the Catawba operating license proceeding. In his decision on the petition, the Director concluded, as did the Licensing Board, that the problems at Catawba, including the violations of Appendix B to Part 50 that had been identified, did not represent a significant breakdown in

¹² The Palmetto Alliance has in fact appealed the Board's June 22nd decision.

quality assurance that would warrant initiation of show-cause proceedings to modify, suspend, or revoke the construction permits. *Id.* at 181. Accordingly, the Palmetto Alliance's request for extraordinary relief in its earlier § 2.206 petition was denied.

Mr. Guild's June 27th letter does not raise any new factual information regarding the matters covered in the July 6th Director's decision or, for that matter, in the Licensing Board's decision. Thus, as the Director informed Mr. Guild in a letter acknowledging receipt of Mr. Guild's request for action under § 2.206 dated July 20, 1984, the problems identified at Catawba do not represent a massive or pervasive breakdown in the quality assurance program. No adequate reasons have been presented in Mr. Guild's letter, nor is there information of which the Staff is aware from its inspections, to reverse the determination made on this point in the earlier Director's decision.

Accordingly, I have determined that a Notice of Violation and Proposed Imposition of Civil Penalty should be issued pursuant to 10 C.F.R. §§ 2.201 and 2.205 for the violation of 10 C.F.R. § 50.7 and that no further enforcement action is warranted.

VI. CONCLUSION

For the reasons stated in this decision, the requests of the Palmetto Alliance and GAP have been granted in part and denied in part.

A copy of this decision will be provided to the Secretary for the Commission's review in accordance with 10 C.F.R. § 2.206(c). Unless the Commission otherwise directs, the Staff will issue a Notice of Violation and Proposed Imposition of Civil Penalty as described in this decision after the conclusion of the period within which the Commission may review this decision.

James M. Taylor, Director
Office of Inspection and
Enforcement

Dated at Bethesda, Maryland,
this 4th day of June 1985.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Thomas M. Roberts
James K. Asselstine
Frederick M. Bernthal
Lando W. Zech, Jr.

In the Matter of

Docket No. PRM-35-5

NUCLEAR RADIATION CONSULTANTS

February 12, 1985

The Commission denies a petition for rulemaking which requested that the Commission amend its regulations governing the medical uses of byproduct material to permit any health professional with appropriate training and experience to obtain a license to use a specific medical diagnostic device containing the radioactive isotope Gd-153. The petition is denied because only physicians licensed by a State to practice medicine have the competence to diagnose diseases and initiate therapy.

DENIAL OF PETITION FOR RULEMAKING

I. BACKGROUND

The Petitioner, Nuclear Radiation Consultants, requested the NRC to amend its regulations governing the human use of byproduct material to permit any health professional with appropriate training and experience to obtain a license to use a specific medical diagnostic device containing the radioactive isotope Gd-153. This device is the dual photon spine scanner, which is also known as a bone mineral analyzer. By measuring

the transmission of radiation through the spinal bones, the condition of the skeleton can be assessed.

As described in the Commission's February 9, 1979 policy statement, "Regulation of the Medical Uses of Radioisotopes" (44 Fed. Reg. 8242):

The NRC and its predecessor the Atomic Energy Commission have regulated the medical uses of radioisotopes since 1946. AEC recognized that physicians have the primary responsibility for the protection of their patients and designed its regulations accordingly. The physicians were required to be licensed by the State, and their applicable training and experience were evaluated in consultation with the Advisory Committee on the Medical Use of Isotopes.

An NRC license for the medical use of radioisotopes is not a license to practice medicine. It has a different purpose, namely, assuring the safe handling and use of radioisotopes. To the extent that it affects the practice of medicine, it does so no more than necessary to protect public health and safety. However, under the Commission's regulations in 10 C.F.R. Part 35, a physician must be licensed by a State to practice medicine prior to receiving an NRC license. NRC's license involving irradiation of humans is restricted to State-licensed physicians because of the need for the requisite competence to practice medicine that is demonstrated by a license from a State.

As is the case with X-ray machines and other diagnostic equipment, the actual measurements may be made on the patient by paramedical personnel. These technicians and technologists are trained in the use of the specific devices by their physician-supervisor in addition to their formal schooling and are supervised by the physician who is responsible for care of the patients. NRC has recognized this situation from the beginning and discusses the permissible scope of activities for a technician in § 4 of Regulatory Guide 10.8, "Guide for the Preparation of Applications for Medical Programs."

NRC has provided an exemption from its requirements that only physicians can obtain a license for human use of byproduct material by allowing podiatrists and dentists to be licensed to use the Lixiscope, a device similar to an X-ray machine. The rationale for this exemption was based on the fact that these professionals must also be licensed by a State to treat specific portions of the human body.

II. PUBLIC COMMENTS

A. Description of Comments Received on Petition

Twenty-seven comment letters were received and all of the commenters opposed adoption of the petition.

B. Issues Raised by Commenters

Among the concerns expressed by the commenters was the potential for erroneous interpretation of the results. These commenters pointed out that complications due to coexistent osteoarthritic or post-surgical changes in the spine may lead to failure to diagnose the serious medical condition of osteoporosis or to initiation of therapy with possibly harmful agents such as estrogens for patients not in need of it. As is true for all areas of clinical medicine, diagnostic results must be interpreted only by individuals who understand the primary and coexistent medical problems of the patient. In addition, allowing nonphysicians to be licensed to use the bone mineral analyzer could lead to unnecessary radiation exposure since tests would be more likely to be performed on individuals not needing them. This would be contrary to the Commission's policy that all radiation exposures should be balanced by a concomitant benefit.

Commenters also noted that, while under optimal conditions the doses to the patient and the operator resulting from the use of bone mineral analyzers are acceptably small, situations can arise which present significant radiation safety hazards. Improper positioning of the patient or failure of the device to move as programmed can result in overexposure of the patient. Instances were cited where the gadolinium source was found to contain another radionuclide, which produced a much higher dose rate, or was leaking, which produced transferable contamination. While these occurrences are rare, they do demonstrate that the bone mineral analyzer is not as innocuous as the Petitioner claimed.

III. FINDINGS

A bone mineral analyzer is used only as a means of obtaining information on a patient's skeletal status in order to diagnose diseases such as osteoporosis. Diagnosing diseases has always been construed by all levels of government as an integral part of the practice of medicine. Consequently, NRC has always issued licenses involving human use of by-product material only to licensed physicians (or to podiatrists or dentists for limited use of the Lixiscope) because only they are authorized to practice medicine and possess the demonstrated competence to practice

medicine, as evidenced by their State license. The Petitioner's statements do not provide adequate justification for changing this policy.

**FOR THE NUCLEAR
REGULATORY COMMISSION**

**William J. Dircks
Executive Director for
Operations**

**Dated at Bethesda, Maryland,
this 12th day of February 1985.**

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

COMMISSIONERS:

Nunzio J. Palladino, Chairman
Thomas M. Roberts
James K. Asselstine
Frederick M. Bernthal
Lando W. Zech, Jr.

In the Matter of

Docket No. PRM-20-7

**NATURAL RESOURCES DEFENSE
COUNCIL, INC.**

March 29, 1985

The Nuclear Regulatory Commission (NRC) is denying a petition for rulemaking submitted by the Natural Resources Defense Council, Inc. The Petitioners requested that the Commission adopt interim regulations for shallow-land disposal of low-level radioactive waste. The petition is being denied on the grounds that the promulgation of the final rule creating 10 C.F.R. Part 61 (entitled "Licensing Requirements for Land Disposal of Radioactive Waste") provides the means of ensuring consistent and safe practices for near-surface disposal of radioactive waste. Thus, the seven issues raised in the petition were encompassed in the Part 61 requirements.

DENIAL OF PETITION FOR RULEMAKING

I. BACKGROUND

On August 6, 1976, Richard Cotton and Terry Lash submitted to the Commission a petition for rulemaking on behalf of the Natural Resources Defense Council, Inc. A notice of receipt of the petition for

rulemaking was published in the *Federal Register* on September 23, 1976 (41 Fed. Reg. 41,759). The Petitioners requested that the Commission adopt the following provisions as interim standards for shallow-land disposal of low-level radioactive wastes.

A. Long-Lived, Transuranic-Contaminated Wastes

1. The transfer of regulatory authority over long-lived transuranic wastes from the states to NRC.
2. An immediate end to burial of long-lived transuranic wastes with only retrievable storage permitted.
3. Payment of fees by persons that produce transuranic wastes to finance adequately safe permanent disposal.
4. Establishment of a reporting and inspection system operated by NRC (with onsite, unannounced inspection by NRC inspectors) to assure accurate classification of transuranic wastes.

B. Other Low-Level Radioactive Wastes

5. The suspension of licensing of new or enlarged burial sites until NRC establishes site selection criteria, radioactive release standards setting maximum permissible migration rates for radionuclides away from disposal sites, minimum standards for environmental monitoring programs, and standards for long-term care with mechanisms to finance such care.
6. Establishment of minimum fees to be paid effective immediately for each cubic foot of waste buried at existing sites to assure adequate funds for long-term care.

C. Solidification of Low-Level Radioactive Wastes Before Shipment

7. The solidification of all radioactive wastes before shipment to reduce the potential for release to the environment either through accident or sabotage.

In an accompanying document (entitled "Memorandum of Points and Authorities in Support of the Natural Resources Defense Council's Petition for Rulemaking and Request for a Programmatic Environmental Impact Statement"), the Petitioners also requested that the Commission undertake the preparation of a programmatic generic environmental impact statement (GEIS) on low-level waste disposal.

II. PARTIAL DENIAL OF PETITION

Following an analysis by the NRC Staff of the issues and points raised by the petition and of the comments received in response to the filing of

the petition, the NRC published a partial denial of the petition; specifically, the request for the preparation of a separate programmatic GEIS on the grounds that the Commission believed that a separate GEIS on low-level waste disposal was neither required by the National Environmental Policy Act of 1969 (NEPA) nor necessary for the development of the NRC program. This denial was included in a *Federal Register* notice that was published on July 25, 1979 (44 Fed. Reg. 43,541) and included a lengthy discussion of the petition, the public comments received on the petition, the NRC Staff position on the petition, and a discussion of the regulations development program which the NRC Staff had begun in 1977. The NRC Staff indicated that when complete, the regulations under development would address the issues of disposal site selection, financing arrangements for closure and long-term maintenance and surveillance of disposal sites, waste form and classification, and waste disposal alternatives.

III. DEVELOPMENT OF 10 C.F.R. PART 61

The regulations that the NRC Staff had under development became the new 10 C.F.R. Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." Part 61 includes licensing procedures, performance objectives and technical requirements for land disposal of radioactive waste. The Draft Environmental Impact Statement was published on October 22, 1981 (46 Fed. Reg. 51,776) following the publication of the notice of proposed rulemaking for Part 61 on July 24, 1981 (46 Fed. Reg. 38,081). Following the NRC Staff's evaluation of a broad range of public comments, the final EIS was published on November 26, 1982 (47 Fed. Reg. 53,829) and the final rule for Part 61 was published on December 27, 1982 (47 Fed. Reg. 57,446).

Part 61 establishes a classification scheme which divides waste intended for land disposal into three classes based on radiological hazard: Class A, B, and C. Class A waste contains the lowest concentrations of radionuclides and must meet only minimum waste form requirements. Class B and Class C wastes contain higher concentrations and must meet both the minimum and stability waste form requirements. Additionally, Class C waste must be disposed of by the disposal site operator using methods that provide additional protection against inadvertent intrusion.

IV. RESOLUTION OF PETITION ISSUES IN 10 C.F.R. PART 61

Issue 1. The transfer of regulatory authority over long-lived transuranic wastes from the States to NRC.

Part 61. Agreement States have made changes in their license conditions for the operating commercial disposal sites to effect compatibility with Part 61 (see § 61.2, Definitions; Subpart C, Performance Objectives; Subpart D, Technical Requirements for Land Disposal Facilities; portions of Subpart B necessary to implement Subparts C and D; § 20.311, Transfer for Disposal and manifests; and that portion of Subpart E requiring closure funding arrangements). See Issue 2, below, regarding transuranic waste disposal.

Issue 2. An immediate end to burial of long-lived transuranic wastes with only retrievable storage permitted.

Part 61. The Part 61 classification system (§ 61.55) limits the disposal of long-lived transuranic contaminated waste to 100 nanocuries per gram (nCi/g) (Class C maximum concentration). Wastes exceeding Class C are currently being stored by waste generators at their sites.

The methodology will also enable a limited independent check of site-specific proposals. Efforts to define requirements for disposal of waste that exceeds Class C concentrations are expected to take several years. However, the Staff believes that generic guidance for evaluating disposal requests for a wide spectrum of these wastes will be available by mid-1985.

Issue 3. Payment of fees by persons that produce transuranic wastes to finance adequately safe permanent disposal.

Part 61. Subpart E, Financial Assurances, § 61.61 — Each applicant for a disposal site license shall show that it possesses the necessary funds to cover the estimated costs of conducting all licensed activities; § 61.62 — Applicants shall provide assurance of funds to carry out disposal site closure and stabilization; and § 61.63 — Applicants shall provide assurances that arrangements are in place to provide sufficient funds to cover the cost of monitoring and any required maintenance during the institutional control period (i.e., up to 100 years).

The Part 61 classification system effectively prohibits disposal of transuranic wastes with concentrations exceeding 100 nCi/g. The matter of special fees being charged to waste generators is currently moot since, in the absence of a repository or other method for disposal, these wastes are currently being stored by the waste generators. When these facilities become available, or some arrangement is made for the Department of

Energy to receive transuranic wastes for either storage or disposal, the matter of fees will be considered.

Issue 4. Establishment of a reporting and inspection system operated by NRC (with onsite, unannounced inspection by NRC inspectors) to assure adequate classification of transuranic waste.

Part 61. Subpart G, Records, Reports, Tests, and Inspections, §§ 61.80, 61.81, 61.82, and 61.83 — The commercial operating disposal sites are all under Agreement State jurisdiction, and requirements compatible to Subpart G are required by license conditions at the sites.

Issue 5. The suspension of licensing of new or enlarged sites until NRC establishes site-selection criteria, radioactive release standards setting maximum permissible migration rates for radionuclides away from disposal sites, minimum standards for environmental monitoring programs, and standards for long-term care with mechanisms to finance such care.

Part 61. Subpart D, Technical Requirements for Land Disposal Facilities — Section 61.50 specifies the minimum characteristics a disposal site must have to be acceptable for use as a near-surface disposal facility; § 61.53(b), (c), and (d) require a licensee to have plans for corrective measures if migration of radionuclides would indicate that the performance objectives of Subpart C may not be met, require maintenance of a monitoring program during the disposal facility construction and operation, and require maintenance of a monitoring system after disposal site closure based on the operating history and the closure and stabilization of the disposal site; also Subpart C, § 61.41 provides limits for annual dose rates to members of the public from releases of radioactive material to the general environment. See discussion on Subpart E, Financial Assurances, under Issue 3.

Issue 6. Establishment of minimum fees to be paid effective immediately for each cubic foot of waste buried at existing sites to assure adequate funds for long-term care.

Part 61. Subpart E, Financial Assurances, is not incumbent on the existing sites, since they operate under Agreement State regulations. However, the Agreement States routinely assess a charge for waste disposal which is placed in a fund to finance long-term care of the site.

Issue 7. The solidification of all radioactive wastes before shipment to reduce the potential for release to the environment either through accident or sabotage.

Part 61. Subpart D, § 61.56(a)(2) and (b)(2) assure that wastes will not be shipped as liquids.

The foregoing discussion of NRC actions, coupled with the earlier partial denial of the NRDC petition, completes the NRC's response to this NRDC petition. The Commission believes that implementation of 10 C.F.R. Part 61 provides the means of ensuring consistent and safe practices for near-surface disposal of wastes. Accordingly, the petition is denied.

FOR THE NUCLEAR
REGULATORY COMMISSION

William J. Dircks
Executive Director for
Operations

Dated at Washington, D.C.,
this 29th day of March 1985.

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