397

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

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

May 24, 1984
(ALAB-772)

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

DECISION

DS02

TABLE OF CONTENTS

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING APPEAL BOARD

Administrative Judges:

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

May 24, 1984
(ALAB-772)

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

Marjorie M. Aamodt and Norman O. Aamodt, Coatesville, Pennsylvania, intervenors pro se.

Louise Bradford and Joanne Doroshow, Harrisburg, Pennsylvania, for intervenor Three Mile Island Alert, Inc.

Ellyn R. Weiss, Washington, D.C., for intervenor Union of Concerned Scientists.

Ernest L. Blake, Jr. (with whom George F. Trowbridge, Bonnie S. Gottlieb, and Deborah B. Bauser were on the brief), Washington, D.C., for licensee Metropolitan Edison Company.

Jack R. Goldberg for the Nuclear Regulatory Commission staff.

DECISION

In several previous decisions, we addressed the emergency planning, environmental, and design issues raised in this special proceeding. See ALAB-697, 16 NRC 1265 (1982); ALAB-698, 16 NRC 1290 (1982), modified, CLI-83-7, 17 NRC 336, and reversed in part, CLI-83-22, 18 NRC 299 (1983); ALAB-705, 16 NRC 1733 (1982), petition for review pending sub nom. Union of Concerned Scientists v. NRC, No. 83-1503

(D.C. Cir. filed May 9, 1983); ALAB-729, 17 NRC 814 (1983), review pending, Commission Order of January 27, 1984 (unpublished). We now turn to the only matter remaining for this Appeal Board's consideration, the ability of licensee's management to operate Unit 1 of the Three Mile Island facility (TMI-1) in a competent, responsible, and safe manner.

Three intervenor groups -- Marjorie and Norman Aamodt, Three Mile Island Alert, Inc. (TMIA), and the Union of Concerned Scientists (UCS)[1] -- appeal the Licensing Board's decisions concluding that licensee has demonstrated its managerial capability and technical resources to operate TMI-1 in a safe manner. See LBP-81-32, 14 NRC 381 (1981), and LBP-82-56, 16 NRC 281 (1982). Each argues, though on somewhat different grounds, that the Board erred in authorizing restart. Licensee and the NRC staff support affirmance of the Licensing Board's decisions. As we explain below, the present state of the record in several

---

[1] UCS, although an active litigant in other phases of this proceeding, participated to only a limited extent in the management phase. No party, however, has objected to its appeal and thus we have given full consideration to the essentially legal arguments advanced in its brief.

The Commonwealth of Pennsylvania originally appealed from the Licensing Board's decisions but later withdrew after entering a stipulation with licensee. In an unpublished order issued December 22, 1983, we approved this action.

areas does not permit us to make an ultimate judgment on the licensee's competence. Accordingly, we remand this proceeding to the Licensing Board for further hearing, primarily on the adequacy of licensee's training program. In addition, we grant the Aamodts' motion to reopen the record for a hearing on the allegations of falsification of leak rate records at TMI-1.

I. Background

This proceeding began approximately five years ago when, in response to the March 1979 accident at Unit 2 of the TMI facility, the Commission ordered a hearing to be conducted prior to restart of TMI-1.[2] The Commission found that "the unique circumstances at TMI require that [certain] safety concerns . . . be resolved prior to restart." CLI-79-8, 10 NRC 141, 143 (1979). Among them were "questions about the management capabilities and technical resources of [licensee], including the impact of the Unit 2 accident on these." Ibid. The Commission also identified

---

[2] At the time of the accident, TMI-1 had been shut down for refueling. It has remained in cold shutdown ever since. Although the Commission has delegated to us the initial responsibility for disposing of appeals on the merits, it has retained authority to decide if and when the plant should actually be permitted to restart. CLI-81-19, 14 NRC 304, 305-06 (1981). That determination is now scheduled for June 1984. Memorandum for the Parties from S.J. Chilk, Secretary to the Commission, "Tentative Commission Views and Plan for Resolution of Management Integrity Issues Prior to Restart" (January 27, 1984), at 3.

specific short-term actions that licensee was to be required to complete before it could safely resume operation. Two are relevant to this phase of the proceeding:

> 1.(e) [The licensee shall] [a]ugment the retraining of all Reactor Operators and Senior Reactor Operators assigned to the control room including training in the areas of natural circulation and small break loss of coolant accidents including revised procedures and the TMI-2 accident. All operators will also receive training at the B&W [Babcock & Wilcox] simulator on the TMI-2 accident and the licensee will conduct a 100 percent reexamination of all operators in these areas. NRC will administer complete examinations to all licensed personnel in accordance with 10 CFR 55.20-23.
>
> * * *
>
> 6. The licensee shall demonstrate [its] managerial capability and resources to operate Unit 1 while maintaining Unit 2 in a safe configuration and carrying out planned decontamination and/or restoration activities. Issues to be addressed include the adequacy of groups providing safety review and operational advice, the management and technical capability and training of operations staff, the adequacy of the operational Quality Assurance program and the facility procedures, and the capability of important support organizations such as Health Physics and Plant Maintenance.

Id. at 144-45. See id. at 146, 149. The Licensing Board presiding over the hearing was to consider, among other things, whether these short-term actions "are necessary and sufficient to provide reasonable assurance that [TMI-1] can be operated without endangering the health and safety of the public, and should be required before resumption of operation should be permitted." Id. at 148.

The Commission later provided more guidance to the Board concerning the hearing on these "management competence" issues. It directed the 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, 11 NRC 408, 408 (1980).[3] The Commission also refined these into 13 "specific issues" warranting the Board's attention. (These include issues that relate to corporate structure, maintenance, safety review, and in-house technical resources; all 13 are set forth in Appendix A to this opinion.) Id. at 408-09.

Numerous parties intervened and participated in the extensive hearings on management issues before the Licensing Board. Shortly before the Board was to issue its partial initial decision on this subject, however, the NRC staff

---

[3] In CLI-81-17, 14 NRC 299 (1981), the Commission authorized the formal transfer of the operating license for TMI-1 from Metropolitan Edison Company to the newly formed General Public Utilities subsidiary, GPU Nuclear Corporation (GPUN). It also instructed the Licensing Board to consider the management competence of GPUN, rather than that of Metropolitan Edison.

notified it of cheating and other irregularities in connection with the April 1981 reactor operator examinations that the Commission had ordered. Consequently, the Board issued its decision in August 1981 but retained jurisdiction to consider how the outcome of the then-pending cheating investigation might affect its conclusions on management competence. The Board explained:

> The issues of Licensee's management integrity, the quality of its operating personnel, its ability to staff the facility adequately, its training and testing program, and the NRC process by which the operators would be tested and licensed, are all important issues considered in this partial decision. We will consider carefully the effect on such issues of the anticipated NRC Staff report, any further action by the Licensee and Staff in light of the report, including whether there will be a reexamination of individuals who took the April examination, and the advice of the parties, to determine whether further actions by this Board appear warranted.

LBP-81-32, supra, 14 NRC at 403 (¶ 45).[4] See id. at 454 n.18, 582 n.63, 583 (¶¶ 204, 584, 585). In all other respects, though, the Board ruled in licensee's favor on the various management issues specified by the Commission. It thus concluded that licensee has demonstrated its "managerial capability and technical resources to operate Unit 1 while maintaining Unit 2 in a safe configuration and carrying out planned decontamination and/or restoration

---

[4] For ease of reference, we cite to the paragraph as well as page references of the Board's various decisions.

activities." Id. at 582 (¶ 584). It also found the short-term actions necessary and sufficient for resumption of operation. Ibid. (¶ 584).

Without the objection of any party, the Licensing Board formally reopened the record on the cheating matter less than a month later and appointed a Special Master to hear the evidence and render an advisory report. ASLB Memorandum and Order of September 14, 1981 (unpublished). See 10 C.F.R. § 2.722.[5] The Board defined the broad issue to be heard in the reopened proceeding as

> the effect of the information on cheating in the NRC April examination on the management issues considered or left open in the Partial Initial Decision, recognizing that, depending on the facts, the possible nexus of the cheating incident in the NRC examination goes beyond the cheating by two particular individuals and may involve the issues of Licensee's management integrity, the quality of its operating personnel, its ability to staff the facility adequately, its training and testing program, and the NRC process by which the operators would be tested and licensed.

ASLB Memorandum and Order of October 14, 1981 (unpublished), at 2. It also gave examples of numerous specific questions to be addressed. (These are set forth in Appendix B.) The Special Master thus held further hearings and in accordance with the Board's instructions issued a report reflecting his conclusions and recommendations. See LBP-82-34B, 15 NRC 918

---

[5] Because of the reopening, we deferred briefing of any appeals from the management partial initial decision.

(1982). The Special Master essentially concluded that although licensee's upper management did not encourage, condone, participate in, or know of the cheating at the time it occurred, it was responsible for the negative attitude among its staff toward the NRC examination process that led to the cheating and similar incidents revealed in the record. Id. at 1053-54 (¶ 338).

The Licensing Board adopted the evidentiary record developed before the Special Master and most of his conclusions. It differed somewhat, however, as to the cause of the breakdown in licensee's training and testing program. According to the Licensing Board, this was attributable to a failure (1) to define clearly the portion of licensee's management with responsibility for the program, and (2) to apply the principles of quality assurance and quality control to the training and testing program. LBP-82-56, supra, 16 NRC at 300 (¶ 2082). The Board nevertheless concluded that these weaknesses did not undermine its earlier findings in favor of restart. Id. at 301 (¶ 2089). It did, however, impose several conditions on restart that basically require future auditing of licensee's training and testing. Id. at 384 (¶ 2421).

Briefing of the intervenors' appeals from the Licensing Board's two management phase decisions followed. But by the time briefing was completed, our consideration of the design phase was well under way and required a reopening of that

part of the record for additional evidence. See ALAB-708, 16 NRC 1770 (1982). We thus deferred consideration of the instant appeals. Appeal Board Memorandum of January 19, 1983 (unpublished). At about the same time, information assertedly bearing on management competence issues was coming to light during the Commission's review of the now-settled civil lawsuit by licensee's parent corporation against the manufacturer of the TMI reactors, Babcock & Wilcox (B&W). See General Public Utilities Corp. v. Babcock & Wilcox Co., No. 80-CIV-1683 (S.D.N.Y. filed March 25, 1980) ["B&W trial"]. By the spring of 1983, we received both the Aamodts' and TMIA's motions to reopen the record, based in part on the B&W trial record and in part on other developments related to management issues. In ALAB-738, 18 NRC 177 (1983), we ruled on those motions as well as a third one filed earlier by the Aamodts. We denied the motions except to the extent they sought reopening on allegations of pre-accident falsification of leak rate data at TMI-2. We remanded that issue to the Licensing Board for hearing, but the Commission has indefinitely stayed that proceeding. Commission Order of October 7, 1983 (unpublished).

As is often the case with complex litigation extending over a long period of time, events occur that appear to overtake, or at least to affect, the matters at hand. Such is the case here. In fulfillment of their well-established obligation to apprise us of "significant new information,"

the parties have submitted an enormous number of documents, reports, etc. See Duke Power Co. (William B. McGuire Nuclear Station, Units 1 & 2), ALAB-143, 6 AEC 623, 625-26 (1973). This information is not evidence of record.[6] On the other hand, we cannot be so myopic as to ignore either the very existence of ongoing investigations into matters relevant to management competence, or important matters of fact about which there can be no dispute (e.g., personnel and staff changes). In this opinion, we attempt to achieve a balance between these competing factors. As a result, we dispose of some issues that appear amenable to final resolution, identify others that clearly require record supplementation, and note still others that are subject to ongoing investigations.

II. Standards

The nebulous concept of "management competence" has assumed different facets as developments have unfolded during the course of this proceeding. What began as an inquiry into primarily licensee's technical capability and resources has evolved -- as a necessary consequence of those

---

[6] We have also been served with copies of myriad pleadings solicited by the Commission to aid it in its consideration of actual "restart." See note 2, supra. Time, lack of resources, and -- most important -- the limitations of formal adjudication compel us to confine ourselves to the adjudicatory record and materials addressed specifically to us.

developments -- into a search for answers to questions concerning the "integrity" of licensee's management as well.[7] In its order providing guidance to the Licensing Board on the specific management issues the Board was to consider, the Commission acknowledged that it had no standards for nuclear power plant management and operation. Nevertheless, it directed the Board to "apply its own judgment in developing the record and forming its conclusions on these questions." CLI-80-5, supra, 11 NRC at 409-10.

The Board, however, was not left to operate entirely within a regulatory vacuum. Section 103b of the Atomic Energy Act, 42 U.S.C. § 2133b, requires licensees to comply with Commission requirements for the protection of the public health and safety. In addition, section 182a, 42 U.S.C. § 2232a, permits the Commission to consider a licensee's "character."[8] Presumably, character is what the

---

[7] In this connection, it should be kept in mind that the purpose of this special proceeding is not to explore what happened during the TMI-2 accident, or even to litigate the overall safety of TMI-1. Rather, given the questions raised by that accident, the focus is on licensee's ability to operate TMI-1 safely in the future, should restart be authorized. See CLI-84-3, 19 NRC __, __ (March 28, 1984) (slip opinion at 9).

[8] Section 182a specifically refers to an applicant's character. But that section also provides that "[t]he Commission may at any time after the filing of the original

(Footnote Continued)

Licensing Board meant by its references to licensee's "management integrity." See, e.g., LBP-81-32, supra, 14 NRC at 403 (¶ 45).[9]

The Atomic Energy Act, however, does not define "character," and the legislative history is unenlightening as to Congress's intent.[10] Evaluation of character always involves consideration of largely subjective factors. In

---

(Footnote Continued)
application, and before the expiration of the license, require further written statements in order to enable the Commission to determine whether the application should be granted or denied or whether a license should be modified or revoked." 42 U.S.C. § 2232a.

[9] "Character" is defined as "reputation esp. when good," and "a composite of good moral qualities typically of moral excellence and firmness blended with resolution, self-discipline, high ethics, force, and judgment." Webster's Third New International Dictionary 376 (unabridged ed. 1971). "Integrity" is "an uncompromising adherence to a code of moral, artistic, or other values: utter sincerity, honesty, and candor: avoidance of deception, expediency, artificiality, or shallowness of any kind." Id. at 1174. The Original Roget's Thesaurus §§ 929, 933 (1962) includes "character" and "integrity" as synonyms for "probity" and "virtue."

[10] Reference to an applicant's character appeared in the original version of section 182 in what ultimately became the Atomic Energy Act of 1954. See Joint Comm. on Atomic Energy, 83d Cong., 2d Sess., A Proposed Act to Amend the Atomic Energy Act of 1946 (1954). We have been unable to locate in the pertinent House and Senate Reports, Hearings, and Debates more than an occasional passing remark concerning the Commission's authority to consider character. See e.g., Hearings Before the Joint Comm. on Atomic Energy on S. 3323 and H.R. 8862, to Amend the Atomic Energy Act of 1946, 83d Cong., 2d Sess. 1131 (1954) (excerpts from an analysis prepared upon behalf of the Federal Power Commission).

the corporate context, with the interplay of individual and collective actors, that undertaking proves even harder to tackle. But not long after the Commission identified a number of management-related issues to be resolved here, in another case it spoke in general, yet forceful, terms on the matter of applicant/licensee competence and character:

> Either abdication of responsibility or abdication of knowledge, whether at the construction or operating phase, could form an independent and sufficient basis for revoking a license or denying a license application on grounds of lack of competence (i.e., technical) or character qualification on the part of the licensee or license applicant.

Houston Lighting and Power Co. (South Texas Project, Units 1 and 2), CLI-80-32, 12 NRC 281, 291 (1980). See also Consumers Power Co. (Midland Plant, Units 1 and 2), CLI-83-2, 17 NRC 69, 70 (1983) (mere planning to withhold material information, e.g., is evidence of "bad character" and could warrant adverse licensing action); id., ALAB-106, 6 AEC 182, 184 (1973) ("managerial attitude," as well as technical qualification, is relevant to inquiry into applicant's quality assurance program).

We also recognize that a licensee of a nuclear power plant has a great responsibility to the public. The view expressed almost two decades ago by the court in Hamlin Testing Laboratories, Inc. v. AEC, 357 F.2d 632, 638 (6th Cir. 1966), is no less apt today: "We can imagine no area requiring stricter adherence to rules and regulations than

that dealing with radioactive materials, from the viewpoint of both public health and national security." A licensee's responsibilities are increased by the Commission's heavy dependence on the licensee for accurate and timely information about the facility and its operation. Petition for Emergency and Remedial Action, CLI-78-6, 7 NRC 400, 418-19 (1978).

Thus, while lacking precise standards against which to measure licensee's conduct, the foregoing views provide valuable aid for grasping the slippery concept of management competence. They serve as well as guideposts for our appellate review of the Licensing Board's decisions.

III. Training

Foremost among the matters warranting our consideration is the broad category characterized by the Licensing Board as "training." Encompassed within this topic are issues concerning the adequacy of the testing procedures to measure training effectiveness and the related cheating matter. The Commission gave training special emphasis in the 1979 order instituting this proceeding. See CLI-79-8, supra, 10 NRC at 144-45. The Licensing Board as well stressed the important relationship between training and operator competence. See LBP-81-59, 14 NRC 1211, 1709-10 (¶¶ 2015-2018) (1981). The substantial part of the record devoted to training underscores its role in assuring the safe operation of

TMI-1. Training thus demands our considerable attention here on appeal.

In its first partial initial decision, the Licensing Board devoted substantial discussion to the TMI-1 training program for both licensed and non-licensed personnel. See LBP-81-32, supra, 14 NRC at 441-79 (¶¶ 163-276). It described the program, organization, and personnel devoted to the facility's training needs, noting that employees spend one of every six weeks in training. Id. at 443-53 (¶¶ 169-200). The Board also discussed the significant changes in licensee's training program since the TMI-2 accident, particularly the Operator Accelerated Retraining Program (OARP). Licensee developed the OARP to satisfy the Commission's short-term requirement (1.(e)) to augment operator retraining. Id. at 451-55 (¶¶ 196-207). See CLI-79-8, supra, 10 NRC at 144. The Licensing Board reviewed the testimony and other evidence licensee adduced in support of its improved training program, as well as that of the NRC staff and Marjorie Aamodt. The Aamodts' contention 2 on training was somewhat vague and principally focused on the need for independent certification that TMI-1 personnel can perform their jobs in a safe manner.[11] The

---

[11] The Aamodts' contention 2 states:

(Footnote Continued)

Board nonetheless addressed the discrete points pressed by the Aamodts at the hearing -- i.e., human factors engineering (control room design), simulator training, the adequacy of licensee's training and testing program, operator stress, operator attitude, and the adequacy of NRC testing. LBP-81-32, supra, 14 NRC at 465-78 (¶¶ 243-275). The Board concluded that licensee's training program is "comprehensive and acceptable" and in compliance with the Commission's orders. Id. at 478-79 (¶ 276).[12] The Board, however, expressly qualified its findings with regard to operator testing and licensing as a result of the then-recent revelations about cheating on the NRC operator examinations, and it promised to reconsider them after further investigation. Id. at 454 n.18, 479 n.24, 582 n.63 (¶¶ 204, 276, 584).

(Footnote Continued)

> It is contended that TMI-1 should not open until the performance of licensee technicians and management can be demonstrated to be upgraded as certified by an independent engineering firm. This upgrading should include 100% test performance of job description with provision for retraining and retest, or discharge of those who cannot consistently and confidently master all necessary information for safe conduct of their job description under all anticipated critical situations as well as routine situations.

LBP-81-32, supra, 14 NRC at 442 (¶ 165).

[12] The Board also reviewed numerous licensee commitments in the area of operator training, imposing many

(Footnote Continued)

After considering the evidentiary record, the Special Master's report, and the parties' comments in connection with the reopened hearing on cheating, the Licensing Board

> remain[ed] 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. As we noted above, on the one occasion when the integrity of the examination procedures was questioned, the Board reasonably inferred that suitable action would be taken, i.e., requalification tests would be "closed-book".

LBP-82-56, supra, 16 NRC at 379 (¶ 2399). Although the Board identified some weaknesses in the program, it did not find the operators to be incompetent. Id. at 300, 381 (¶¶ 2085, 2410). Rather, the Board attributed these shortcomings to failures in quality assurance and quality control. Id. at 300, 379, 381 (¶¶ 2084, 2401, 2410). As a remedy for this problem, the Board imposed five conditions on restart, requiring, among other things, a two-year post-restart audit of licensee's training and testing program. Id. at 384 (¶ 2421).[13]

(Footnote Continued)
as license conditions. Id. at 567-71, 578-82 (¶¶ 538-555, 583).

[13] The five conditions imposed are:

> (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

(Footnote Continued)

We now turn to the numerous arguments raised on appeal that concern the broad topic of training.

(Footnote Continued)

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.

(5) Until further order in this proceeding, any participation of Gary P. Miller in the start-up, testing or operation of TMI-1 shall be under the direct supervision of an appropriately qualified official of GPU Nuclear Corporation.

LBP-82-56, supra, 16 NRC at 384 (¶ 2421). The Board also sought to impose a $100,000 penalty on licensee "as a long-term remedy to provide reasonable assurance that TMI-1 can be operated without endangering the public health and safety." Ibid. (¶ 2420). In CLI-82-31, 16 NRC 1236 (1982), however, the Commission concluded that the Board had no jurisdiction to impose such a fine and referred the matter to the Office of Inspection and Enforcement. See CLI-83-20, 18 NRC 1 (1983).

A. Licensee's Consultants

On appeal, the Aamodts first challenge both the "independence" and the qualifications of the consultants who reviewed licensee's training program and testified on its behalf. In addition to several of its own employees, licensee presented a panel of three consultants whom it asked to evaluate the adequacy of the upgraded training program. These three witnesses were Dr. Eric Gardner, an educational psychologist; Dr. Julien Christensen, an engineering psychologist and human factors specialist; and Mr. Frank Kelly, a nuclear engineer and president of PQS Corporation, a firm that acts as a consultant to power plants on training and staffing. Licensee also introduced into evidence the June 1980 report of the OARP Review Committee ("OARP Report"). See Lic. Exh. 27. Dr. Robert E. Uhrig, an official of Florida Power & Light Company, chaired the committee, which included as members Drs. Gardner and Christensen, as well as Dr. William R. Kimel, Dean of the College of Engineering at the University of Missouri, and Mr. Richard J. Marzec, a training official for Duke Power Company.

The Aamodts' objection to characterizing these individuals as "independent" is baseless. None is an employee of licensee, and none has ever purported to be anything but a hired consultant. The latter fact of itself does not undermine the value of these individuals'

testimony. See Louisiana Power and Light Co. (Waterford Steam Electric Station, Unit 3), ALAB-732, 17 NRC 1076, 1091 (1983).

Nor have the Aamodts successfully challenged the qualifications or testimony of licensee's consultants. We have reviewed each and find that both the witness panel and the OARP Review Committee are comprised of exceptionally well qualified persons from a range of disciplines (nuclear engineering, education, psychology, testing) most suitable to their task. See Gardner, fol. Tr. 12,409, at 2-4; Kelly, fol. Tr. 12,409, at 1, App. A; Christensen, fol. Tr. 12,409, at 1-3; Lic. Exh. 27, OARP Report, at 4-9. Understandably, no one witness or member of the OARP Review Committee is an expert in all of these areas. In this age of specialization, it would be rare indeed to find such a Renaissance man or woman. See generally Consumers Power Co. (Midland Plant, Units 1 and 2), ALAB-379, 5 NRC 565, 569 (1977).[14] It is not surprising, then, that Dr. Gardner, an educational psychologist, told Mrs. Aamodt at the hearing that he was "not qualified" to respond to her question concerning the operators' "competen[ce] to operate the plant

---

[14] Brought to mind is John Kennedy's often paraphrased statement to a White House gathering of Nobel laureates that there had never been a greater collection of genius -- with the possible exception of when Thomas Jefferson dined alone.

under all conditions." Tr. 12,628. The few other examples cited by the Aamodts of where these witnesses' testimony was "destroyed or weakened through cross-examination" are similarly without foundation. See Aamodt Brief (October 4, 1982) at 5-6. Further, the limited intervenor testimony presented did not damage that of licensee's witnesses. See Aamodt, fol. Tr. 12,931.

As for the Aamodts' complaint that the Licensing Board overlooked the more critical elements of the OARP Report, we believe that the Board could have elaborated more on the areas the Committee identified as needing improvement (e.g., description of control room operator tasks, the training facility, instructor training, communication between management and staff). See LBP-81-32, supra, 14 NRC at 454 (¶ 203). See also Lic. Exh. 27, OARP Report, at 140, 141, 143, 146-47, 149. Nonetheless, it cannot be reasonably disputed that the overall conclusion of the OARP Review Committee, which took account of the weaknesses in the program, was strongly favorable, and the Board's decision fairly reflects that. But see pp. 67-71, infra.

B. Cheating

Both TMIA and the Aamodts devote substantial portions of their arguments on appeal to the cheating incidents explored at the reopened hearing. They are primarily dissatisfied with the Licensing Board's treatment of allegations against several individuals, particularly where

the Board's conclusions differ from those of the Special Master.[15] In intervenors' view, the Board should have deferred more to the Special Master's observations concerning witness demeanor and credibility.

Before turning to the individual areas on which intervenors disagree with the Licensing Board's conclusions, a brief synopsis of the cheating episode is in order. In July and August 1981, the Licensing Board received a series of Board Notifications from the NRC staff, informing it that cheating had occurred on the NRC Reactor Operator (RO) and Senior Reactor Operator (SRO) examinations in April 1981. The staff also noted that some sessions of the examinations had been unproctored for extended periods of time, and it concluded that reexamination was warranted. See BN-81-17 (July 28, 1981); BN-81-17B (August 7, 1981); BN-81-17C (August 14, 1981); BN-81-17D (August 17, 1981). The Licensing Board soon thereafter issued its already completed

---

[15] Intervenors also complain about the "loose" testing procedures and the casual attitude of a number of operators as to what constitutes cheating. There is no real dispute that the administration of the April 1981 NRC examination and earlier licensee tests was lax. See LBP-82-56, supra, 16 NRC at 357 (¶ 2324). In fact, the Commission has issued a Notice of Violation imposing a $40,000 civil penalty for licensee's failure to implement its Operator Accelerated Retraining Program properly. CLI-83-20, supra, 18 NRC 1. What is relevant here, however, is whether there can be confidence that future training and testing procedures will not be so compromised. We address that issue below at pp. 62-77.

partial initial decision on management, but retained jurisdiction and reopened the hearing insofar as the cheating allegations were concerned. An extensive hearing was held before the Special Master, and the Licensing Board, after consideration of his findings, issued another partial initial decision on cheating alone.

At this stage, the following facts are essentially no longer in dispute. Two shift supervisors, O and W,[16] cheated extensively on licensee-administered examinations as well as the April 1981 NRC examinations. Their employment with licensee has been terminated. G and H, reactor operators, cheated on licensee-administered examinations. G is no longer employed by licensee. Letter from E.L. Blake to Appeal Board (October 7, 1982); App. Tr. 159. Pursuant to a stipulation between licensee and the Commonwealth of Pennsylvania (see note 1, supra), H will never again operate TMI-1 and is now assigned to the TMI-2 Waste Shipping Department as an engineering associate. Commonwealth of Pennsylvania Motion to Withdraw Appeal (July 8, 1983), Stipulation of Withdrawal (July 6, 1983) at 2; App. Tr.

---

[16] In order to protect their identities, many of the persons involved in the cheating incidents have been referred to throughout this proceeding by letter designations, per agreement of the parties and at the discretion of the Special Master. Our continuation of this practice should not be construed as an endorsement of it.

221.[17] A number of other licensee employees also were implicated in various cheating incidents. While the Special Master was able to reach conclusions as to wrongdoing in some instances, the Licensing Board was, in some cases, unable either to reach the same conclusions or to impose sanctions for conduct it did, in fact, find improper. It is the Licensing Board's action in this regard that is the principal source of intervenors' complaints on appeal concerning the cheating incidents.

1. Michael Ross

We devote our attention first to the charges involving Michael Ross, Manager of Plant Operations at TMI-1. The Licensing Board rightly described him 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 (¶ 155). He is the highest level of management directly implicated in cheating and, thus, it is essential that all questions concerning his conduct be resolved satisfactorily.[18]

---

[17] In these circumstances, it is not necessary for us to address TMIA's argument that G and H should be removed from licensed duties.

[18] This is so despite the fact that none of the intervenors filed proposed findings on the Ross matter. See LBP-82-56, supra, 16 NRC at 326 n.236 (¶ 2194). In this circumstance, they may be deemed to be in default and to

(Footnote Continued)

The allegations against Ross are twofold but arise from the same set of circumstances. He is accused of improperly influencing the NRC examiners to broaden the answer keys for the April 1981 NRC licensing test so as to increase the operators' scores. At the same time, he is said to have kept, intentionally, the NRC proctor away from one of the examination rooms. The Special Master found both allegations to be true. LBP-82-34B, supra, 15 NRC at 976, 988 (¶¶ 152, 178).

First, the Special Master acknowledged that it is the NRC's standard practice to have the senior members of a facility's staff review the questions and answers for NRC licensing examinations. This is done to assure that the questions and answers are still valid for the plant and that the questions can be clearly understood. The review is done during the examination to avoid premature disclosure of answers, while still leaving time to correct any errors in it. See Staff Exh. 29, ES-201 (rev. 2, 1969), at 3. On

---

(Footnote Continued)
have waived any further right to pursue the issue. See LBP-81-32, supra, 14 NRC at 399 (¶ 35); 10 C.F.R. § 2.754. See also Detroit Edison Co. (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-709, 17 NRC 17, 23 (1983).

Nevertheless, we view this matter with great concern. As an indication of that, we asked the parties to devote special attention to the charges against Ross during oral argument of this appeal. Appeal Board Memorandum and Order of December 22, 1983 (unpublished), at 5.

April 23 and 24, 1981, Ross and two of licensee's training instructors, Nelson Brown and Dennis Boltz, met with Bruce Wilson, the NRC examiner and proctor, to review the answer key for the "A" examination (given on April 21 and 22) and the questions and answers for the "B" examination then in progress. The unusual aspect of this review was that Ross himself had taken the "A" examination because of the Commission's requirement that all licensed personnel be retested. See CLI-79-8, supra, 10 NRC at 144. It was thus unavoidable that at least one examinee would also have to be a reviewer. See LBP-82-34B, supra, 15 NRC at 970-72 (¶¶ 137-141).[19]

The Special Master, however, relied heavily on the testimony of YY, a former TMI-1 employee who had reported an incident involving Ross to the NRC's Office of Inspection and Enforcement (I&E) in September 1981. YY alleged that on April 23 or 24, Ross

> appeared to be in a very happy -- almost ecstatic -- mood and was talking to the shift supervisor. . . . [Ross] told how he had met with one of the NRC people in BB's office to go over the RO/SRO exam. He said that he had gotten the NRC to "expand" the answer key so as to give the examinees more latitude in their answers and also

---

[19] So that there could be some review of the "A" examination while it was in progress on April 21-22, licensee provided two members of its staff and an outside training consultant. None, however, was a licensed operator with "hands-on" knowledge of the day-to-day operation of the plant. See LBP-82-34B, supra, 15 NRC at 971 (¶ 139).

> that he had kept the proctor out of the room for a very long period of time. The inference I [YY] drew was that by both actions he had made it easier for the people taking the tests.

Staff Exh. 27, Encl. 1.[20] YY added his belief that Ross "had meant what he said" and was not "beyond doing something such as purposely keeping the NRC proctor out of the room." Ibid. He also stated, however, that Ross could have been "bragging." Id. at 7.

The Special Master called YY to testify at the hearing. YY essentially repeated the charges against Ross. Tr. 26,011, 26,015-16. The Special Master found other evidence of Ross's comments in statements to NRC investigators by GG, KK, and RR. LBP-82-34B, supra, 15 NRC at 972-73 (¶ 143). Ross testified that he could not remember specifically, but that he probably made statements similar to those YY attributed to him. He added, however, that by such remarks he would have meant the answer keys were adjusted to correspond better with the operators' training and that his intent in making the remarks was to increase low operator morale. Id. at 973 (¶ 144). See Tr. 24,331-32, 24,334-35. But the Special Master found Ross's testimony "not credible," citing several discrepancies in his statements.

---

[20] Ross is referred to in this statement and other testimony as EE, but did not seek anonymity.

LBP-82-34B, supra, 15 NRC at 974-75 (¶ 147).[21] He also discounted the somewhat more favorable testimony of Bruce Wilson because Wilson had an interest in not appearing as though Ross had duped him. Id. at 975-76 (¶ 150). On the other hand, the Special Master found YY's testimony "clear" and his demeanor "completely forthright," while finding Ross's demeanor "less than forthright." Id. at 976 (¶ 151).

The Special Master also considered a sampling of 12 changes -- about one-fourth the total number -- made to the answer key of the "A" examination. He found many changes correct and necessary, except for two, where "[t]he good faith of the reviewers is at issue." Id. at 987 (¶ 177). In those two instances, the Special Master was especially influenced by the fact that the reviewers (Ross, Brown, and Boltz) were about the only examinees to benefit from the proposed changes. Ibid. (¶ 177). This, coupled with the Special Master's negative findings on Ross's credibility, led to his conclusion that Ross acted improperly, as alleged by YY. Id. at 987-88 (¶ 178).

---

[21] The discrepancies in Ross's testimony concerned the following: whether changes in the answer key were in fact made; how many changes were suggested; how much time had elapsed since the exam; how long it took for the review; and whether the exam was in fact being proctored during the review. See LBP-82-34B, supra, 15 NRC at 974-75 (¶ 147).

The Licensing Board disagreed, emphasizing a number of factors. LBP-82-56, supra, 16 NRC at 326, 327 (¶¶ 2195, 2199). First, the occasion for Ross and his colleagues to review the examination with Wilson was not of Ross's making: it was the product of both the ordinary NRC practice of having senior plant personnel review its examinations, and the extraordinary requirement that all operators be retested. Id. at 326-27 (¶ 2198). Second, the Board found Ross's statement, even as recalled by YY, "equivocal" -- i.e., "it could mean that Mr. Ross influenced the NRC to expand the answer keys accurately to fairly provide more latitude and that this process took a very long time." Id. at 327 (¶ 2201). Third, the Board found YY's own statements and the surrounding circumstances even more equivocal. Id. at 327-29 (¶¶ 2201-2205). Fourth, the Board stressed that GG, KK, and RR inferred from Ross's statements that he had fairly broadened the answer keys. Id. at 329 (¶ 2206). Fifth, although the Board conceded that Ross's statements were sometimes uncertain, it found the more important discrepancies noted by the Special Master (see note 21, supra) explained by other testimony and "Ross' tendency to limit his testimony to his definite knowledge." Id. at

329-30 (¶¶ 2207-2209).[22] Sixth, the Board analyzed the two answers that the Special Master concluded Ross improperly sought to alter. As to one, the Board found the change recommended by Ross was just as likely to be correct as the NRC's original answer. As to the other, the Board concluded that the change was properly rejected but suggested in good faith by Ross and Boltz. Id. at 330-33 (¶¶ 2212-2224). In sum, the Board determined that the charges against Ross were unfounded. Id. at 333 (¶ 2225).

After conducting our own review of all of the testimony and evidence pertinent to this matter, we fully agree with the Licensing Board. That Board analyzed the record thoroughly and did not reach its favorable conclusion on Ross lightly.[23] Like the Licensing Board, we find that the statements attributed to Ross -- which he has not denied

---

[22] For instance, the Board noted that three NRC officials were available to proctor the "A" examination, which Ross took. Thus, Ross did not have reason to assume that the "B" examination was unproctored while he reviewed the exams with Wilson. LBP-82-56, supra, 16 NRC at 330 (¶ 2209).

[23] The Aamodts contend that the Board "lacked objectivity" because it had reached its own tentative conclusions about Ross independent of the Special Master's report. Aamodt Brief at 21. See LBP-82-56, supra, 16 NRC at 326 (¶ 2194). That argument, on its face, suggests just the contrary. In any event, we are convinced that the Board fully and fairly reviewed the record before reaching its conclusion. It even went so far as to issue its decision on the Ross issues in draft form, allowing the parties one more opportunity to comment. Ibid. (¶ 2195).

making -- are on their face benign. But when viewed with other evidence, the statements become amenable to an interpretation more plausible than that proffered by the Special Master.

For example, according to YY, Ross "said that he [Ross] had gotten the NRC to 'expand' the answer key so as to give the examinees more latitude in their answers." Staff Exh. 27, Encl. 1. At least three other employees, KK, GG, and RR, heard this comment. In statements (one of which was sworn) to the NRC investigators, these persons stated their impression that Ross had meant that the review resulted in more correct and fairer answers. Further, they viewed his comments as intended to reassure an already depressed and angry group of employees. Id. at 24, 26, 27-28, Encl. 6.[24] This is consistent with Ross's own testimony. See Tr. 24,331-32, 24,334-35. As for the changes in the answer key itself, by the Special Master's own reckoning, the great proportion of them were correct and necessary.[25] The

---

[24] The Special Master specifically called YY to testify, but did not call KK or RR in order to explore their statements further. GG testified but apparently was asked only a few questions about this incident by TMIA's representative. See Tr. 25,688-89.

[25] As for the two instances where the Special Master found the reviewers' attempts to have the answer key changed improper, we agree with the Licensing Board's analysis and contrary conclusion. See LBP-82-56, supra, 16 NRC at 330-33 (¶¶ 2212-2224).

Special Master appears to have overlooked, or at least unfairly minimized, this fact when he found Ross to have acted in bad faith. The need for such heavy reliance on facility personnel may well reveal serious deficiencies in the NRC's examination procedures. See pp. 72-76, infra. But problems inherent in that program cannot and should not provide a basis for inferring bad faith on Ross's part.

With respect to Ross's statement -- as attributed to him by YY -- "that he had kept the proctor out of the room for a very long period of time," again, on its face, the statement is benign and in accordance with other testimony concerning the length of time the review took. Despite Ross's denial (Tr. 24,342-43), the Special Master concluded that Ross "obviously knew" that one of the examination rooms was unproctored for a long time. But the evidence on which he bases his conclusion shows only that the NRC proctor (Wilson) "obviously knew" the examination was unproctored. See LBP-82-34B, supra, 15 NRC at 975 (¶ 149). Apparently at no point did the Special Master or any party attempt to determine what Ross actually knew about this. For example, no one asked Wilson if, during all the hours spent with Ross, either had mentioned the unproctored status of the room. Wilson, in fact, indicated his belief that the reviewers had not intended to distract him. See Staff Exh. 27, Encl. 2 at 3-4. When one considers that it was NRC procedures and requirements that occasioned this situation

in the first place (see pp. 25-26, supra), the evidence on which the Special Master relies to conclude that Ross "obviously knew" all proctors were absent is thin indeed. We, like the Licensing Board, are not willing to make so broad a jump.

The Special Master also did not fully take account of the fact that YY's testimony, both at the hearing and to the NRC investigators, reflects his perceptions. That is, it largely recounts YY's "feelings" and inferences. To be sure, much testimony could be so characterized, inasmuch as what a witness says he saw or heard is often determined by what the witness thinks he saw or heard. But where the record permits it, triers of fact generally consider a witness's particularly perceptual testimony in context. Here, the Special Master failed to note several factors that may well have influenced YY's perceptions -- e.g., YY never took the licensing examination (Tr. 26,022); YY objected to Ross's apparently inconsistent attitude toward requisitioning office supplies (Tr. 26,009-10, 26,013-14, 26,020-21, 26,023); YY did not report his concerns to the NRC until some five months after the exam and after O and W were terminated; YY felt it was wrong for management (of which Ross was a part) to fire W for cheating (Tr. 26,018-19). None of these factors, of course, could provide a basis for discrediting YY's testimony. But they do supply the background detail to complete the picture of YY's total testimony. Moreover, because YY testified as to his

perceptions, his statements are not necessarily or totally inconsistent with the testimony and evidence of other witnesses. The Special Master did not have to pick and choose between YY and Ross, finding one truthful and one not.

The Special Master, however, presumably felt compelled to do so on the basis of YY's and Ross's demeanor. See LBP-82-34B, supra, 15 NRC at 976 (¶ 151). But having identified demeanor as a factor of decisional significance, the Special Master failed to elaborate on why YY's demeanor was "completely forthright" and Ross's was less so. See ibid. (¶ 151).[26] Contrary to intervenors' arguments, the Licensing Board did give "special weight" to the Special Master's direct observations of witness demeanor. LBP-82-56, supra, 16 NRC at 289 (¶ 2036). Cf. Duke Power Co. (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 404 (1976) ("where credibility of evidence turns on the demeanor of a witness, [appeal board] give[s] the judgment of the trial board which saw and heard his testimony particularly great deference"). The Board noted,

---

[26] In contrast, the Special Master gave fuller explanations as to why he found certain of Ross's testimony "not credible." Demeanor, of course, is a more intangible concept and is based on one's observations of the witness. Thus, we recognize that it is more difficult -- but not impossible -- to articulate why a person's demeanor influences a factfinder's judgment one way or the other.

however, that "where [the Special Master's] conclusions are materially affected by witness demeanor, [it has] given especially careful consideration as to whether or not other, more objective credibility criteria are consistent with his conclusions." LBP-82-56, supra, 16 NRC at 289 (¶ 2036). Thus, in the case of Michael Ross, the Licensing Board found other more objective evidence at odds with the Special Master's demeanor findings and so concluded that Ross had not acted improperly. Id. at 325-33 (¶¶ 2192-2225). The Board's analysis is wholly in accord with judicial precedent. See Millar v. FCC, 707 F.2d 1530, 1539-40 (D.C. Cir. 1983) (demeanor evidence of little value where other testimony, documentary evidence, and common sense suggest contrary result); Local 441, IBEW v. NLRB, 510 F.2d 1274, 1276 (D.C. Cir. 1975) (providing it acknowledges and explains the basis of its disagreement, Labor Board may differ with administrative law judge's demeanor findings as a result of its own assessment of the probabilities of the situation). In these circumstances, and fortified by our own independent review of the record, we see no basis for disturbing the Licensing Board's conclusions about Michael Ross.

2. Henry Shipman

Henry Shipman is the plant operating engineer and principal assistant to Michael Ross. He also holds a senior reactor operator's license and thus took both licensee and

NRC examinations in April 1981. By his own account, he provided an answer on one of those exams to an unidentified individual. The incident probably occurred during the NRC's "A" examination on April 21 or 22. Shipman had taken a break and, while at the coffee machine in the hallway, he was approached by someone who asked a question, which Shipman answered. He later realized that the question, which he could not identify, was probably on the exam. Although he could not identify the individual either, he assumed that he came from the smokers' room, because Shipman was in the nonsmokers' room and only one person from each room could take a break at the same time. Shipman first disclosed this incident during an interview with Henry Hukill (then, TMI-1 Vice President; now, Director of TMI-1) in the wake of the disclosure of the cheating by O and W. He also gave statements concerning this matter to NRC investigators and testified at the hearing before the Special Master.[27] After inquiring into the matter himself, the former president of GPU Nuclear, Robert Arnold, placed a letter of reprimand in Shipman's file. See LBP-82-34B, supra, 15 NRC at 954-55 (¶¶ 94-95); LBP-82-56, supra, 16 NRC at 313-14 (¶¶ 2139-2141).

---

[27] In some testimony and documents, Shipman is referred to as FF, although he did not claim any right to confidentiality.

The principal focus of this incident is on who asked Shipman the question at the coffee machine. Shipman has steadfastly maintained that he cannot recall who it was. The NRC investigators and the Special Master, however, concluded that Shipman is not being truthful. Tr. 25,368; LBP-82-34B, supra, 15 NRC at 956 (¶ 100). The suspicion is that he is protecting someone; that someone, perhaps still a TMI-1 employee, cheated. After reviewing the record, the Licensing Board tempered the Special Master's conclusion somewhat. In its view, the conclusion that Shipman is not truthful "is probably the best inference to be drawn," but it is not so convincing as to warrant removal or suspension of Shipman from his position at TMI-1. LBP-82-56, supra, 16 NRC at 314 (¶ 2144).

We essentially share the Special Master's and the NRC investigators' judgment that Shipman is not telling the truth in his asserted failure to recall who solicited the test answer from him. We find it virtually impossible to believe that he could recall the incident and where it occurred but not the principal player, or even any of his physical characteristics. See Tr. 23,986-87, 25,368-71.[28] This is especially so considering that there was not much

---

[28] As noted, Shipman could not recall what the question was, but when pressed at the hearing, he speculated as to what it could have been. Tr. 26,363-64.

room at the coffee stand, and that the list of possible persons who could have asked the question numbers only eight. Tr. 26,360; Lic. Exh. 83. Included among those individuals are shift foremen and training instructors -- people with whom Shipman is presumably familiar. One would expect him to have been able at least to exclude some persons, thereby narrowing the field for the investigators. Moreover, according to Shipman's own sworn statement, his action likely resulted "from compassion for my co-worker. We are a very close-knit group." Staff Exh. 28, Encl. 3 at 6. It is hard to believe that one could have such strong feelings without being able to recall the beneficiary of them. In such circumstances, the most plausible inference to be drawn is that Shipman does recall who approached him but is indeed protecting him.[29]

Nonetheless, we do not agree with the Special Master's recommendation that licensee not be permitted to use Shipman in the operation of TMI-1 until he either names the unidentified questioner or provides a credible reason why he cannot do so. See LBP-82-34B, supra, 15 NRC at 1044-45 (¶ 315). For one thing, as the Licensing Board correctly

---

[29] While disbelieving Shipman about his ability to remember who asked him for help, we find credible his description of the spontaneity of the situation that prompted him to supply the answer. See Tr. 26,377.

noted, "[n]either will ever happen." LBP-82-56, supra, 16 NRC at 315 (¶ 2145). It is clear from the record that even the "quite persuasive" efforts of Hukill and the NRC investigators were not enough to elicit the questioner's identity from Shipman. See Tr. 25,373-74. Thus, it is extremely unlikely that the primary purpose of the Special Master's recommendation -- identification of the unknown cheater -- would ever be fulfilled.

Moreover, other more positive factors militate against additional sanctions. Shipman voluntarily -- albeit not as promptly as he should have -- came forward with the disclosure of this incident, a clear admission against his own self-interest. But for his statements, this incident would never have been revealed.[30] Shipman willingly testified in his own name and, as a consequence, has had his veracity publicly disputed.[31] He has been formally

---

[30] In this regard, the Licensing Board quite properly noted the "public interest in encouraging such disclosures." LBP-82-56, supra, 16 NRC at 314 (¶ 2144). In this scheme of regulation, so heavily and necessarily dependent upon self-policing, disclosure of some information about wrongdoing (or any type of problem) is more desirable than disclosure of no information. Indiscriminate imposition of draconian sanctions on those who come forward with important information would surely lead to the latter.

[31] Mrs. Aamodt asked Shipman if he would be ostracized by his fellow workers, were he to reveal the questioner, and if this would influence his decision to talk. Shipman stated that being ostracized would be "insignificant"

(Footnote Continued)

reprimanded, and Hukill has promised to terminate him for any similar incident in the future. Tr. 23,985-86. Finally, apparently this is the only incident in his career with licensee where his honesty and "capability to respond properly to unexpected events" have been questioned. Hukill, fol. Tr. 23,913, at 14-15; Tr. 23,989. In these circumstances, the formal reprimand is sufficient.[32]

3. Charles Husted

There are essentially two allegations with respect to Charles Husted -- who, until recently, was a licensed operator training instructor. First, he allegedly solicited (but did not obtain) an answer to a question from P, a TMI-1 shift supervisor, during an unproctored session of the April 1981 NRC SRO licensing examination. Second, Husted was accused of failing to cooperate with NRC investigators inquiring into the overall cheating controversy.

On the first charge, despite much conflicting testimony and a determination that neither P nor Husted was credible, the Special Master found that Husted did solicit information

---

(Footnote Continued)
compared to what "this has been like so far." Tr. 26,389-90.

[32] See p. 56, infra, concerning the adequacy of licensee's investigation of this matter.

from P concerning an exam question.[33] The Special Master also found that Husted, at least initially, had refused to cooperate with the NRC investigators. LBP-82-34B, supra, 15 NRC at 957-61 (¶¶ 101-111). As for sanctions, the Special Master suggested that Husted be reprimanded for soliciting the exam answer. For Husted's failure to cooperate with the NRC, the Special Master essentially recommended a sanction less than removal from licensed duties, inasmuch as he found no standard against which to measure Husted's conduct. Id. at 1045-46 (¶¶ 316-317).

The Licensing Board, however, found insufficient evidence to support the Special Master's conclusions about P's and Husted's credibility and, more important, his ultimate finding that Husted had asked P for the answer. But as for Husted's alleged failure to cooperate with the NRC investigators, the Board is in full agreement with the Special Master. Indeed, on that count, the Board found Husted's testimony "incredible" and lacking "seriousness and regret." LBP-82-56, supra, 16 NRC at 315-19 (¶¶ 2148-2166). In order to treat this "attitude" problem, the Board requires certain changes in licensee's training program, including (1) development of criteria for training

---

[33] In some evidence, Husted is referred to as DD, but has not claimed any right to confidentiality.

instructors, and (2) an audit of the training program, as actually implemented. Although it imposes no direct sanction on Husted, the Board recommends that his performance receive particular attention in the audit. Id. at 320, 365, 384 (¶¶ 2168, 2347, 2421).

Developments subsequent to briefing of these appeals make it unnecessary for us to resolve the dispute between the Special Master and Board concerning Husted's alleged solicitation of an answer, or to determine if Husted should be removed from licensed duties. By stipulation with the Commonwealth of Pennsylvania (see p. 23, supra), licensee has agreed to the following.

> 2. Now and at any time in the future Licensee will not utilize Mr. [Husted] (whose attitude was criticized by the ASLB) to operate TMI-1 or to train operating license holders or trainees.
>
> 3. Licensee will direct that the ASLB-mandated training audit specifically evaluate Mr. [Husted's] performance and attitudes as an instructor and Licensee will comply with the findings in a timely and appropriate manner, but in no event would Mr. [Husted] be utilized for any function specified in paragraph 2, above. Prior to the audit Licensee will continue to monitor Mr. [Husted's] performance and assign work consistent with that performance.

Commonwealth Motion to Withdraw, Stipulation at 2. We have also been advised by licensee that Husted has been named Supervisor of Non-Licensed Operator Training. Letter from D.B. Bauser to Appeal Board (May 6, 1983) at 3. While, as noted, the stipulation has effectively mooted some issues as

to Husted, his promotion to a supervisory position of such importance has surely raised another that we cannot ignore.

At the outset, we confirm that the record supports the conclusions of both the Special Master and Licensing Board about Husted's poor attitude toward his responsibilities -- as reflected in his failure to cooperate with the NRC investigators. See Staff Exh. 26 at 39; Staff Exh. 27 at 16; Tr. 26,927-33.[34] The Licensing Board explains it quite well:

> By first refusing to answer fully the NRC examiners' question [Husted] raised suspicions where perhaps none would have arisen otherwise. His testimony on the matter was not only unbelievable, but it gave the sense that he didn't care whether he was believed or not.
>
> . . . These factors are not exactly quantifiable but they add up to a conclusion that, if Mr. Husted is representative of the TMI-1 training department, his attitude may be a partial explanation of why there was disrespect for the training program and the examinations. We would have expected Mr. Husted to shoulder at least part of the responsibility for the need perceived by O, W, G and H to cheat. We would expect him to be gravely concerned about the damage to his co-workers, his employer and the public's confidence in the operation of the unit caused by the cheating episodes and failure of his own training department to create a serious and organized environment during the training and quizzes. As a licensed operator instructor Mr. Husted may have the ability to impart accurate technical knowledge to his charges -- the record is silent on this. But, from our evaluation of

---

[34] Licensee conceded that Husted was flippant and did not appear to take this matter seriously. Licensee Proposed Findings (January 5, 1982) at 89.

> his contribution to the investigation and the reopened hearing, we question whether he is able, or if able, willing, to impart a sense of seriousness and responsibility to the TMI-1 operators.

LBP-82-56, supra, 16 NRC at 319 (¶¶ 2166-2167).

We must, however, part company with the Licensing Board on how it views the relationship of Husted's attitude toward his teaching responsibilities. The Board states:

> We have no evidence that the attitude we criticize is manifested in [Husted's] performance as a teacher but, as noted above, we fear that such is the case. But there is also the widely held view in the field of education that the attitude of a teacher is irrelevant to his or her competence. Mr. Husted does not have to love and respect the NRC to do his duties.

Id. at 319-20 (¶ 2168). This does not square with the Board's earlier finding that Husted's "attitude may be a partial explanation of why there was disrespect for the training program and the examinations." Id. at 319 (¶ 2167). Nor does the Board provide any support for what it terms "the widely held view in the field of education that the attitude of a teacher is irrelevant to his or her competence." Id. at 320 (¶ 2168). Such a view would be valid only if the Board defines "competence" so narrowly as to mean the mere possession of and ability to impart to others a certain quantum of information. We reject that notion in favor of one that recognizes teacher competence to include the ability to communicate effectively a sense of responsibility as well as information. See Lic. Exh. 27,

OARP Report, at 60 (factors considered by OARP Review Committee in rating training instructors). Where, as here, so much of the training information to be conveyed concerns the need to comply with proper procedures (see p. 76 and note 61, infra), the instructor's attitude toward -- i.e., respect for -- those procedures becomes an integral (though perhaps subliminal) part of his or her ability to teach.

To be sure, Husted will no longer be permitted to train licensed operators. Moreover, there is no hard evidence on this record that Husted's bad attitude did, in fact, affect his teaching performance. See, e.g., Lic. Exh. 27, OARP Report, at 60-63. But in his new position as Supervisor of Non-Licensed Operator Training, not only will Husted be in a position to instruct personnel with important duties that affect the public health and safety,[35] he will obviously have certain management responsibilities. As such, Husted will presumably also have a role in establishing the criteria for training instructors and developing the audit program imposed by the Licensing Board, at least in part, as a remedy for his own failure to cooperate with the NRC. See LBP-82-56, supra, 16 NRC at 320, 365, 384 (¶¶ 2168, 2347,

---

[35] These non-licensed personnel are auxiliary operators, who are on the career path to becoming licensed operators.

2421).[36] We seriously question licensee's judgment in promoting Husted to an important position with management responsibilities, given his documented past failure to cooperate with the NRC in its cheating investigation.[37] We therefore require, in addition to those commitments reflected in the stipulation with the Commonwealth and the conditions imposed by the Licensing Board should restart be authorized, that Husted have no supervisory responsibilities insofar as the training of non-licensed personnel is concerned.

4. U

The Licensing Board aptly described U, a control room shift foreman: "Either he has an unlucky affinity for situations having an aura of cheating, or he was involved in cheating episodes." Id. at 320 (¶ 2169). Three allegations concerning U were pursued at the hearing -- (1) he was "available" in Husted's office during the NRC "B" examination to help those taking the test; (2) during that

---

[36] The Board's conditions apply to the overall training program, not just licensed operator training.

[37] Here on appeal and in reference to Husted's conceded attitude problem, licensee states: "While this type of attitude should not be and has not been condoned or encouraged, neither should it be equated with a lack of integrity." Licensee's Brief (November 15, 1982) at 89. Promoting Husted to Supervisor of Non-Licensed Operator Training, in our view, amounts to at least condoning his demonstrated bad attitude.

same examination, he called KK (a shift technical advisor) to solicit the answer to an examination question, assertedly on O's behalf; and (3) he used notes written on his hand and "crib sheets" to cheat on NRC and licensee examinations.[38]

Both the Special Master and Licensing Board explored these charges in depth, and no purpose would be served here by a rehearsal of the relevant testimony. See LBP-82-34B, supra, 15 NRC at 962-69, 1046-47 (¶¶ 112-132, 318-319); LBP-82-56, supra, 16 NRC at 320-24 (¶¶ 2169-2187). The Board noted that it reached some conclusions more favorable to U than the Special Master and some others less favorable to him. But, on balance, both reached the same ultimate result of reluctantly giving U the benefit of the doubt and recommending no sanction against him. LBP-82-56, supra, 16 NRC at 324 (¶ 2185). The Special Master described some evidence about U as "extraordinarily confusing" and referred to the events surrounding U's alleged telephone call to KK as "a mystery." LBP-82-34B, supra, 15 NRC at 967 (¶¶ 127, 129). Our own review of the record leaves us uncomfortable but leads us to an ultimate conclusion no different than that of the Board and Special Master.

---

[38] We note that U was also one of the eight individuals implicated in the Shipman incident, pp. 35-40, supra. See Lic. Exh. 83; Tr. 25,375.

We add only a few comments in response to the principal arguments raised in this regard on appeal. TMIA calls our attention to T's testimony concerning his own use of Husted's office during the "B" examination. (T is a control room operator who took the "A" examination.) We find that T's testimony in fact lends support to U's claim that he was legitimately in Husted's office at the time in question to study, and not for the purpose of improperly aiding test candidates. See Tr. 26,600-04, 26,616-20. Also in this connection, the fact that U may have never studied before (or since) in Husted's office is of little or no significance. It must be kept in mind that the entire operator retraining program and reexamination process was a one-time event in response to the Commission's post-TMI-2 order. Although U, as an already licensed operator, would have had some training on a regular basis, he previously would not have had to undergo this more demanding program. In this circumstance, it is not implausible that he would study so far in advance for another exam and that he would use Husted's office for that purpose.

Finally, TMIA repeats the argument it made to the Licensing Board that, although licensee's management may not have placed him there, U stationed himself in Husted's office to help examinees. The Board found this "inviting conjecture with some evidentiary support" in U's own testimony. After listing that evidence, however, the Board

noted its reluctance to find misconduct on U's part without "some reliable external evidence." It thus gives U the benefit of the doubt. LBP-82-56, supra, 16 NRC at 323-24 (¶¶ 2184-2185). We see it a bit differently. It is not a matter of giving U the benefit of the doubt. Rather, the evidence on the whole is inadequate to support a finding of wrongdoing by U. Clouds of suspicion, though thick, are not enough.

5. GG, W, and MM

GG, W, and MM are, respectively, a shift foreman, former shift supervisor, and shift technical advisor. The answers they provided to two questions on a December 1980 licensee-administered quiz were remarkably similar. Especially as to "Lessons Learned" Question 1, the three answers contained the same stilted language and spelling errors. The Special Master found that GG and W cooperated on the answers to both questions and that MM cooperated as well on Question 1. Although he was not able to determine who copied from whom, the Special Master thought the evidence suggested GG copied from either W or MM. LBP-82-34B, supra, 15 NRC at 951-54 (¶¶ 82-93). He recommended no sanction, however, against either MM or GG, essentially because of the limited nature of this incident. Id. at 1043-44 (¶¶ 312-313). (W had already been terminated for cheating on an NRC examination. See p. 23, supra.)

The Licensing Board disagreed with the Special Master's finding that MM cheated on Question 1. The Board relied in part on MM's comments submitted after the Special Master's report. MM pointed out that, as a shift technical advisor, he was not required to take these quizzes but did so only to evaluate his knowledge. MM also noted that his answers were in the form of a "list" (which the question sought) and thus the language should not be viewed as unnatural or stilted. Although the parallelisms in the answers of MM, GG, and W still troubled the Board, it concluded that MM had not cheated. LBP-82-56, supra, 16 NRC at 310-12 (¶¶ 2128-2132). The Board agreed with the Special Master, however, that the evidence established cooperation between GG and W on the two questions. Characterizing it as a weak inference, the Board concluded that W copied from GG, with the latter's consent or knowledge. Id. at 312 (¶¶ 2133, 2134). But the Board imposed no sanction on GG for four reasons:

> (1) W was his supervisor, (2) this was a company-administered examination, (3) there was inappropriate informality and inadequate proctoring during the examinations, and (4) there was a broad attitude of disrespect for the examination process.

Ibid. (¶ 2135). The Board observed that its finding would differ had this been an NRC licensing examination.

On appeal, TMIA first objects to the Licensing Board's reliance on MM's post-hearing comments. MM did not testify and was not present at the hearing. He filed his comments

in response to the Board's invitation to all affected plant personnel to comment on the Special Master's report. Id. at 311 (¶ 2130). TMIA contends that it was a violation of due process for the Board to have treated MM's comments as evidence when it was not introduced as such. In the abstract, we would agree. But as applied to the particular circumstances here, we find no prejudice or violation of TMIA's due process rights.

The Licensing Board itself pointed out that, when they had the opportunity, none of the intervenors even proposed a finding of wrongdoing by MM to the Special Master. Id. at 311 n.232 (¶ 2132). See, e.g., TMIA's Proposed Findings (January 15, 1982) at 46-49. In that circumstance and out of concern for fairness to MM, it was not unreasonable for the Board to give him an opportunity to defend himself against the Special Master's unfavorable conclusions.[39] The Board recognized this procedure was unconventional but, after weighing the alternative of reopening the record for MM's testimony, it found little likelihood of a different outcome and decided against reopening. LBP-82-56, supra, 16 NRC at 311 n.232 (¶ 2132). We believe the Board's action

---

[39] It is not clear why no one (including the Special Master) called MM to testify in the first place.

was reasonable and resulted in no prejudice to TMIA or any other intervenor.[40]

TMIA also challenges the Board's conclusion that W copied from GG. TMIA apparently believes GG was the "aggressive cheater" and that the Board's contrary conclusion is "arbitrary" and "favorable to Licensee." TMIA's Brief (September 30, 1982) at 42, 43. TMIA's argument, however, ignores the principal Board findings that GG and W did cooperate on the exam and that GG consented to or knew of W's copying. See LBP-82-56, supra, 16 NRC at 312 (¶¶ 2133, 2134). See also id. at 290 (¶ 2040). This, of course, is cheating -- just as if GG copied from W -- and can hardly be characterized as a finding "favorable to Licensee." As for the Board's conclusion itself, we see no basis in the record for overturning it. There is no doubt in our minds that GG and W cooperated on the quiz, and the testimony supports the Board's "albeit weak" inference that

---

[40] We note further that the Board's actual finding as to MM was lukewarm at best. As the Board stated,

> This is not the total exoneration to which MM might have been entitled after a full hearing with his participation. The evidence simply isn't there to overcome all the implications of the very similar answers. It would be exceedingly unfair to MM, and possibly a factual mistake, if his status or reputation were to be affected by our uncertain conclusion.

LBP-82-56, supra, 16 NRC at 311-12 (¶ 2132).

W copied from GG, with the latter's consent or knowledge. See Tr. 25,692-99, 26,144-49, 26,155-56.

Finally, TMIA complains about the Board's failure to impose a sanction on GG.[41] It expresses concern about the distinction between ethics and technical competence drawn by the Licensing Board in this regard. See LBP-82-56, supra, 16 NRC at 312 (¶ 2135). In general, we share that concern. Although perhaps conceptually different, ethics and technical proficiency are both legitimate areas of inquiry insofar as consideration of licensee's overall management competence is at issue. See pp. 10-14, supra.

On the other hand, we believe the Board here properly took account of the attendant circumstances of the quiz (especially the informality of its administration) in not imposing a sanction on GG. See LBP-82-56, supra, 16 NRC at 312 (¶ 2135). In our view, the Board erred only in failing to consider a sanction less than removal from licensed duties, like one akin to the reprimand given to Shipman. See pp. 36, 39-40, supra. We do not read the Board's opinion, however, as condoning GG's conduct. In fact, the

---

[41] TMIA essentially acknowledges that action less than removal from licensed duties would be acceptable in this instance. TMIA's Brief at 56.

Board's very conclusions, which we here affirm, serve as at least an implicit reprimand of GG.[42]

6. Other Individuals Implicated in Cheating

TMIA, the Aamodts, and UCS mention other incidents that, in their view, show cheating or a lack of credibility by some individuals. For instance, WW (a shift technical advisor) provided information over the telephone, which he later learned could have been helpful during a licensee-administered exam then in progress. WW was not able to identify the caller. The Licensing Board found this was probably cheating and chastised WW for his "carelessness" and for not providing this information earlier in the NRC investigation. LBP-82-56, supra, 16 NRC at 324 (¶¶ 2188-2189). See LBP-82-34B, supra, 15 NRC at 969 (¶¶ 133-134). There was also evidence (OO's own testimony) that OO, P, and Q discussed questions and answers during some quizzes. See id. at 946-47, 958 (¶¶ 69, 106); LBP-82-56, supra, 16 NRC at 317 (¶ 2159). Further, the Special Master found it likely that, despite their denials, A and I had observed cheating by O and W. See p. 23, supra.

---

[42] A corresponding concern, however, is the adequacy of licensee's response to this incident, given the Board's finding of GG's cooperation on the examination. We believe that in this circumstance it is both fair and proper that licensee now formally reprimand GG, as it has Shipman for similar conduct.

Nonetheless, the evidence of this was not so strong that he could in fact conclude that there was misconduct on their part. LBP-82-34B, supra, 15 NRC at 932-33 (¶¶ 23-24).

Though intervenors refer to each of these items in passing, none develops any particular argument on brief. Our own review of the record in this regard has provided no basis for reaching conclusions other than those of the Special Master and Licensing Board in their essentially compatible decisions. We add only that each incident provides yet more evidence of the poor administration of both NRC and licensee examinations at TMI-1 during 1980 and 1981.

7. Licensee's Investigation of, and Response to, the Cheating

Intervenors, particularly TMIA, argue in general terms that licensee did not adequately investigate the cheating incidents, impeded the NRC staff's investigation, and did not take appropriate disciplinary action toward certain employees. In intervenors' view, this reflects licensee's negative attitude about its responsibilities to the public. The Licensing Board has thoroughly canvassed the record and considered the Special Master's recommendations on the subject. There is no need here to rehearse in detail that evidence and those findings, except to note the Board's ultimate conclusion that licensee's investigation was "adequate." See LBP-82-56, supra, 16 NRC at 333-44

(¶¶ 2228-2271). One aspect of the Board's decision, however, warrants additional comment.

There can be no doubt that the investigatory work of licensee's attorney, John Wilson, was not as thorough as it should have been. If licensee truly did not "stint[] in the resources allocated to the investigation," the fact that time may have been short does not fully explain the failure to follow up on obvious leads (e.g., by interviewing W and the eight individuals implicated in the Shipman incident): additional investigators/attorneys could have been assigned to assist Wilson. See id. at 343 (¶ 2269). Nor does it satisfactorily explain why licensee never investigated the important allegation that U was stationed in Husted's office to help those taking the NRC examination. See id. at 337-38 (¶¶ 2243-2246).

The Board found that Wilson was naive and naturally inclined to believe in the honesty of licensee's employees. Id. at 339 (¶ 2252). Despite questioning his impartiality, however, the Board declined to second-guess licensee's management on the assignment of Wilson to the cheating investigation. Id. at 342 (¶ 2266). While recognizing the benefit of hindsight, we are more critical of licensee's decision in this regard. Given the serious implications of the cheating allegations, the already high visibility of this proceeding, and licensee's earlier use of outside counsel to investigate other serious allegations of

wrongdoing,[43] licensee exercised extremely poor judgment in delegating a company employee the responsibility for investigating his fellow employees. In the summer of 1981 licensee should have been aware of the folly of its decision.

Nonetheless, we are not willing to equate this bad judgment and Wilson's defective detective work with improper motives on the part of licensee. There is nothing in the record to suggest that licensee's management manipulated the investigation or actively discouraged Wilson from pursuing important lines of inquiry. Further, the unusually active involvement of two of licensee's top managers (Arnold and Hukill) in some aspects of the investigation and their meetings with employees indicate anything but a desire to cover up the cheating allegations and inhibit serious inquiry. See id. at 343, 336 (¶¶ 2269, 2237-2238). We can therefore endorse the Licensing Board's ultimate determination of the adequacy of licensee's investigation. Moreover, except in the two instances noted above at pp. 45-46 and note 42 (Husted and GG), we find licensee's action in response to improper employee conduct was appropriate.

---

[43] In April 1980, licensee hired a Minneapolis law firm (Faegre & Benson) to conduct an inquiry into the so-called "Hartman allegations" of falsified leak rate data at TMI-2. See ALAB-738, supra, 18 NRC at 184. The Licensing Board,

(Footnote Continued)

8. O and VV

Both the Special Master and the Licensing Board dealt at length with the incident involving O and VV -- a matter not directly related to the 1980 and 1981 cheating episodes. Briefly, according to the Board, in July 1979 VV (former Supervisor of Operations at TMI-2, the counterpart of Michael Ross) submitted work prepared by O in fulfillment of his (VV's) operator licensing requalification requirements.[44] Despite his asserted knowledge of that fact, Gary Miller (former TMI Station Manager) certified to the NRC -- with the knowledge and assent of John Herbein (former Metropolitan Edison Vice President) -- that VV had satisfactorily completed the 1978-79 requalification program. The Board therefore concluded that licensee, by the action of Miller and Herbein, had made a material false statement to the agency, in violation of the Atomic Energy Act, 42 U.S.C. § 2236. In addition to conditioning restart with the requirement that any participation by Miller in the start-up, testing, or operation of TMI-1 be under the direct supervision of an "appropriately qualified" official of

---

(Footnote Continued)
however, was not aware of this at the time it issued its decision. See id. at 197 n.38.

[44] 10 C.F.R. § 55.33 and 10 C.F.R. Part 55, Appendix A, describe the requirements for requalification, which licensed operators must satisfy every two years.

licensee, the Board recommended to the Commission that it direct some component of the staff to conduct a broader investigation into this matter. LBP-82-56, supra, 16 NRC at 344-55 (¶¶ 2272-2320).

TMIA contends that this incident bears on licensee's integrity in several respects. It questions whether the sanction imposed on VV -- removal from his supervisory duties and assignment to an ad hoc group gathering information about the TMI-2 accident -- was adequate, both in fact and as a matter of perception within the TMI organization. It also complains that Miller and Herbein were retained in their high level management posts for some time after this incident. And TMIA argues that the testimony of former GPUN president Robert Arnold on the O and VV incident was not credible and suggests direct involvement by Arnold in VV's certification to the NRC.

Several factors make extended discussion of this matter unnecessary. As already noted, the Special Master and Licensing Board gave it substantial attention, and we can find no fundamental error in the Board's approach. The principal players against which TMIA seeks the imposition of sanctions are no longer employed within GPU Nuclear.[45]

---

[45] O was terminated for cheating on the NRC licensing examination. See p. 23, supra. VV resigned in April 1983
(Footnote Continued)

Finally, insofar as VV's certification to the NRC allegedly constituted a material false statement, the Commission has directed us "not to consider" this matter in our review. CLI-82-31, supra, 16 NRC at 1237. On that score, the Commission agreed with the Licensing Board on the need for further inquiry and consequently turned the matter over to its Office of Investigations. That investigation led to a Notice of Violation and a proposed $100,000 civil penalty against licensee for material false statements in connection with VV's certification. CLI-83-20, supra, 18 NRC 1.[46]

What this whole incident highlights, however, is the fact that a serious problem existed throughout licensee's organization: formal training and the NRC's regulatory requirements for operator licensing and requalification were regarded rather cavalierly, from the staff level to the

---

(Footnote Continued)
and does not work anywhere in the GPU system. Letter from D.B. Bauser to Appeal Board (May 6, 1983) at 3. Herbein is employed by a non-nuclear GPU subsidiary, as is Miller. Letter from E.L. Blake, Jr., to Appeal Board (March 11, 1982) at 1-2; App. Tr. 154. Arnold has resigned as president and director of GPUN. Notice to Commission, et al. (December 1, 1983).

[46] The public record does not reflect whether licensee has consented to the proposed penalty or plans to contest it. It shows only correspondence in August 1983 concerning licensee's request for the investigation report, and the staff's statement that it is deciding whether to release it. Letter from R.C. Arnold to R.C. DeYoung, Director, Office of Inspection and Enforcement (August 5, 1983); letter from R.C. DeYoung to R.C. Arnold (August 22, 1983).

higher plateaus of management. Moreover, it provides another instance of an employee (VV) in a responsible supervisory position, who is considered technically proficient but who found it necessary and apparently acceptable to submit work not his own.

9. Summary

The Licensing Board stated that, although it could not "conclude with certainty that all possible cheating has been revealed," it is "comfortable with the results of the inquiries." LBP-82-56, supra, 16 NRC at 290 (¶ 2041). The Board believed that probably all relevant and important cheating had come to light because of (1) the active participation of the intervenors, Commonwealth, and NRC staff in the investigation and hearing, and (2) the "repetitive" and "finite" testimony of the witnesses (operators) themselves. Id. at 290-91 (¶¶ 2041-2043). While we have noted some areas of disagreement with the Licensing Board concerning its conclusions about particular individuals or incidents, we generally agree with the Board that overall the inquiry (especially the hearing) has been as thorough as possible. Though intervenors quarrel with that notion, they have failed to give us serious cause to doubt that all significant cheating occurrences have been revealed and investigated.

Earlier in this opinion, we noted that the proper focus of this special proceeding is on whether licensee has

demonstrated its ability to operate TMI-1 in a safe and responsible manner in the future. See note 7, supra. The efficacy of action intended to remedy identified deficiencies in past conduct is a necessary element in that equation. With that in mind, we next consider licensee's operator training program and the implications of the cheating episodes for that program.

C. Licensed Operator Training

1. Licensee's Program

Intervenors attack numerous aspects of the TMI-1 training program. The Aamodts, in particular, question the qualifications of the instructors and supervisors within the training department; course content; the amount of time spent on training; the adequacy of simulator training and testing; and the validity of the examination process. All intervenors, especially UCS and TMIA, argue generally that the record in the reopened proceeding on cheating presents a serious challenge to the Licensing Board's earlier favorable findings concerning licensee's training program. See LBP-81-32, supra, 14 NRC at 478-79 (¶ 276). The Licensing Board recognized that the cheating episodes cast some doubt over those findings. See generally LBP-82-56, supra, 16 NRC at 355-63 (¶¶ 2321-2342). The Board, however, characterized this as a "quality assurance" problem -- one that could be remedied by future audits of various aspects of the training program. Id. at 364-65 (¶¶ 2344-2347). Intervenors

disagree, contending that future audits do not assure safe operation of the facility now.

The Licensing Board correctly framed the issue: "is the instruction adequate to prepare the operators to operate the plant safely?" Id. at 363 (¶ 2343). We disagree with the Board, however, on its affirmative answer to that question. The 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. Indeed, the record in the reopened proceeding perhaps has raised more questions than it has answered satisfactorily.[47] 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?

---

[47] Hence, we disagree with the Licensing Board's view that the evidence in the reopened proceeding has not brought the adequacy of licensee's training program into question. See LBP-82-56, supra, 16 NRC at 296 (¶ 2061). We do not overlook licensee's improvements in test administration, as supplemented by the Licensing Board. Id. at 359-60 (¶¶ 2330-2331). But, like the Special Master, we are not yet convinced that those largely ministerial fixes will

(Footnote Continued)

Moreover, we are troubled by the fact that one-fourth of those who took the April 1981 NRC examinations (9 out of 36) either were directly involved in cheating of some sort or were implicated in a way that could not be satisfactorily explained or resolved. See Lic. Exh. 83. See also note 52, infra. Several of these individuals were or are still in supervisory positions. Perhaps most disturbing is the testimony that a number of employees (including training instructors) did not take the courses or examination process seriously. See, e.g., Tr. 25,695-96, 25,745, 25,983, 26,404-06.

The principal difficulty with the decision below, however, is the Licensing Board's failure to reconsider, as promised and in a meaningful way, its earlier finding that licensee's training program was "comprehensive and acceptable." See LBP-81-32, supra, 14 NRC at 478 (¶ 276). Instead, the Board relied on the post-cheating testimony of only licensee and the staff.[48] But more significant, the Board essentially presumed that the earlier, favorable

---

(Footnote Continued)
salve what may be more serious infirmities in the training program. See LBP-82-34B, supra, 15 NRC at 1015-20. (¶¶ 242-251).

[48] Even in so doing, the Board noted its misgivings about the testimony of Dr. Robert Long, former Director of Training and Education and now Vice President of Nuclear Assurance, which oversees the training program. LBP-82-56, supra, 16 NRC at 380-81 (¶¶ 2406-2407).

expert testimony by the outside consultants would not have been altered by the cheating revelations. See LBP-82-56, supra, 16 NRC at 299, 378-79 (¶¶ 2081, 2396-2400). See also id. at 360-61 (¶ 2335). We are not so sure, and, in any event, we are not willing to speculate on how the OARP Review Committee and other consultants would assess the cheating incidents and licensee's subsequent changes in its training and testing program.

It is apparent that the generally positive testimony of the OARP Review Committee and licensee's other independent consultants was of decisional significance to the Board's initial, equally positive judgment on licensee's training program. See, e.g., LBP-81-32, supra, 14 NRC at 453-54, 459-65, 471, 472-73, 477 (¶¶ 201-203, 225-241, 260, 263, 272). Once 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.[49] The future audits imposed by the Licensing Board to treat what it sees

---

[49] The Board described the evidence from the reopened proceeding on cheating as showing "only . . . significant weaknesses" -- not a "failure" -- in the quality of instruction (and thus training). Id. at 361 (¶ 2337). Irrespective of the terminology employed, the underpinnings of the Board's earlier decision (i.e., the consultants' predictive testimony) were shaken. If that testimony is to have any real weight, it must be reevaluated in light of actual events.

as a quality assurance infirmity are both necessary and desirable. But whether they are sufficient as well can be determined only after further testimony by the independent consultants.[50]

For example, it is essential to know if Dr. Gardner's favorable opinion of the Operator Accelerated Retraining Program -- offered in late 1980 and based on what he believed was the satisfactory implementation of the program -- would be altered by the subsequent knowledge of cheating on licensee and NRC examinations. See Gardner, fol. Tr. 12,409, at Outline. Mr. Kelly testified about the pride and enthusiasm found among employees in the training program, as well as the professionalism of the instructors. Kelly, fol. Tr. 12,409, at 4, 6, 10. Dr. Christensen observed similar attitudes. Christensen, fol. Tr. 12,409, at 12-13. Subsequent, post-cheating testimony, however, reflected a lack of those qualities. Kelly and Christensen should have been asked how the latter might bear on their previous assessments of the effectiveness of the training program.[51]

---

[50] Inasmuch as the record on training is now closed, we thus explicitly find the pertinent criteria for reopening satisfied. See Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-598, 11 NRC 876, 879 (1980).

[51] Kelly did appear again at the reopened hearing, but his testimony was limited to his role in administering

(Footnote Continued)

The OARP Review Committee reported, on balance, favorably on licensee's training program and predicted that program candidates would be well trained and well prepared for the NRC licensing exams. Lic. Exh. 27, OARP Report, at 1, 3. We have seen that the latter prediction was overly optimistic, at best. As to whether the candidates are nevertheless well trained to operate the plant, the record is incomplete. In reading the OARP Report, one question is inescapable: would the Committee reach the same favorable conclusions in light of the cheating incidents and subsequently acknowledged deficiencies in licensee's training program?

Before answering that ultimate question, the Committee must necessarily reconsider its specific subsidiary conclusions. For instance, the OARP Report referred to "pre-accident neglect" of the TMI Training Department and identified more specific shortcomings (bitterness and anxiety among some employees, inadequate training facilities, the need for special teacher training for the instructors, etc.). Id. at 58, 145-47. Notwithstanding these and other criticisms of the program, the Committee gave the OARP high marks. How would the Committee members

---

(Footnote Continued)
certain "mock" examinations. He did not reassess his earlier expressed views on the OARP. See Kelly, fol. Tr. 24,894.

now strike the balance between the positive and negative aspects of the program? The Report commented briefly but favorably on the written examination. See id. at 67. How might that view be revised? One or more of the instructors evaluated by the OARP Committee were involved in the cheating episodes. See id. at 62-63.[52] Would that alter the Committee's generally favorable perceptions of the instructors? See id. at 58-61. The Licensing Board's decision requires licensee to establish criteria for training instructors. Licensee has submitted these new criteria and the staff has approved them. Letter from R.W. Starostecki to H.D. Hukill (September 27, 1983), Inspection Report No. 50-289/83-22 at 2. See also letter from J.F. Stolz to H.D. Hukill (July 28, 1983), Attachment (Safety Evaluation). But in view of the weaknesses in this area previously identified in the OARP Report, the Committee as well should review licensee's new training instructor

---

[52] We determined this by comparing the list of named instructors in the OARP Report with the letter designation code used in the hearing before the Special Master to protect the identities of the TMI employees. Because all parties have the code and can thus verify our statement, there is no need for us to identify specifically whom we mean. But see note 16, supra.

criteria. See Lic. Exh. 27, OARP Report, at 146-47.[53]

The OARP Review Committee devoted substantial attention to the use of both part-task and replica simulators. Id. at 95-112. Because of the demonstrated weaknesses in past testing procedures, would the Committee require even greater

---

[53] The Aamodts contend that instructors who teach fluid flow, heat transfer, and thermodynamics should have baccalaureate degrees because "the Commission referred to 'college level' as the standard for augmentation of those courses." Aamodt Brief at 7. On its face, the logic of this point seems apparent. The Aamodts, however, have confused a summary of a June 1979 meeting between the staff and licensee -- which states that "the operators will be taking college level technical courses" in those three subjects -- with a Commission "standard." See "Meeting Summary on the Open Items Regarding TMI-1 Restart" (June 28, 1979) at 1. We have been unable to find any specification of course level for fluid flow, heat transfer, and thermodynamics in any of the relevant Commission documents. See, e.g., "Qualifications of Reactor Operators" (March 28, 1980) ["Denton Letter"] at 1; Encl. 1 at 2, 5; Encl. 2. Rather, the focus is on course content. See id. at Encl. 2. The Licensing Board explored this area at hearing and concluded that licensee's training program was not a college curriculum, nor should it be. LBP-81-32, supra, 14 NRC at 472 (¶ 262). We find the Board's conclusion is amply supported by the record.

The Aamodts also complain that the Board erred in finding the number of training instructors at TMI has been increased to 45. Aamodt Brief at 7. See LBP-81-32, supra, 14 NRC at 472 (¶ 262). The Aamodts claim, without any reference to the record, that there are nine instructors. The Board did err in referring to the "faculty" as numbering 45, when the record shows the training "staff" (which could include non-teaching personnel) is now 45. See Long, et al., fol. Tr. 12,140, at 3. This minor error is without consequence -- and the Aamodts suggest none. The important consideration is the qualifications of the training instructors. And that is what the OARP Review Committee should address again in the context of licensee's new instructor criteria.

usage of simulators in training and testing?[54] Perhaps the

---

[54] The Aamodts argue that the upgraded training program does not include enough simulator training time to satisfy regulatory requirements. They point to NUREG-0660, "NRC Action Plan Developed as a Result of the TMI-2 Accident," as recommending 160-200 hours per operator annually, compared with the 20 hours of actual hands-on simulator training for each TMI-1 operator per year. Aamodt Brief at 15. See Tr. 12,156-57, 12,263. We can find no reference to a specific amount of simulator time in the final version of NUREG-0660, dated May 1980. See NUREG-0660, supra, at I.A.4-1 to I.A.4-7. The Aamodts apparently got the 160-200 figure from Lic. Exh. 27, OARP Report, at 110, where the OARP Review Committee mentions a "proposed" version of NUREG-0660 that required "160-200 hours of simulator experience for hot license training." Though not adopted in the final version of NUREG-0660, this refers to initial operator training, not the requalification training for already licensed operators discussed at the referenced part of the hearing.

In this connection, we have been unable to locate any regulatory requirement for a specific amount of simulator training. The OARP Review Committee, however, should reconsider its generalized view on this topic with respect to the particular amount of simulator time per operator at TMI-1. See Lic. Exh. 27, OARP Report, at 99. At the same time, the Committee should consider whether all TMI-1 operators, previously licensed or not, should be tested on a simulator. The Aamodts attempted to inject this as an issue at the eleventh hour, just as the Licensing Board was about to issue its original management competence decision. The Board denied that attempt, stating that the motion was too late and that Commission regulations and the order instituting this proceeding do not require simulator testing by the NRC. LBP-81-32, supra, 14 NRC at 568-69 (¶¶ 542-548). We agree with the Board that there is no such requirement. Nonetheless, the Board's mandate from the Commission was to decide if the actions ordered were "sufficient" as well as necessary. Licensee has already committed to NRC testing of newly licensed TMI-1 personnel on a simulator. Id. at 568 (¶ 542). We believe it is important that the OARP Review Committee now consider whether, in view of the compromised written examinations, previously licensed operators should be tested on the simulator as well. (Thus, we need not decide if the Board

(Footnote Continued)

most important matter that the Committee should address upon further hearing, however, is its rather prophetic, concluding statement: "Top management needs to keep aware of the real and perceived problems of its employees." Id. at 149. The Committee suggested that there was a lack of communication between top management and the operating crews.[55] Do the post-cheating changes in the training program adequately ameliorate this situation?[56]

We recognize that by requiring additional hearing on the post-cheating views of licensee's outside consultants we are further prolonging a proceeding that appears to have no end. Nor are we insensitive to the morale problems among

---

(Footnote Continued)
erred in refusing to entertain the Aamodts' "late contention" on this subject.)

[55] The Special Master similarly concluded, with regard to the poor administration of licensee's examinations, that if licensee was not aware of these conditions, "its management was out of touch with the training program." LBP-82-34B, supra, 15 NRC at 1050 (¶ 329).

[56] In reconsidering its earlier appraisal of the OARP, the Committee should take account of several important personnel changes within the Training Department. For example, Dr. Robert Long, who was Director of Training and Education during the cheating incidents, has been promoted to GPUN Vice President for Nuclear Assurance. Dr. Richard P. Coe has replaced him. Samuel Newton, former Operator Training Manager, is now Manager of Plant Training. Edward J. Frederick, a control room operator assigned to TMI-2 at the time of the accident, has been promoted to Supervisor of Licensed Operator Training. Letter from D.B. Bauser to Appeal Board (May 6, 1983) at 2-3. In view of what occurred, are these appropriate assignments?

employees whose training and job performance continue to be under scrutiny, despite eventual successful retesting by the NRC.[57] But we are presented with a Hobson's Choice: decide the pivotal issue of the adequacy of training at TMI-1 notwithstanding a significant gap in the record,[58] or impose more demands, in the form of further hearing, on the resources of all parties and the agency alike. We believe the latter is the more appropriate alternative.

2. The Role of the NRC Staff

We would be remiss were we to overlook the role of the NRC staff in the past deficiencies in licensee's training program. Indeed, the staff must share a large measure of the blame due to its poor test administration and inability to earn the respect of many TMI employees. The staff has conceded its laxity with regard to the April 1981 NRC

---

[57] A related problem -- indeed, a "catch 22" -- is that, because of lack of use, the operators' skills have declined during the long period of plant shutdown. This is evident from a recent Inspection Report, where the staff concludes that overall licensed personnel at TMI-1 are well trained but identifies several areas of weakness that are to be addressed in a special restart training program. Letter from R.W. Starostecki to H.D. Hukill (April 13, 1984), Enclosure (Inspection Report No. 50-289/84-05 at 4-5).

[58] This is not a matter of bringing a "stale" record in a closed proceeding up to date. See Interstate Commerce Commission v. Jersey City, 322 U.S 503, 514-15 (1944). Rather, it is akin to recalling a crucial witness for further testimony after new developments come to light during a lengthy trial.

examination[59] and has informed the Special Master and Licensing Board of new test procedures it has established for the future (e.g., more rigorous proctoring). See Staff Exh. 30, ES-201 (draft rev. 3). While such improvements are desirable, we share the concern voiced by the Licensing Board about the level of staff involvement with respect to licensee's training program.

First, the Board expressed concern with the staff's limited role as "auditor" of licensee's requalification

---

[59] While criticizing the staff, the Licensing Board found it "in literal compliance" with the governing standard for administering operator license examinations, ES-201. LBP-82-56, supra, 16 NRC at 368 (¶ 2357). We would not be so generous. The extensive review during the examination and the numerous changes that were necessary strongly suggest that the examiners failed to acquaint themselves adequately with the facility and that headquarters staff did not conduct the pre-examination review, as required by ES-201. See Staff Exh. 29, ES-201 (rev. 2, 1969), at 1, 2. Moreover, the staff's argument that the standard was satisfied by having at least one NRC representative present somewhere in the training building during the examination makes a mockery of the standard as well as the examination process. See NRC Staff's Proposed Findings (January 15, 1982) at 68. Under "Administration of Examination," ES-201 provides that "applicants should not be allowed to leave the examination room, except for the obvious purpose, (one at a time)," and "[d]uring the examination, applicants are not permitted to communicate or refer to any texts or descriptive material. . . ." It also refers to "ensur[ing] the integrity of the examination," avoidance of the use of facility proctors, and the desirability of oversight of the examination personally by the examiner. Staff Exh. 29, ES-201 (rev. 2, 1969) at 2-3. It would be impossible, in our view, to administer an examination in compliance with this standard simply by having one NRC representative present somewhere in the building during the test.

program and administrator of the NRC licensing examination. LBP-82-56, supra, 16 NRC at 364 (¶¶ 2345-2346). The staff has indicated its intent not to review licensee's future plans to qualify candidates for the NRC examination, limiting its involvement to comparing the performance level of license candidates on NRC examinations with a perceived industry norm and licensee's past record. Boger, fol. Tr. 25,480, at 2-3. As the Board pointed out, this conflicts with the more substantive role for the staff contemplated in the regulations. See generally 10 C.F.R. §§ 55.10(a)(6), 55.33(4). See also 10 C.F.R. Part 55, Appendix A (". . . a requalification program which has been reviewed and approved by the Commission"). It also conflicts with Task I.A.2 of NUREG-0660, which provides that "[t]he NRR staff will review the contents of revised training programs, and the IE staff will audit the implementation." NUREG-0660, supra note 54, at I.A.2-1. See also id. at I.A.2-3 to I.A.2-4.[60] In our view, focusing on the performance level of license candidates (i.e., the percentage that passes the

---

[60] Regulatory Guide 1.8 envisions similar increased staff "participation" in licensee training programs for both initial license candidates and those seeking requalification. See, e.g., Reg. Guide 1.8, "Personnel Qualification and Training," 2d proposed rev. 2 (1980), §§ 2.2.2, 2.2.7. Although this document still exists only in draft form, it represents a public statement of the staff's current position.

examination) puts too much emphasis on the examination qua examination and too little on the substance of the training itself.

We are also troubled by the numerous substantive problems in the examination identified by the Special Master and noted with concern by the Board. See LBP-82-34B, supra, 15 NRC at 1026-35 (¶¶ 269-287); LBP-82-56, supra, 16 NRC at 369-71 (¶¶ 2363-2372). In short, the questions and answer keys often reflected training information (some of which might be either obsolete or overly specific), rather than actual plant design. This, in turn, means that training may not be oriented to actually operating the plant. Again, this shows undue emphasis on passing the examination, as opposed to learning how to operate the particular plant in question.

We are, or course, aware that the problems just discussed are generic in nature, and that we have no jurisdiction to require the staff to adopt or abandon certain methods for doing its myriad assigned duties. We are aware, too, that Congress has directed the Commission to take a new look at the broad subject of training. See Nuclear Waste Policy Act of 1982 § 306, 42 U.S.C. § 10226. The Commission's substantial effort in that regard is under way. See SECY-84-56 (February 2, 1984); SECY-84-56A (April 30, 1984). We thus join the Licensing Board in urging the Commission to give the highest priority to the efforts to

make the operator training and testing process a meaningful one. See LBP-82-56, supra, 16 NRC at 371 (¶ 2372).

In sum, proper training is essential to the safe operation of the plant and requires the closest scrutiny.[61] This is especially so here, where because of the role of operator error in the TMI-2 accident, training has been of key importance in this proceeding from the outset. There is no substitute for a complete and convincing record. We therefore remand to the Licensing Board that part of this

---

[61] The record in this proceeding is replete with examples of where it is essential for an operator to be fully conversant with plant design and procedures. See, e.g., ALAB-729, supra, 17 NRC at 832-35, 894 (action to enhance reliability of emergency feedwater system); 841-42, 846-47 (raising steam generator water level to 95 percent to promote boiler-condenser cooling); 861 n.213, 862 n.217 (closure of PORV block valve in event of a loss-of-coolant accident); 864 (prevention of low temperature overpressurization of the reactor vessel); 864-65 (mitigation of inadequate core cooling conditions); 866, 870-71 (intervention to combat unforeseen events); 880-81, 894 (reliance on redundant indication closest to saturation); 856, 860, 886-87, 894 (connection of pressurizer heaters to emergency power). See also LBP-81-59, supra, 14 NRC at 1709-10.

We note in this connection a recent Notice of Violation citing numerous instances where licensee's personnel failed to follow proper operating procedures. The staff noted that licensee had admitted and identified most of these violations and took corrective action. Nonetheless, because of the large number of violations within a relatively short time, the staff determined that a $40,000 civil penalty should be imposed. See letter from R.C. DeYoung to P.R. Clark (May 7, 1984), Appendix at 4-5. Licensee has apparently decided to pay this fine. Wall St. J., May 16, 1984, at 53, col. 6.

proceeding devoted to training, for further hearing on the views of licensee's outside consultants (including the OARP Review Committee) in light of both the weaknesses demonstrated in licensee's training and testing program and the subsequent changes therein.

D. Non-licensed Operator Training

Although most of the attention at the hearing with regard to training was directed to licensed operators, the Licensing Board recognized the important functions of non-licensed personnel for the safe operation of the plant. The Board found that licensee has expanded and improved its training program for non-licensed employees. LBP-81-32, supra, 14 NRC at 441-42, 455-59 (¶¶ 164, 208-224). Although intervenors did not participate in the litigation of the issue, the Board also addressed issue 4 specified in CLI-80-5, supra, 11 NRC at 409, concerning the qualifications of TMI-1 health physics personnel. It concluded that this staff is adequately trained to ensure effective implementation of licensee's radiological controls program. LBP-81-32, supra, 14 NRC at 505-11 (¶¶ 360-376).

On appeal, the Aamodts raise essentially three matters with regard to non-licensed operator training. First, they contend that the Board "failed to develop any significant record." Aamodt Brief at 12. The Aamodts rely on a November 1980 Inspection Report (No. 50-289/80-21) that identified several weaknesses in licensee's training program

for non-licensed operators, including the absence of a written training program and a disorganized management overview. See Staff Exh. 4, NUREG-0680 (Supp. No. 1), Appendix B at 9. The staff indicated in that report, however, that it would apprise the Board and parties of its evaluation of licensee's corrective action during the hearing. Ibid. The staff fulfilled this commitment in Staff Exh. 13, NUREG-0680 (Supp. No. 2), at 2-4. There the staff described the content of licensee's training programs for auxiliary operators and plant technicians (including radiological control and chemistry technicians) and concluded that each complied with the pertinent regulatory requirements. The staff also noted that licensee had issued a training manual incorporating the details of these programs. The staff stated that it was reviewing the manual and would "assure its adequacy prior to any recommendation for restart of TMI-1." Id. at 4.[62] The staff also concluded that licensee's training program for non-licensed personnel was acceptable and that it considered the weaknesses identified in Inspection Report No. 50-289/80-21

---

[62] The staff has now completed its review of the manual and training program for non-licensed personnel, finding them acceptable. See letter from T.T. Martin to GPU Nuclear Corporation (January 12, 1983), Inspection Report No. 50-289/82-19 at 24-25; letter from T.T. Martin to GPU Nuclear Corporation (March 10, 1983), Inspection Report No. 50-289/83-02 at 10.

to be resolved. Ibid. The Licensing Board took note of that evaluation, and the Aamodts have offered no basis to challenge it. See LBP-81-32, supra, 14 NRC at 459 (¶ 224).

Second, the Aamodts argue that the Licensing Board measured licensee's training program for non-licensed operators by the wrong standard, American National Standard for Selection and Training of Nuclear Power Plant Personnel ANSI/ANS-3.1 (1978). See id. at 441 (¶ 164). They point out that this standard preceded the TMI-2 accident and argue that the appropriate standard for augmented training should be the post-accident 1979 draft version of ANS-3.1.[63] Although the Board referred to ANSI/ANS-3.1 (1978), the record shows that the staff applied the even more rigorous requirements of the December 6, 1979, draft version of ANSI/ANS-3.1 to licensee's training program. The staff testified that it would apply the Second Proposed Revision 2 of Regulatory Guide 1.8 (September 1980) to all licensees. Crocker, et al., fol. Tr. 12,653, at 7-8. That Regulatory Guide (at 10) explicitly incorporates and endorses the requirements of the 1979 version of ANSI/ANS-3.1. Id. at 5-6. Thus, although the Licensing Board's decision does not reflect it, the record shows that licensee's training

---

[63] The Aamodts refer to "Draft ANS 3.2-1979." Aamodt Brief at 13. We assume they mean ANS-3.1.

program was, in fact, evaluated in terms of the post-TMI-2 standard sought by the Aamodts.

Third, the Aamodts complain that at the reopened hearing on cheating the Special Master erred in refusing to let Harry Williams, who had been briefly employed as a guard at TMI, testify about "looseness in licensee's administration of Radiation Worker Permit tests during April 1979. Williams had alleged cheating and other improprieties by certain non-TMI employees (construction workers). The Special Master concluded, after voir dire of Williams, that he was a highly unreliable witness. The Special Master excluded Williams's testimony for that reason as well as its lack of probative value. LBP-82-34B, supra, 15 NRC at 988-89 (¶¶ 179-180). The Licensing Board agreed. LBP-82-56, supra, 16 NRC at 333 (¶ 2226). So do we, for the reasons stated by the Special Master. The Aamodts argue, however, that Williams's allegations have been effectively corroborated by a later incident involving licensee's failure to secure the answer keys to a radiation worker test. This same incident was the basis of a motion to reopen filed by the Aamodts and denied in ALAB-738, supra, 18 NRC at 193-94. We explained there that licensee's response to this incident was both prompt and sufficient. Indeed, it demonstrated that licensee's system for dealing with such irregularities was working. The Aamodts have provided no cause for us to reconsider either that

conclusion or the Special Master's initial exclusion of Williams's testimony.

IV. Staffing and Work Hours

Two matters related to training are licensee's staffing plans and work schedule for operating personnel. The Aamodts express concern about licensee's ability to staff TMI-1 with enough high quality operators on each shift. They assert that the Licensing Board's staffing requirements are below the minimum standards set forth in several Commission documents, particularly NUREG-0737, "Clarification of TMI Action Plan Requirements" (November 1980), and NUREG-0731, "Guidelines for Utility Management Structure and Technical Resources" (September 1980). As we understand their argument, the Aamodts want a minimum of five shifts to operate the plant, with each shift to have a minimum of two senior reactor operators (SROs). They also want limits on overtime. Aamodt Brief at 16-19. The Licensing Board would require licensee to "employ all reasonable efforts to ensure personnel will be scheduled on a six-shift rotation" but otherwise authorizes lesser variations in shift rotations. The Board would also permit licensee to staff each shift with one SRO (who will act as shift supervisor), another person who is either an SRO or a reactor operator (RO), and two other ROs. LBP-81-32, supra, 14 NRC at 580-81 (¶ 583, condition 9).

Subsequent events have essentially mooted the Aamodts' appeal on this matter. In July 1983, the Commission promulgated new regulations governing licensed operator staffing at nuclear power plants. These regulations, which took effect January 1, 1984, and apply to all licensees (including TMI), incorporate the NUREG-0737 criteria sought by the Aamodts. Pursuant to 10 C.F.R. § 50.54(m)(2)(i), licensee now must have a minimum of two SROs and two (or three) ROs[64] per shift. 48 Fed. Reg. 31,611, 31,614 (1983). In addition, 10 C.F.R. § 50.54(m)(2)(iii) requires at least one of the SROs to be "in the control room at all times" and an RO or SRO to be "present at the controls at all times." Ibid. These new regulations supersede the less stringent conditions imposed by the Licensing Board in 1981.[65]

---

[64] The new rule specifies two SROs and two ROs for a one-unit facility with one unit operating. A two-unit facility (with two control rooms) with only one unit operating requires two SROs and three ROs. TMI is, of course, such a two-unit facility, but because Unit Two is indefinitely shutdown, it is not clear whether it should be classed as a one-unit or two-unit facility for purposes of this rule. Because the Aamodts' concern is with the number of SROs and the rule requires two SROs for both one-unit and two-unit facilities, we need not resolve the question of how many ROs are required.

[65] This is so despite the contrary impression given by certain recent staff correspondence. See letter from J.F. Stolz to H.R. Hukill (February 22, 1984), Enclosure at 1-2, 3.

Licensee has notified the staff of both its ability and willingness to satisfy this requirement. As of March 1984, it has 13 SROs and 20 ROs and "plans to utilize the six-shift rotation plan for licensed operators during startup" and power escalation testing. Letter from D.B. Bauser to Appeal Board (April 4, 1984), Attachment (letter from H.D. Hukill to T.E. Murley (March 30, 1984) at 3, 4) (emphasis added).[66] This number of SROs and ROs is more than enough to satisfy the new staffing requirements of 10 C.F.R. § 50.54(m)(2)(i) for all six shifts (12 SROs and 12 (or 18) ROs).[67] Thus, licensee will exceed the staffing requirements sought by the Aamodts.[68]

With respect to the Aamodts' concern about excessive overtime by licensed operators, the Commission staff has now

---

[66] As far as we are aware, the Commission has never set or suggested a specific number of shifts for any facility, leaving that to management prerogative. Licensee here has clearly expressed its preference for six shifts -- a number that appears to be consistent with the Aamodts' position. We see no need to formalize this commitment further.

[67] See note 64, supra.

[68] The Aamodts express concern about the high attrition rate at TMI. Licensee's March 30 letter notes that only one licensed operator has resigned in the past two years. Licensee also sets out in chart format the experience of each member on each shift, showing a very favorable comparison with the baseline experience suggested for "Near Term Operating License" plants. Letter from D.B. Bauser to Appeal Board (April 4, 1984), Attachment (letter from H.D. Hukill to T.E. Murley (March 30, 1984) at 3, 1, Attachment 1).

adopted overtime restrictions. Before the accident at TMI-2, there were no such regulations or policy. NUREG-0737, however, noted studies showing that fatigue could affect operator performance. It also referred to inspections that revealed personnel at some plants remain on duty for extended periods of time. Consequently, the staff proposed overtime guidelines for interim use while the agency and industry working groups studied the matter further. NUREG-0737, supra, at 3-10 to 3-11 (IE Circular No. 80-02). Two years later, the staff revised NUREG-0737 and issued Generic Letter No. 82-12, "Nuclear Power Plant Staff Working Hours" (June 15, 1982). See 47 Fed. Reg. 7352 (1982). This reflects the current NRC policy on overtime and applies to all licensees and applicants.

The stated objective of the policy is "to prevent situations where fatigue could reduce the ability of operating personnel to keep the reactor in a safe condition." Consequently, enough personnel should be employed to "work a normal 8-hour day, 40-hour week" and to avoid "routine heavy use of overtime." The policy recognizes, however, that situations can arise that make

overtime inevitable.[69] It therefore prescribes the following guidelines for licensees to follow:

a. An individual should not be permitted to work more than 16 hours straight (excluding shift turnover time).

b. An individual should not be permitted to work more than 16 hours in any 24-hour period, nor more than 24 hours in any 48-hour period, nor more than 72 hours in any seven day period (all excluding shift turnover time).

c. A break of at least eight hours should be allowed between work periods (including shift turnover time).

d. Except during extended shutdown periods, the use of overtime should be considered on an individual basis and not for the entire staff on a shift.

Generic Letter No. 82-12, Attachment at 2-3. Licensee has agreed to these restrictions and has already incorporated them into its Administrative Procedures and Technical Specifications for TMI-1. Letter from H.D. Hukill to D.H. Eisenhut (December 16, 1982); letter from J.F. Stolz to H.D. Hukill (September 1, 1983) at 1. See note 89, infra.

Aware of Generic Letter No. 82-12, the Aamodts nonetheless now argue that the new overtime guidance and restrictions are "not reassuring." Aamodt Brief at 29.[70]

---

[69] In fact, it seems logical that, in an emergency, overtime by certain employees would be desirable in order to assure continuity in some functions and to provide important information to the next shift.

[70] The Aamodts also contend that the Licensing Board (Footnote Continued)

They fail to elaborate other than to urge "short hours." Ibid. Without more -- including a nexus to the TMI-2 accident (see note 70, supra) -- we are unwilling and unable to impose any stricter limitations on overtime than those to which licensee is already committed pursuant to Generic Letter No. 82-12. Moreover, these restrictions, in conjunction with licensee's fully-staffed, six-shift rotation and obligation to comply with 10 C.F.R. § 50.54(m)(2)(i), represent a significant improvement in licensee's operation. The Aamodts, in fact, have gotten all

---

(Footnote Continued)
erroneously denied them the opportunity to litigate operator fatigue in connection with both control room design and operator working hours. The Board excluded the Aamodts' "fatigue" evidence because it had no nexus to the TMI-2 accident itself or licensee's response to the accident. Tr. 17,256, 17,265-67. We have reviewed Mrs. Aamodt's testimony, fol. Tr. 12,931, and agree with the Board. See also Intervenor Response to Board Request for Evidence (March 10, 1981). That is not to say that her general points concerning the relation of fatigue and operator performance are not valid. Indeed, Mrs. Aamodt relies on the same material in NUREG-0737 that is discussed above and that undergirds the staff's current overtime policy. Where the Aamodts failed, however, is in showing a particular connection between fatigue and the TMI-2 accident -- a linkage necessary in this special proceeding. See Commission Order of March 14, 1980 (unpublished) at 2. The points they raised are of general applicability to all plants -- hence, the staff's eventual generic response.

As for control room design, that matter was thoroughly litigated in the design phase of this proceeding and to a lesser extent in this phase. See LBP-81-59, supra, 14 NRC at 1318-28 (¶¶ 907-920); LBP-81-32, supra, 14 NRC at 466-67 (¶¶ 244-247). The Aamodts raise no specific arguments on appeal in this regard.

they originally sought with regard to plant staffing and work hours. Assuming that licensee's personnel are adequately trained (see pp. 62-72, supra), we conclude that TMI-1 is sufficiently staffed to assure safe operation of the facility.

V. Maintenance

Among the management competence issues the Commission directed the Licensing Board to consider in this proceeding was the adequacy of licensee's maintenance program. See CLI-79-8, supra, 10 NRC at 145; CLI-80-5, supra, 11 NRC at 409. In addition, the Board admitted and litigated TMIA's contention 5. As pertinent here, the contention alleged that licensee has deferred "safety-related" maintenance and repair in violation of its own procedures, failed to keep accurate and complete maintenance records, and used overtime extensively in performing safety-related maintenance. See LBP-81-32, supra, 14 NRC at 479 (¶ 277). (The entire contention is set out in Appendix C.) Although the Licensing Board identified some deficiencies in licensee's maintenance program (particularly its record keeping practices), it resolved all issues encompassed within TMIA contention 5 in licensee's favor. See generally id. at 479-501 (¶¶ 278-348). On appeal, TMIA raises a number of procedural and substantive objections to the Board's

treatment of this important matter.[71] As explained below, however, we see no basis for overturning the Board's decision on licensee's maintenance program.

A. TMIA's Procedural Objections

1. Burden of Proof

The Licensing Board candidly admitted that TMIA's maintenance contention "was not litigated . . . in the usual manner, . . . with Licensee first presenting its case on the subject, followed by the Staff and by any intervenors presenting direct evidence." Id. at 479 (¶ 278). The Board had directed TMIA to proceed with its case first because of TMIA's failure to comply with certain discovery requests and Board orders. As the Board explained, this would give licensee the opportunity to "discover" the specific dimensions of TMIA's case and thus permit it to respond more effectively. Id. at 480 (¶ 278). See Northern States Power Co. (Minnesota) (Tyrone Energy Park, Unit 1), LBP-77-37, 5 NRC 1298, 1300-01 (1977), cited with approval in Pennsylvania Power and Light Co. (Susquehanna Steam Electric Station, Units 1 and 2), ALAB-613, 12 NRC 317, 338 (1980).

---

[71] TMIA does not challenge the Licensing Board's decision on those parts of its contention 5 that concern licensee's maintenance budget and staffing plans. See LBP-81-32, supra, 14 NRC at 493-96 (¶¶ 320-330). Our own review of that part of the Board's decision discloses no error warranting corrective action.

TMIA now claims that this alteration in the order of evidence presentation was unfair and amounted to an improper shift in the burden of proof.

TMIA's claim is without merit. First, there is absolutely no indication in the Board's decision -- and TMIA cites none -- that TMIA in fact bore the burden of proof on contention 5. Indeed, throughout this entire special proceeding, that burden has been (and remains) on licensee to show cause why it should be authorized to restart TMI-1. See Consumers Power Co. (Midland Plant, Units 1 & 2), ALAB-315, 3 NRC 101, 105 (1976). On the other hand, by raising a particular contention challenging licensee's ability to operate TMI-1 in a safe manner, TMIA necessarily assumed the "burden of going forward" with evidence to support that contention. See Consumers Power Co. (Midland Plant, Units 1 and 2), ALAB-123, 6 AEC 331, 345 (1973). The procedures employed by the Licensing Board here are entirely consistent with that responsibility.

Moreover, the Board was fully justified in requiring TMIA to proceed first. As the Board noted, it could have found TMIA in default for failing to comply with its discovery orders and dismissed its contention. LBP-81-32, supra, 14 NRC at 480 n.26 (¶ 278). See 10 C.F.R. §§ 2.707, 2.718(e). Instead, because of the importance of the issue, the Board chose to require TMIA to proceed with its case first. We find the Board's action to be a reasonable

exercise of its discretion, fully in accord with agency law and the Administrative Procedure Act. See Public Service Co. of Indiana (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-459, 7 NRC 179, 188 (1978); 10 C.F.R. § 2.731; 10 C.F.R. Part 2, Appendix A, § V(d)(4); 5 U.S.C. § 556. The Board's action was also in furtherance of the Commission's instruction in this very proceeding to ensure that all necessary information be received, but without undue delay. See CLI-79-8, supra, 10 NRC at 147.[72]

2. Loss of Counsel

TMIA was initially represented by legal counsel in this proceeding. After the presentation of its case-in-chief on contention 5, TMIA was unable to continue paying its legal fees and its counsel withdrew. TMIA now claims that the Licensing Board violated due process when, in January 1981, it imputed knowledge of what had transpired thus far to TMIA's new lay representative, Louise Bradford. It contends that the Board should have provided her with "constructive assistance" and should not have expected her to understand, analyze, and prepare cross-examination of licensee's witnesses. TMIA's Brief at 7.

---

[72] Subsequent to the Board's action, the Commission issued its Statement of Policy on Conduct of Licensing Proceedings, CLI-81-8, 13 NRC 452 (1981), in which it "reemphasized" the boards' authority and responsibility to

(Footnote Continued)

When a party is permitted to enter a case late, it is traditionally expected to take the case "as it finds it." It follows that, when a party that has participated in a case all along simply changes representatives in midstream, knowledge of the matters already heard and received into evidence is of course imputed to it. The Licensing Board's only other alternatives here were to dismiss contention 5 or to relitigate what had already been presented. Neither would have been in TMIA's best interest, and the latter option would have been unfair to the other parties as well and caused undue delay. The record reflects that the Board was duly solicitous of TMIA's situation and essentially directed TMIA's former counsel to bring Bradford up to date on the case. Tr. 10,421-23, 10,431-32, 10,440-42. See ABA Model Code of Professional Responsibility EC 2-32 (1980) (now, ABA Model Rules of Professional Conduct Rule 1.16(d)(1983)).[73] TMIA itself stated its intent to participate "in a more limited way" from that point on and

---

(Footnote Continued)
take a wide range of measures to ensure the orderly conduct of NRC proceedings. See id. at 453, 454.

[73] Despite the fact that intervenors ceased getting free transcripts during the proceeding (see pp. 143-44, infra), all documents and transcripts were still available in the local public document room.

apparently did not seek extra time to get caught up on the case. Tr. 10,421.[74]

The NRC's Rules of Practice are more liberal than those of some other agencies and courts, in that the NRC permits non-attorneys to appear and represent their organizations (like TMIA) in agency proceedings. See 10 C.F.R. § 2.713(b). Compare 49 C.F.R. §§ 1103.2, 1103.3 (Interstate Commerce Commission); 2d Cir. § 46(d); 3d Cir. R. 9; Fed. Cir. R. 7(a). Further, we do not hold lay representatives to as high a standard as we do lawyers. But the right of participation accorded pro se representatives carries with it the corresponding responsibilities to comply with and be bound by the same agency procedures as all other parties, even where a party is hampered by limited resources. Statement of Policy on Conduct of Licensing Proceedings, supra note 72, 13 NRC at 454. See, e.g., Pennsylvania Power and Light Co. (Susquehanna Steam Electric Station, Units 1 and 2), ALAB-693, 16 NRC 952, 956-57 (1982). Expecting Bradford to be familiar with her organization's own case neither is unfair nor violates due process.

---

[74] Bradford entered her appearance on January 15, 1981. At that time, there was no date set for hearing licensee's evidence on contention 5, but the Board assured her that she would have "some lead time" to prepare. Tr. 10,422. The Board, in fact, did not begin to receive testimony on this matter until February 24, 1981. See Tr. 13,528 et seq.

3. Licensing Board Involvement

In a related vein, TMIA suggests that the Licensing Board itself should have participated more directly to compensate for TMIA's lack of legal and technical expertise. Specifically, in TMIA's view, the Board should have appointed independent experts to assist both TMIA and the Board in presenting and understanding the evidence on contention 5. As explained below at pp. 143-44, the Board was precluded by law from appointing anyone to assist TMIA in its case. With respect to the Board's calling upon independent experts to assist the Board itself, we pointed out in South Carolina Electric and Gas Co. (Virgil C. Summer Nuclear Station, Unit 1), ALAB-663, 14 NRC 1140, 1146 (1981), that this action is warranted in only the most extraordinary circumstances -- i.e., when "'a board simply cannot otherwise reach an informed decision on the issue involved.'" The record here presents no such circumstance. The mere fact that TMIA may regard certain of the Licensing Board's conclusions as arbitrary does not demonstrate the Board's inability to make an informed decision, so as to require outside expertise.[75]

---

[75] Likewise, TMIA's random charges of the Board's "bias" are supported by neither the record nor the fact that the Board's ultimate conclusions are contrary to those urged by TMIA.

TMIA's claim that the Board was obliged to play a more active role at the hearing is similarly without basis. Our canvass of the record reveals a board well aware of its responsibility to the public and the Commission "to ensure that it receives all information necessary to a thorough investigation and resolution of the questions before it." CLI-79-8, supra, 10 NRC at 147. See Tr. 3034. Particularly with respect to TMIA contention 5, the Board could have found TMIA in default and dismissed the contention. See p. 89, supra.[76] Yet, because of the importance of the issue, it chose to receive evidence on it. LBP-81-32, supra, 14 NRC at 480 n.26 (¶ 278). In addition to TMIA's 15 witnesses, the Board called another to testify on licensee's overtime practices -- an issue specifically raised in contention 5. Ibid. (¶ 279). Further, the Board required licensee to produce additional evidence concerning its maintenance record keeping practices and pursued other areas of inquiry on its own. Id. at 488, 484, 497 (¶¶ 302, 290, 336). This scarcely shows a board content only to call "balls and strikes" and insensitive to its public responsibilities.

---

[76] The Board, of course, would still have been obliged to consider the general adequacy of licensee's maintenance program, as that was among the issues specified for hearing by the Commission. See p. 87, supra.

Accordingly, we reject TMIA's argument that it was unfairly and improperly impeded in developing the record on its contention 5.

B. TMIA's Substantive Objections

1. Deferral of Safety-related Maintenance

Briefly, TMIA sought to show, through the testimony of licensee's employees and a sample of numerous job tickets requesting maintenance work at Unit 1 before the TMI-2 accident, that licensee had deferred "safety-related" maintenance even beyond the time for such work specified in licensee's own procedures. Licensee responded with witnesses of its own who addressed the specific job tickets cited by TMIA. The staff adduced testimony as well, generally supporting licensee's claim that its past and present maintenance practices have not endangered the public health and safety. TMIA disagrees with the Licensing Board's finding that licensee deferred no significant maintenance work. See id. at 485 (¶ 296). It argues that the Board arbitrarily rejected or ignored its evidence, while relying on assertedly unsupported statements of licensee and the staff. Further, TMIA complains that the Board did not explain its decision adequately.

A problem confronting the Board at the outset was the definition of "safety-related," as used in TMIA's contention 5. The problem remains on appeal, particularly insofar as TMIA objects to the Licensing Board's discussion of the

parties' "agreement" concerning this term. See id. at 484-85 (¶¶ 291-295). We have reviewed the pertinent portions of the record and conclude that, overall, the Board's discussion reflects the gist of the parties' positions on the meaning of safety-related.[77] TMIA is correct, however, in identifying some discrepancies -- minor ones, in our view -- between the Board's opinion and its (TMIA's) statements at the hearing. For the sake of clarification, we believe the following more accurately states the parties' positions.

TMIA stated that it would call Joseph Colitz (Manager of Plant Engineering at TMI-1) to testify and to provide technical expertise on the matter of what is safety-related. TMIA indicated, however, that it might not agree with Colitz's views[78] and would leave it to the Board to draw its own conclusions. Licensee, on the other hand, was willing to accept Colitz's opinion. Tr. 2575-77. TMIA went on to

---

[77] One point that is clear and disputed by no one is that safety-related, as used in TMIA's contention 5, was meant to have a common-sense, ordinary dictionary meaning. There was no intent to reflect any particular NRC usage of the term. See Tr. 2575-77, 2860-62, 2865-67. We therefore do not have the problem here that we recently certified to the Commission for resolution in Long Island Lighting Co. (Shoreham Nuclear Power Station, Unit 1), ALAB-769, 19 NRC __ (April 23, 1984).

[78] The Board, in fact, noted subsequent areas of disagreement between TMIA and Colitz. LBP-81-32, supra, 14 NRC at 484 (¶ 292).

offer its alternative view that the safety significance of a maintenance activity could be found on the face of the job ticket -- i.e., in the description of the function of the system to be repaired and in the priority assigned to the work order. The Board expressed its skepticism, though, as to the adequacy of TMIA's approach. Tr. 3032-38.

TMIA's criticism of the Board's actual evidentiary rulings and comments at the hearing, however, is not warranted on the record. TMIA has taken isolated remarks out of context and not fairly represented what occurred.[79] For example, TMIA excerpts parts of the transcript that suggest an arbitrary rejection of unspecified evidence by a board that is confused and uninformed. TMIA's Brief at 6-7. In fact, in one instance, after initially leaning toward rejection of certain evidence (TMIA Exh. 34A-K) on the ground that it was not related to nuclear safety, the Board nevertheless admitted it because it concerned quality

---

[79] It should be kept in mind that TMIA's contention 5 alleged that licensee had violated its own procedures in deferring safety-related maintenance. But as the Licensing Board found, licensee had and has no fixed times within which certain work is to be performed. Id. at 483-84 (¶ 289). Strictly speaking, then, the Board could have ended its inquiry into that portion of the contention early on. Nonetheless, the Board found it important to pursue the broader issue of whether the examples of deferred maintenance cited by TMIA demonstrated significant deficiencies in licensee's maintenance practices. Id. at 484 (¶ 290).

control in licensee's record keeping practices. Tr. 3727-32.[80] In another instance cited by TMIA, the Board rejected TMIA Exh. 29A-D because the discussion on the record showed no safety significance to the work in question. Tr. 3671-75. TMIA claims this action was arbitrary because the Board "admittedly did not have sufficient information as to the exhibit's relevance to make a fair ruling." TMIA's Brief at 6. In fact, the Board simply referred to "a void of information" on the subject work orders, pointed out by counsel for the Commonwealth. Tr. 3675-76. If anything, that "void in information" detracts further from the probative value of the proffered exhibit and shows the correctness of the Board's ruling.

There is no doubt that this part of the record reflects a certain amount of confusion on the part of all participants. But this was of TMIA's own making; had it cooperated during discovery, there would have been no need for the Board to alter the usual order of procedure. See pp. 88-90, supra. As a consequence, the presentation of evidence and testimony was unavoidably complicated. The transcript only reflects the Board's frustration in attempting to develop the record as fully and efficiently as

---

[80] The Board discussed this evidence in its decision as well. Id. at 487, 490 (¶¶ 298, 308).

possible -- not the arbitrariness ascribed to it by TMIA. See, e.g., Tr. 3032-38, 3126-32, 3662-63, 3731-32. TMIA wanted the Board to "draw its own conclusions." Tr. 2575. It appears to us that the Board did just that. It ruled on a substantial amount of evidence tendered by TMIA, admitting a good deal of it in the process. TMIA has not directed us to any particular evidence that was rejected and explained why it should have been admitted. We thus have no cause to conclude the Board was arbitrary in its treatment of TMIA's case on contention 5.

TMIA also argues that the Board failed to explain adequately the basis for its conclusions on maintenance deferral. In particular it objects to the Board's direct reliance on licensee's testimony for the conclusion that TMIA's work request exhibits do not show improper maintenance deferral. See LBP-81-32, supra, 14 NRC at 485-86 (¶ 296). We disagree with TMIA and find the Board's explanation sufficient. The Board noted that licensee's responsive written testimony addressed, in detail, each of the work requests admitted as TMIA's exhibits. The Board found nothing inconsistent between that testimony and the witnesses' additional testimony at the hearing. The Board also pointed out that, during its cross-examination of the witnesses, TMIA did not attempt to elicit further

information about the exhibits.[81] Rather than setting out this extensive testimony, the Board listed all 20 exhibits with explicit references to the portion of the record that explained why each work request was not an example of improperly deferred maintenance. Id. at 486 (¶ 296). Given that no effective challenge was made to the testimony, no purpose would have been served by the Board's rehearsal of it. We thus find the Board's approach entirely reasonable in the circumstances.

Even on appeal, TMIA makes no more than a generalized attack on licensee's rebuttal to its work request exhibits. See TMIA's Brief at 8. Nonetheless, we have reviewed each exhibit and the corresponding testimony and concur in the Licensing Board's finding that no significant maintenance was unduly delayed. While many of the work requests seemed to show long delays in repair, licensee's witnesses explained that often the maintenance was performed immediately, but the paperwork on closing out the job was delayed or the matter would be held open for observation for six months or more. See, e.g., Shovlin, et al., fol. Tr. 13,533, at 25 (TMIA Exh. 13), 52-53 (TMIA Exh. 11), 76-77 (TMIA Exh. 31). In other instances, items were properly

---

[81] The Commonwealth, however, conducted some cross-examination. See, e.g., Tr. 13,599-606.

identified for repair at some time in the future -- i.e., at the next scheduled outage. See, e.g., id. at 53-55 (TMIA Exh. 19), 75-76 (TMIA Exh. 20). In still others, design modification was thought preferable to a repair (although not for safety reasons), leading to a longer than usual closeout of the work request. See, e.g., id. at 23-24 (TMIA Exh. 12), 56-58 (TMIA Exh. 22). In many cases, the problem was paperwork (i.e., bad record keeping), not deferral of important safety-related work. See, e.g., id. at 30-34 (TMIA Exhs. 42, 43), 61-68 (TMIA Exhs. 16, 17, 18, 28).

Where the Board did address at greater length the particular items involved in the work requests, TMIA objects to the Board's conclusions. TMIA's Brief at 8-9. See LBP-81-32, supra, 14 NRC at 486-88 (¶¶ 297-299). In one instance, the Board agreed with TMIA that its exhibits showed bad maintenance practices in delaying replacement of certain filters. But the Board also found that licensee's new inclusion of monthly filter inspections in its preventive maintenance program would help to avoid a potential effect on safety-related equipment in the long run. Id. at 487 (¶ 298). We see no basis for disagreeing with the Board's treatment of this matter. Another of TMIA's exhibits concerned an alarm that infrequently (once or twice a year) sounds for no apparent reason. The Board concluded from the record that this had no safety significance but commented critically on what was, by that

time, a four-year delay in repairing it. Id. at 487-88 (¶ 299). We join in the Board's criticism of such inordinate delays, but we are unable to conclude on this record, as TMIA suggests, that this matter presents a risk to the public health and safety. See Shovlin, et al., fol. Tr. 13,533, at 27-29; Tr. 13,602-04.

Although the Licensing Board found (correctly, in our view) no significant deferral of safety-related maintenance, that was not intended as an endorsement of all aspects of licensee's maintenance program. The Board found licensee's former system for designating the priorities for corrective maintenance work "clearly unsatisfactory as conceded by Licensee." LBP-81-32, supra, 14 NRC at 482 (¶ 285). Under that system, there were three general priorities: Priority 1 - urgent; Priority 2 - routine; Priority 3 - low priority. They reflected neither an estimate of work time for the job nor its safety significance. Shovlin, et al., fol. Tr. 13,533, at 51. As a consequence, the designation of a priority for a given work request was a largely subjective undertaking. Because it could not be relied on to highlight the really important maintenance, "real" priorities were determined on an ad hoc basis at meetings held three times a week and attended by maintenance and operations personnel. LBP-81-32, supra, 14 NRC at 482 (¶¶ 285-286).

As of October 1980, this system was supplanted by the following four new priority categories:

> Priority 1: Can only be classified by superintendents, department heads or shift supervisors; will cause a plant shutdown; reduce generation; has a time clock of very short duration; is an immediate industrial or nuclear safety hazard; compromises nuclear safety or security, reactor control or power conversion cycle control system in so far as to present a clear threat of initiation of a trip or severe transient; imposes or threatens increased personnel radiation exposure; constitutes one element of a multievent failure which would result in initiation of a trip or transient.
>
> Priority 2: Could cause a plant shutdown if operation is continued too long; redundant component and backup is no longer available; could cause a plant limitation in the near future; time clock on the component that will require it to be repaired in a timely fashion; items that should be repaired when plant conditions allow.
>
> Priority 3: Routine corrective maintenance that does not impact plant operation.
>
> Priority 4: Corrective maintenance to clear minor problems that don't actually affect the operation of any components; all change modifications and any improvements that are not related to plant performances.

Id. at 481-83 (¶¶ 284, 287). The old work request form was also replaced by a computerized "job ticket." This reflects the work originator's priority recommendation (which may be changed by his or her immediate supervisor) and the priority ultimately established by the Manager of Plant Maintenance (or his or her designee). Tr. 3096-98.

TMIA contends that the new priority system does not amount to any real change. It claims the categories are still too subjective and ambiguous, and there are no guidelines for determining, for example, what constitutes

"an immediate industrial or nuclear safety hazard." TMIA also argues that the review process is essentially the same: the initiator recommends a priority and his or her supervisor reviews it; the new procedures and computerized job ticket simply formalize this. In TMIA's view, the changes reflect a concern for form over substance, while the potential for the abuses of the old system remains. TMIA also complains that the individual managers responsible for maintenance are the same now as under the old system.

We disagree with TMIA, in that we believe licensee's new priority designations do represent a meaningful improvement over its former system. Priorities 1 and 2, in particular, provide useful guidance for plant personnel. See p. 103, supra. Any such system is inherently subjective, no matter how detailed the priority categories, and will require varying degrees of skilled and informed judgment. Licensee's new priorities are no exception. But it must be kept in mind that it is not laymen who will make these maintenance determinations. It will be trained, experienced plant personnel,[82] and their decisions will be reviewed by at least two levels of management.

---

[82] This provides yet another example of the important role of training in the safe operation of TMI-1. See p. 76, supra. Properly trained personnel should find these priorities unambiguous and readily amenable to application to most maintenance problems that arise.

With respect to that review procedure, however, we agree with TMIA that there appears to be little or no substantive change from the previous system.[83] The originator of the work request recommends a priority, his or her supervisor reviews it, and the Manager of Plant Maintenance (or his or her designee) passes ultimate judgment on the matter. The only real difference from the old system is that the new job tickets show on their face the ultimate priority assigned by the Manager of Plant Maintenance. See Tr. 3096-99. The new form is thus somewhat clearer, but we fail to perceive any substantive change in how priorities are assigned and reviewed. Unlike TMIA, however, we do not find anything objectionable in this procedure. It seems eminently reasonable and desirable that the work request originator's supervisor would review his or her recommendation and that the Manager of Plant Maintenance

---

[83] We are compelled to note that both the written and oral testimony on the new maintenance procedures is less than clear and does not always appear entirely consistent. Compare Lic. Exh. 2; Shovlin, et al., fol Tr. 13,533, at 14-19, 40-41; Tr. 3096-99. Our conclusions are based on a common-sense reading of the record. Of course, if our understanding of the record is in error, we expect the parties to call that to our attention, with proper documentation.

(or similar official) would be responsible for the ultimate priority assignment.[84]

TMIA characterizes as the "most relevant point regarding maintenance practices" the fact that the same pre-1979 maintenance managers are still in charge of the department today. TMIA's Brief at 12.[85] What should not be overlooked, however, is that these are the same managers who recognized the need for improvement in the system and developed new procedures to that end. Moreover, as discussed above, we agree with the Licensing Board that there was no significant deferral of safety-related maintenance. Hence, the abuses TMIA perceives have not been shown on this record. We have no basis to adjudge them "incompetent," as TMIA suggests. See generally LBP-81-32, supra, 14 NRC at 419-22, 440-41 (¶¶ 87-94, 156-162).

2. Record Keeping

Another aspect of TMIA's contention 5 alleged that the failure to keep accurate and complete maintenance records shows licensee's disregard for safety. The Licensing Board

---

[84] Further, this hierarchy should result in uniformity in the application of the four priorities to particular work requests.

[85] The former lead shift maintenance foreman, however, has recently been reassigned and replaced, apparently as a routine personnel change. Letter from D.B. Bauser to Appeal Board (January 27, 1984) at 2.

found that TMIA had demonstrated poor record keeping in the past by licensee. Id. at 489 (¶ 304). For example, the Board noted problems with duplicative work requests, unexplained or ambiguous "cancellations," and lost job tickets. Id. at 489-90 (¶¶ 305-309). The Board concluded, however, that licensee has properly responded to these deficiencies, principally through a new computerized system that tracks the maintenance job tickets. Id. at 490 (¶ 310). TMIA demurs, claiming that the new computer system itself has problems and has not been shown to be effective.

To be sure, when the new computer system ("Generation Maintenance System," or GMS) was developed in the late 1970s, some of the same record keeping problems as existed under the old system continued. See Shovlin, et al., fol Tr. 13,533, at 29-30. But as the Board pointed out, TMIA has ignored licensee's corrective actions undertaken since 1979. LBP-81-32, supra, 14 NRC at 491 (¶ 312). See Shovlin, et al., fol. Tr. 13,533, at 30-34. Many of the early startup problems in the GMS were the inevitable result of making the transition from a manual to an automated information system. Licensee has moved to correct those deficiencies, and the testimony by the time of the hearing revealed an effective system for tracking maintenance work

requests. Id. at 12-21, 35-39.[86]

That is not to say licensee's record keeping system is perfect. The Board noted several areas, all involving quality control (QC), where there is still room for improvement. TMIA, however, has failed to show that any of these areas is of safety significance.

First, the Board opined that Quality Control should sign off (initial) at each QC "observation hold point[]," rather than only at the completion of the job. LBP-81-32, supra, 14 NRC at 492 (¶ 317). The Board found that licensee had complied with its own procedures in this regard and that it did not reveal "a serious problem on the part of management attitude." Nonetheless, the Board found that the ability to audit the QC records would be enhanced by the addition of intermediate QC sign-offs. Id. at 495-96 (¶ 328). Because these extra notations will supplement the maintenance history for a particular job, we join in the Board's recommendation. Requiring this as a condition of restart, however, is not warranted; the significant factor is that QC signs off at the completion of the job.

---

[86] One action licensee took was a monthly review of all outstanding work requests in an effort to clear out those that had been cancelled, completed, or superseded. Shovlin, et al., fol. Tr. 13,533, at 30. We have been informed that this review is now undertaken on a quarterly basis "due to the fact that the great majority of old work requests have,
(Footnote Continued)

Second, the Board commented that delays in noting QC approval for the work should be minimized. Id. at 492 (¶ 318). It noted as well, though, that these delays were not shown to have an impact on plant safety, and that the enlargement of licensee's QC staff should result in fewer future delays. Id. at 496 (¶¶ 329-330). TMIA has presented no reason to doubt the Board's judgment on that score.

Third, the Board strongly urged licensee to consider revising its new job ticket format to reflect better the nuclear safety effect of the requested work, where the maintenance is to be performed on a non-QC component. Id. at 492-93 (¶ 319). We endorse the Board's view, and apparently licensee does as well. It has now revised its job ticket so that management must explicitly agree that particular work will have no effect on nuclear safety, irrespective of the QC/non-QC status of the work. See Board Notification BN-84-016 (January 27, 1984).[87]

(Footnote Continued)
over time, been removed from the computer system." Letter from E.L. Blake, Jr., to Appeal Board (November 29, 1983), Attachment at 2.

[87] The Licensing Board also noted that, due to a limited data base, the Component History Report provided by the GMS does not always reliably reflect the QC status of the component involved in a given work request. LBP-81-32, supra, 14 NRC at 491 (¶ 313). Acknowledging this shortcoming in its system, licensee stated that it does not consider this particular computer printout as official documentation. As the history in the data base expands, its
(Footnote Continued)

While pointing out these several areas that, in its view, warrant minor improvement, the Board emphasized the clear benefits of the GMS:

> The automated system, with the rapid retrieval of information in various formats, and the administrative checks to avoid the problems of duplicative requests, multiple work not being documented as it was performed, and priority designations being checked at appropriate management levels to assure the computerized system accurately reflects the real priority, all represent substantial improvement.

LBP-81-32, supra, 14 NRC at 490 (¶ 310). It therefore reasonably concluded that licensee's conceded record keeping problems appeared to be solved. Because any such finding is necessarily predictive, the Board suggested that the staff give special attention, during its routine future inspections, to the efficacy of licensee's already improved maintenance record system. Id. at 492 (¶ 315). TMIA has shown no basis for requiring more.

3. Overtime

TMIA's contention also alleged that licensee extensively relied on overtime in performing maintenance, in further disregard of the public's safety. Its argument is similar to that of the Aamodts (see pp. 83-87, supra):

(Footnote Continued)
reliability will be enhanced. In the meantime, machinery history is maintained on cards and not through the use of this computer printout. See Shovlin, et al., fol. Tr. 13,533, at 38-39.

overtime should be prohibited because it increases the risk of carelessness due to fatigue. Although the Licensing Board considered this issue at length, TMIA claims the Board gave this matter "shoddy treatment." TMIA's Brief at 14. See LBP-81-32, supra, 14 NRC at 496-501 (¶¶ 331-348). According to TMIA, the Board mischaracterized the testimony, was arbitrary, and failed to provide a reasoned analysis of the evidence.

At the outset, the Licensing Board correctly observed that "[m]uch of the maintenance and modification work [at a nuclear plant] can be done only during refueling outages." Id. at 496 (¶ 332). A staff large enough to perform these functions without overtime would be idle much of the time during normal operation. Moreover, the quality of safety-related maintenance is often enhanced when it is begun and completed by the same crew, particularly where some of the employees have special skills. Licensees must balance these various considerations. Id. at 496-97 (¶¶ 332-333).

With that in mind, the Board turned to the evidence. It heard from three witnesses, all current or former TMI maintenance employees. Their testimony reflected the whole range of views on overtime. Some employees personally disliked it but felt compelled by management to work overtime, some liked it for the extra money, and some were neutral. Id. at 497-98 (¶¶ 335-338). The Board considered

the testimony highly subjective and was unable to determine if licensee had had sound overtime practices or not. But it relied heavily on a staff inspection report that found no evidence that licensee's use of overtime had affected the quality of the maintenance performed. Id. at 498-500 (¶¶ 339-342). The Board also found that TMIA's concerns -- not supported by the record -- were, in any event, mooted by a subsequent staff statement on overtime, IE Circular No. 80-02. Id. at 500 (¶ 343).

The Board's decision belies TMIA's characterization of it as "shoddy treatment." The decision is consistent with the testimony and other evidence, and we have been given no reasonable cause to disturb the Board's findings on maintenance overtime practices.[88] Insofar as TMIA objects to the Board's mootness finding, we would agree that the mere adoption by the staff of a new "policy" on overtime does not in and of itself moot TMIA's issue. Unless the policy amounts to a regulatory requirement or a party agrees to be bound by it, there is no assurance that the standards enunciated in the policy will be observed and enforced. But as we explained at pp. 84-85, supra, since the Licensing

---

[88] Hearing from additional witnesses, as TMIA urges, would not have added to the scope of the testimony presented to the Board (see p. 111, supra), or made the employees' personal views on overtime less subjective. See LBP-81-32, supra, 14 NRC at 498 (¶ 339).

Board's decision, the Commission has adopted a new overtime policy (embodied in Generic Letter No. 82-12), and licensee has agreed to be bound by it.[89] The policy, which discourages routine heavy use of overtime and sets guidelines for those inevitable occasions when overtime will be necessary, expressly applies to key maintenance personnel and major maintenance work. Deviation from the guidelines is permitted only if senior management, taking account of personnel effectiveness, authorizes it. Generic Letter No. 82-12, supra, Attachment at 2-3. In our view, this new policy, binding on licensee, is an adequate response to TMIA's stated concern in contention 5 about the "extensive" use of overtime for maintenance work.

VI. Management Response to the TMI-2 Accident

In CLI-80-5, supra, 11 NRC at 409, the Commission directed the Licensing Board to consider (as Issue 10)

> whether the actions of Metropolitan Edison's corporate or plant management (or any part or individual member thereof) in connection with the accident at Unit 2 reveal deficiencies in the corporate or plant management that must be corrected before Unit 1 can be operated safely[.]

---

[89] As noted at p. 85, supra, licensee has incorporated the new overtime restrictions into its technical specifications. As such, they become part of its operating license and are legally binding. See Portland General Electric Co. (Trojan Nuclear Plant), ALAB-531, 9 NRC 263, 272-73 (1979).

Licensee and the staff presented direct evidence on this issue, but none of the intervenors did. The staff, and Licensing Board as well, focused principally on the flow of information, during and after the accident, from licensee to the NRC, the Commonwealth, and others.[90] On appeal, TMIA argues that the Board has not resolved Issue 10, and that there is no reasonable assurance that licensee has corrected all the asserted management problems revealed by the TMI-2 accident.

A. Witness Credibility

TMIA first complains that the witnesses presented by licensee on this issue were not credible. Those witnesses were: William S. Lee, President of Duke Power Company, who served as an assistant to Herman Dieckamp (GPU President) beginning a week after the accident; William Wegner, a consultant from Basic Energy Technology Associates, Inc. (BETA); and Robert W. Keaten and Robert L. Long (see note 48, supra), two members of licensee's management. While we would not go so far as to find them "not credible," we do find that the direct testimony of licensee's witnesses was

---

[90] Also included under Issue 10 was the Board's brief discussion of the then-ongoing Department of Justice investigation into certain of licensee's past practices. See LBP-81-32, supra, 14 NRC at 557 (¶¶ 504-506). This matter came to be known as the "Hartman allegations" and is discussed more fully in ALAB-738, supra, 18 NRC at 183-92. See also p. 9, supra; pp. 149-54, infra.

not particularly probative or responsive to the issue at hand. But we also find that the Licensing Board appears to share that view, inasmuch as it did not rely on their testimony to any significant extent in reaching its conclusions on Issue 10.

For example, after summarizing Lee's testimony, the Board noted that Lee described his view of licensee's response to the accident after he arrived on the scene one week later, rather than licensee's response at the time -- which is the focal point of the "information flow" issue. LBP-81-32, supra, 14 NRC at 539 (¶ 465). See Lee, fol. Tr. 13,251. As for Keaten and Long, the Board found their testimony "more positive than appears warranted," and does not rely on it for any substantive findings. LBP-81-32, supra, 14 NRC at 539 (¶ 466). See Keaten and Long, fol. Tr. 13,242.[91] The Board found the "broader perspective" of Wegner's brief testimony on this issue "more accurate." According to him, the problems that led to the accident were shared throughout the civilian nuclear power industry. At the time of his testimony before the Board, Wegner considered it still too early to expect that all of the deep

---

[91] The Licensing Board could also have fairly described it as "self-serving;" in our view, the testimony is more self-serving than is ordinarily expected from a proponent's own statement.

seated problems would be corrected. He essentially concluded, however, that licensee was making progress in that direction, sufficient to permit restart. Wegner, fol. Tr. 13,284, at 33-35. Other than summarizing his testimony, however, the Board does not appear to have given it any par icular weight on Issue 10. Indeed, Wegner's testimony is so general and brief that the Board would have been hard pressed to use it as support for any specific finding.

Thus, although the testimony of licensee's witnesses on Issue 10 was not especially useful, it also did not provide the evidentiary basis for any critical finding by the Board. Accordingly, we see no error in the Board's decision in that regard.

B. Information Flow

1. Motion to Reopen (TMIA Exhs. 49 and 50)

TMIA argues that the Licensing Board erred in rejecting two exhibits it offered in connection with a motion to reopen the record on Issue 10. TMIA Exh. 49 is a March 1981 report by the Majority Staff of the U.S. House of Representatives Committee on Interior and Insular Affairs, entitled "Reporting of Information Concerning the Accident at Three Mile Island." It is known as the "Udall Report" and is critical of licensee's actions on March 28, 1979, the date of the TMI-2 accident. TMIA Exh. 50 is actually TMIA's July 2, 1981, Motion to Require Further Development of the Record. Attached to the motion is a June 1981 review of the

Udall Report by Edward C. Abbott, a Senior Fellow for the NRC's Advisory Committee on Reactor Safeguards (ACRS). Abbott agrees with the Udall Report's conclusions.

According to TMIA, "[t]he Board took official notice of every other federal government report on the information flow topic," except for the Udall Report. That was the only such report that concluded that two of licensee's officials, former TMI Station Manager Gary Miller and former Met Ed Vice President John Herbein, "deliberately withheld information" on the day of the accident from state and federal officials. TMIA's Brief at 24. The others, in particular Staff Exh. 5, NUREG-0760, "Investigation into Information Flow During the Accident at Three Mile Island" (January 1981), at 11, concluded that, while licensee was "not fully forthcoming on March 28, 1979," neither did it intentionally withhold information. In TMIA's view, the Licensing Board relied too heavily on NUREG-0760: it used facts selectively and is therefore not a credible document. It asserts that the Board should have formally admitted the Udall Report and Abbott's review to provide more balance. TMIA also offered, a week after it moved to reopen, to provide witnesses to sponsor the two exhibits. Tr. 22,997-98. On appeal, TMIA requests that we review "sua sponte" [sic: de novo] all of "the raw materials" on this subject. TMIA's Brief at 25.

The record on information flow during the accident had closed several months before TMIA filed its motion to reopen for receipt of Exhs. 49 and 50. TMIA was therefore obliged to show that the motion was timely and addressed a significant issue, and that it might alter the outcome. Diablo Canyon, supra note 50, 11 NRC at 879.[92] Also, the Board had explained on several occasions earlier in the hearing that the Udall Report was not the type of matter of which the Board could take official notice and that, for it to be treated as formal evidence, it must be proffered in a timely fashion and sponsored by a witness. Tr. 12,006-07, 20,776-82, 21,011-15. See Duke Power Co. (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-669, 15 NRC 453, 477 (1982).

Several months later, on the last day of the hearing, when TMIA for the first time formally tendered the Udall Report with possible witness sponsorship, the Board was justified in finding that it was not a timely offer. Further, TMIA conceded that the raw material in the Udall Report was essentially the same as in NUREG-0760, which was

---

[92] TMIA incorrectly states the staff "endorsed" its motion. TMIA's Brief at 24. Rather, the staff did "not interpose an objection" and suggested that, if the Board granted the motion, it should also admit into evidence other reports, which were more favorable to licensee's position. Tr. 22,965.

in evidence. TMIA Exh. 50, Motion at 2. Only the conclusions differed. Thus, as to both the Udall Report and Abbott's review, the Board stressed that, because it (the Board) was responsible for reaching conclusions on licensee's response to the accident, the conclusions of others would not be of any particular value. Tr. 22,998-99. In other words, while the facts as to what happened were important (and were in evidence in NUREG-0760), the opinions of the Udall committee and Abbott would not have influenced the Board's decision one way or the other. We agree with the Board here that, once it is fully apprised of the facts, it is able and obliged to form its own conclusions. This is not a situation involving the competing opinion testimony of experts in a technical field. Thus, the Board did not err in denying TMIA's motion.

The important consideration is that, despite TMIA's contrary representation to us, the Board treated equally all of the various governmental reports and memoranda concerning information flow that were not admitted into evidence. It did not take official notice of any of them or make any findings solely on the basis of such extra-record material. The only actual evidence on this issue was NUREG-0760 (Staff Exh. 5), and it was properly sponsored by a witness, who thus was available for cross-examination. See LBP-81-32, supra, 14 NRC at 540-42 (¶¶ 469-471). Nevertheless, the Licensing Board was unquestionably aware of the conflicting

conclusions reached on basically the same underlying data. In fact, to demonstrate its awareness of these views it set forth and discussed significant portions of the Udall Report and other documents. Id. at 546-51 (¶¶ 482-489). Furthermore, the Board was not wholly persuaded by the conclusions and terminology of NUREG-0760 either.[93] The Board "interpreted" the statement in NUREG-0760 that licensee was "not fully forthcoming" in providing information as meaning that licensee's officials intentionally -- i.e., consciously -- held back information, possibly because they did not appreciate the severity of the situation. The Board agreed with former Commissioner Hendrie's comment that this was "cold comfort indeed." Id. at 544 (¶ 477).

In sum, we see no purpose that would have been served by the formal receipt into evidence, at the eleventh hour, of the Udall Report and Abbott's review of it. The factual material discussed by both was already in evidence, and the Board was aware of the differing conclusions reached on that

---

[93] TMIA also attacks the credibility of NUREG-0760, contending that at a December 1981 public meeting its author, Victor Stello, in essence recanted his earlier conclusions and now agrees with the Udall Report. TMIA's Brief at 25. But in a subsequent memorandum to Commissioner Gilinsky, served on the parties on March 10, 1982, Stello states that his views on information flow "remain unchanged" from those expressed in NUREG-0760.

same data by several different entities. There is no error in the Board's evidentiary rulings on TMIA Exhs. 49 and 50.

2. John Herbein and Gary Miller

TMIA's principal argument in regard to the Board's treatment of Issue 10 is that the Board failed to pursue thoroughly the roles of licensee officials John Herbein and Gary Miller in responding to the accident. For example, TMIA cites an instance where Miller (former TMI Station Manager) knowingly provided incomplete information to Commonwealth official William Dornsife. See Staff Exh. 5, NUREG-0760, at 108-1 to 108-3, 112-1 to 112-5. According to TMIA, the Board should have questioned Dornsife about this matter at the hearing. As for Herbein, TMIA contends that he demonstrated bad judgment on several occasions (e.g., assertedly pulling Miller offsite at the height of the emergency to meet with Lieutenant Governor Scranton). Acknowledging that it (TMIA) declined to litigate this matter, TMIA argues that the Board was "derelict in its duty" to pursue Herbein's conduct on its own. TMIA's Brief at 27. The implications for the public health and safety are significant, according to TMIA, because of the high level position Herbein held with licensee. TMIA also expresses concern that the Board did not examine fully how the involved individuals interpreted the events of March 28, 1979.

It would certainly be unfair to suggest that the Board did not devote considerable attention to licensee's role in providing the Commonwealth and the NRC with information at the time of the accident. See generally LBP-81-32, supra, 14 NRC at 537-55 (¶¶ 461-497). It is apparent from the Board's opinion itself, however, that not all the questions concerning information flow were fully explored on the record. In addition to raising questions about the principal evidence, NUREG-0760 (see p. 120, supra), the Board identified a number of points or witnesses that could have been pursued further. See, e.g., id. at 543-44, 552 (¶¶ 475, 476, 491).

But with respect to Miller, the Board stressed that no party had alleged he was unfit for his then-present position as Manager of the Startup and Test Department, and that intervenors had not questioned available witnesses on Miller's actions. Conceding the relevance of personal integrity to any job, the Board concluded Miller's role in the flow of accident information had assumed less importance in view of Miller's change in job duties. Id. at 545 (¶ 479). The Board made similar observations concerning Herbein. It noted TMIA's failure to litigate this matter in a timely fashion and found particularly significant the Commonwealth's and the staff's decisions not to challenge Herbein's fitness for a management position. Id. at 551-52 (¶ 490). Also influenced by the Commission's apparent

determination not to take enforcement action with respect to information flow, the Board concluded it would not be worthwhile, from a public health and safety standpoint, to conduct further inquiry on its own, especially given its limited investigatory resources. Id. at 552-53 (¶¶ 491-493).

Although we have both the benefit of hindsight and an appreciation for the Board's enormous task in conducting this prolonged hearing on a plethora of issues in addition to those dealing with management competence, we agree with TMIA that the Board should have pursued the inquiry into information flow more fully on its own. Despite the absence of active intervenor participation on this issue, the Board was nonetheless obliged to make all reasonable efforts to resolve lingering questions. In CLI-79-8, supra, 10 NRC 141, the Commission ordered the Licensing Board to conduct a hearing on specified issues. In CLI-80-5, supra, 11 NRC 408, it further "directed" the Board to examine three broad issues and 13 specific ones including the actions of licensee's management in response to the TMI-2 accident. Neither the hearing itself nor the litigation of the specified issues was dependent upon the active participation of intervening parties. In the course of hearing and deciding those issues, the Licensing Board was thus bound "to ensure that it receive[d] all information necessary to a

thorough investigation and resolution of the questions before it." CLI-79-8, supra, 10 NRC at 147.[94]

To be sure, the Board's lack of its own investigating team and lack of authority to direct the staff in the performance of its duties effectively limit the Board's ability to comply with the Commission's mandate. See Carolina Power and Light Co. (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), CLI-80-12, 11 NRC 514, 516 (1980). But the Board can at least call and examine witnesses of whom the Board is aware and who are likely to have information necessary for the proper resolution of the issues before it. See generally 10 C.F.R. § 2.718.[95] In this case, the Board could have called Dornsife and another involved Commonwealth official, Thomas Gerusky, as well as

---

[94] The Licensing Board's pursuit of this matter is thus distinguishable from a board's raising of an issue sua sponte in an operating license application proceeding. See 10 C.F.R. § 2.760a.

[95] It is clear from Summer, supra, 14 NRC at 1152-57, that, in the proper circumstances, NRC adjudicatory boards are empowered to call witnesses to help develop the record. Our strong criticism of the Licensing Board's effort in that case to call outside consultants to give expert testimony is easily distinguished from the situation here, where the needed testimony concerned the witnesses' factual recollections, more than expert opinions.

Herbein and Miller, to testify directly about the communications that occurred among them on March 28, 1979.[96]

We also believe the Board was wrongly "influenced by the fact that the Commission itself, in the context of its oversight of the staff's enforcement actions, elected not to recommend further censure of individuals because of improper disclosure of information." LBP-81-32, supra, 14 NRC at 552 (¶ 492). Generally, where the Commission wants to foreclose adjudicatory inquiry into a matter in favor of enforcement action, it so indicates unambiguously, as in the case of the O and VV incident. See p. 60, supra. Here, the Board cites, and we are aware of, no expression or even suggestion of such a Commission intent with regard to the information flow issue.[97] Moreover, we view it as unwise for a board to give too much weight to enforcement action or the lack thereof. The Commission's enforcement program has a different purpose and scope than adjudication. Further, the independence of the adjudicatory boards is essential to

---

[96] The Board obviously had several other individuals in mind as well who might be able to contribute testimony. See LBP-81-32, supra, 14 NRC at 552 (¶ 491).

[97] Indeed, it is by no means clear that further enforcement action is out of the question. Various investigations of TMI are still under way and inquiry into the information flow issue may well be included. See, e.g., Board Notifications BN-[83]-117 (August 4, 1983) and BN-83-152 (October 3, 1983).

preserve the integrity of the hearing process. The Commission itself noted in South Texas, supra, 12 NRC at 289, that

> [a] decision by the Director of Inspection and Enforcement in an enforcement action does not bind a [l]icensing board in an operating license adjudication from making a decision which would further restrict, or even deny a license for, the operation of a facility. The [b]oard must make its decision based upon the record in the case before it.

The same should apply for a special proceeding such as this, particularly when the Board has been directed to hear certain issues that may also be subject to enforcement action.

Be that as it may, we see no purpose that could be meaningfully served at this late date by requiring further hearing on Herbein's and Miller's actions on the day of the accident. Apart from denial of restart authorization, the Board correctly observed that "the most adverse outcome of such an inquiry . . . would be the removal of Mr. Herbein from some or all of his proposed duties." LBP-81-32, supra, 14 NRC at 552 (¶ 491) (footnote omitted). The same would be true for Miller. That has effectively been accomplished: neither is now employed by GPU Nuclear, the actual licensee subject to NRC jurisdiction. See notes 3 and 45, supra.

Although TMIA suggested to the Licensing Board that this would be an appropriate remedy, it now argues on appeal that the removal of these licensee officials does not

"exonerate the corporate entity . . . ultimately responsible. . . ." TMIA Exh. 50, Motion at 3; TMIA's Brief at 27. We would agree that, if further hearing established significant improper action by Herbein and Miller -- or indeed any employee -- the corporate entity itself must bear some of the responsibility. The degree would depend on the circumstances and conduct involved. In that sense, then, the corporate entity can never be held blameless for past acts. But the question here is whether the corporate entity can reasonably assure more responsible conduct by its managers in the future. A corporate entity is a "person" in the legal sense that it can sue and be sued and incur responsibilities, but in a real sense it can "act" solely at the direction of individuals. Replacing high level managers can therefore effect a corresponding substantive change in the philosophy and overall behavior of management. In this connection, we stress that we find only that the Board erred in not pursuing the Herbein and Miller matter further; we do not pass judgment on their actions. Nonetheless, it cannot be gainsaid that their absence from the ranks of licensee's managers removes a large hurdle in licensee's path to proving it is competent to manage TMI-1 in a safe manner.[98]

---

[98] We also note that the "corporate entity" to which TMIA refers has been denied permission to operate TMI-1 for
(Footnote Continued)

3. The Dieckamp Mailgram

On May 9, 1979, Herman Dieckamp, President of GPU, sent a mailgram to Congressman Morris Udall in an effort to correct assertedly erroneous information about TMI reported in the New York Times the day before. The story concerned a "pressure spike" that had occurred within the TMI-2 containment at about 1:50 p.m. the day of the accident. As the Licensing Board explained, this "was a sudden increase in containment pressure from about 3 to 28 psig, followed by a rapid decrease to 4 psig. . . . It was caused by a sudden burning or explosion of hydrogen, which would be symptomatic of core damage." LBP-81-32, supra, 14 NRC at 555 (¶ 499). This increased pressure initiated containment spray. There are conflicting statements, set out in NUREG-0760, as to how several employees in the TMI-2 control room interpreted this at the time. Licensee did not report the pressure spike to the NRC or the Commonwealth, however, until a day or so after it occurred. Ibid. (¶ 499). The pertinent part of Dieckamp's mailgram for our purposes here is his statement that

---

(Footnote Continued)
more than five years. Virtually every aspect of its plant management and operation has undergone, and will continue to be subject to, scrutiny by the NRC and myriad external organizations (including intervenors) greater than that to which most other plants are subjected. Thus, it cannot be fairly said that the corporate entity has escaped sanction for its action in connection with the TMI-2 accident.

> [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.

Staff Exh. 5, NUREG-0760, at 117-1.

The staff investigated this matter to determine if Dieckamp's mailgram contained a material false statement in violation of Section 186 of the Atomic Energy Act, 42 U.S.C. § 2236, and concluded it did not. Id. at 45-46. The Licensing Board considered this matter more broadly, in terms of its implication for management integrity. Nonetheless, it agreed with the conclusion of the staff witness who testified on this issue that Dieckamp believed the statement was true when he made it. As the Board saw it, the staff's inquiry into the matter was "equal to or better than any the Board could make." Thus, it regarded the staff view as "reliable enough to set the matter to rest." LBP-81-32, supra, 14 NRC at 556 (¶ 501). See also ibid. (¶ 503). The Board equivocated, though, commenting that, in retrospect, perhaps it should have pursued the matter by recalling Dieckamp to testify. Ibid. (¶ 502).[99] It decided against this, however, because it would mean

---

[99] When Dieckamp testified on other issues, neither the Board nor any party questioned him with regard to the mailgram to Congressman Udall. Further, licensee presented no testimony on this subject at the hearing. LBP-81-32, supra, 14 NRC at 556 (¶ 502).

"substantial delay" in issuing its decision and "a serious distraction" from the other important issues involved in the proceeding. Ibid. (¶ 503).

TMIA thus complains that the Board erred in not resolving this issue as part of its overall responsibility to resolve Issue 10. We agree. The Board itself essentially conceded both the importance of this issue to management integrity and the unresolved nature of it. See Tr. 13,063, 13,060.[100] As is the case with the actions of Herbein and Miller on the day of the accident, the Board was obliged to pursue the circumstances of the Dieckamp mailgram as best it could, given the limits on its authority and resources. See pp. 123-24, supra. Indeed, we think the Board greatly underestimated its own ability to ferret out the facts, while overestimating the thoroughness of the staff's inquiry on this matter.

In the first place, the staff's review of the matter was solely from the standpoint of whether Dieckamp had made a material false statement as that term is used in the Atomic Energy Act. See Staff Exh. 5, NUREG-0760, at 45-46. That narrow focus was bound to have influenced the staff

---

[100] Our citation to Tr. 13,063 refers to lines 20-23. These are identified by "A" as the witness's words; it is clear from the context, however, that it is the Board speaking, beginning with line 16.

investigators in the questions they asked and conclusions they reached.[101]

More important, though, is that the staff's investigative report, upon which the Board was so willing to rely, is wholly conclusory. It is devoid of any explanation of why the staff believed some of those it interviewed, but not others -- namely, those whose statements suggested knowledge or a suspicion (by one or more persons) as to the cause of the pressure spike at the time it occurred.[102] With respect to Joseph Chwastyk, Brian Mehler, and Theodore Illjes, the staff just summarily concluded that their respective recollections about the pressure spike and its possible connection to the presence of hydrogen were "in

---

[101] The Board stated that staff witness Norman C. Moseley "made it clear [when testifying] that IE did not rest entirely upon such narrow grounds as duty to report under the Atomic Energy Act." Ibid. (¶ 501). It infers this from Moseley's statement that he believed Dieckamp thought he (Dieckamp) was being truthful at the time he sent the mailgram. See Tr. 13,063-64. We do not agree with the Board's assessment of the scope of the staff inquiry. Moseley's statement was no more than a specific answer to the Board's specific leading question during the hearing. It reveals little or nothing about the scope of the staff's actual inquiry while under way. If anything, the transcript shows Moseley thought there might be different ways to interpret Dieckamp's statement; but because Moseley did not believe they were worth pursuing, he suggested that the Board question Dieckamp about it. See Tr. 13,062. This hardly shows breadth in the scope of the staff's approach to this matter.

[102] None of these persons testified before the Licensing Board on this subject.

error" or occurred after March 28, 1979. Id. at 28, 29.[103] Nor do the excerpts of these individuals' statements to the staff investigators, appended to NUREG-0760, supply any basis for the staff's conclusions. See id. at 57-1 to 57-11, 59-1 to 60-1, 77-1 to 81-1, 87-1 to 89-2, 91-1 to 91-6. Finally, it is not readily apparent that the staff even interviewed the principal individual involved in this incident, Dieckamp himself. The transcript suggests the staff interviewed him on the subject of the mailgram, but NUREG-0760 does not include any reference to such an interview. See Tr. 13,063; Staff Exh. 5, NUREG-0760, at 22-31, 45-46, Appendix B at 1-5 (list of attachments).

Thus, the Board did not have a reasonable basis for relying on the staff's investigation of this matter. Notwithstanding the additional delay it would have caused, and as in the case of Herbein and Miller, the Board should have pursued the matter on its own by seeking testimony from Dieckamp, those in the control room at the time of the pressure spike, and those from whom Dieckamp got the

---

[103] The fact that other persons interviewed did not have similar personal recollections is irrelevant to the Dieckamp mailgram inquiry. It is important here to emphasize what is at issue in this regard and what is not. First, was there evidence that anyone interpreted the pressure spike and containment spray in terms of core damage at the time of the spike, and was any such information withheld? Second, on what information, and from what source(s), did Dieckamp base his statement?

information conveyed in his mailgram. But unlike Herbein and Miller, Dieckamp is still a high level "presence" at GPU Nuclear. Although he was recently replaced as Chairman and Chief Executive Officer of GPUN, he remains a Director there and thus will continue to participate in the management of GPUN, albeit to a far lesser extent. Notice to the Commission, et al. (February 6, 1984). It is not unreasonable to expect that, as a former Chairman and CEO, Dieckamp will have a more commanding voice in directing the affairs of GPUN than many of his fellow members of the Board. Moreover, he sent the mailgram to Congressman Udall in his capacity as President of the parent firm, GPU -- a position he still holds (along with Chief Operating Officer and Director).

We therefore believe that it is important that this matter be further explored by the Licensing Board so as not, in the Board's own words, to "leave it dangling." Tr. 13,060. Again, we do not suggest any wrongdoing by Dieckamp; the record as only partially developed does not permit a determination one way or the other. Accordingly, we remand to the Board for further hearing on the significance of Dieckamp's mailgram vis-a-vis licensee's competence to manage TMI-1 safely.

We recognize that such a hearing, now five years after the fact, may not be particularly fruitful. Memories fade, making selective recall a problem. But unlike the staff and

Licensing Board, we believe it is worth some additional effort, even at this late date. See LBP-81-32, supra, 14 NRC at 556 (¶ 503). Although delay and distraction were disincentives to reopening in 1981, they do not figure as prominently now. In fact, it would seem logical for the Board to pursue this matter at the same time it commences hearing on the training issues we have remanded above. See pp. 76-77, supra. Moreover, the scope of the Board's inquiry is relatively limited. As we pointed out at note 103, supra, the focus should be on (1) whether anyone interpreted the pressure spike and containment spray, at the time, in terms of core damage, and (2) who or what was the source of the information that Dieckamp conveyed in the mailgram.

VII. Corporate Organization

Two of the issues the Commission directed the Licensing Board to consider at the hearing are:

> (1) Whether Metropolitan Edison's command and administrative structure, at both the plant and corporate levels, is appropriately organized to assure safe operation of Unit 1;
>
> * * * [and]
>
> (6) whether the relationship between Metropolitan Edison's corporate finance and technical department is such as to prevent financial considerations from having an improper impact upon technical decisions[.]

CLI-80-5, supra, 11 NRC at 408-09. As in the case of Issue 10 (see p. 114, supra), licensee and the staff presented testimony on these subjects, but intervenors did not. In

each instance, the Board resolved the issue favorably to licensee. LBP-81-32, supra, 14 NRC at 412, 518 (¶¶ 67, 401). TMIA's objections to the Board's decision generally parallel those it raised in connection with Issue 10. According to TMIA, the Board erred in resting its decision on only the unreliable, self-serving testimony of licensee and staff witnesses; consequently, its decision does not really resolve either issue. But unlike the case of Issue 10, we disagree with TMIA and find that the Board did a thorough job of developing the record on Issues 1 and 6. Further, it satisfactorily resolved each. See id. at 403-41, 514-18 (¶¶ 46-162, 387-401).

A. Command and Administrative Structure

With respect to the organization of licensee's corporate structure (Issue 1), TMIA's principal point goes to the reliability of the various witnesses.[104] In TMIA's view, NRC staff witnesses Lawrence P. Crocker, Frederick R. Allenspach, Richard R. Keimig, and Donald R. Haverkamp lack the necessary expertise to testify on the proper management structure of a nuclear power plant. TMIA further disputed their objectivity and credibility. BETA consultants William Wegner and Murray E. Miles, called on behalf of licensee,

---

[104] TMIA also accordingly complains about the Board's rejection of TMIA's proposed findings on this topic, which would have found the witnesses unreliable.

assertedly have no management-related experience or training. William S. Lee, President of Duke Power Company and another licensee witness, lacked objectivity and credibility because of "his prominent position in the nuclear industry." TMIA's Brief at 20. TMIA argues that the Board was obliged to inquire beyond their testimony.

The curricula vitarum and testimony of these witnesses refutes TMIA's broad attack. Staff witnesses Crocker and Allenspach conceded they lacked formal management training, but their experience over the years in the military, research, and the AEC/NRC qualifies them to testify on this subject. Tr. 11,990-91. See Resumes of Lawrence P. Crocker and Frederick R. Allenspach, fol. Tr. 12,653.[105] More important, perhaps, is their principal authorship of NUREG-0731, "Guidelines for Utility Management Structure and

---

[105] The same can be said for Keimig and Haverkamp. See Resume of Richard R. Keimig, fol. Tr. 11,946; Resume of Donald R. Haverkamp, fol. Tr. 11,934.

TMIA's treatment of Haverkamp, who at the time of his testimony was a Senior Resident Inspector at TMI, is particularly unjustified. TMIA states that his "objectivity in evaluating GPU's management structure was questioned." TMIA's Brief at 20. The implication is that there was a reason to doubt his objectivity. Review of the portion of the transcript upon which TMIA relies shows no such thing. One of the members of the Licensing Board took the occasion of Haverkamp's appearance as a witness to ask a general question she had "wanted to ask . . . of resident inspectors for a long time -- how does a resident inspector maintain his independence when he is the NRC person on-site amongst many of the utility personnel." Tr. 12,025.

Technical Resources," supra. This report -- still in draft form and prepared in response to the TMI-2 accident -- represents the NRC staff's current guidelines for utility management.

Both the Commission, through its early acknowledgment of the lack of standards in this area, and the Licensing Board, in its recognition of the inherent shortcomings in the NUREG-0731 guidelines, demonstrate that this is new territory to explore. CLI-80-5, supra, 11 NRC at 409-10; LBP-81-32, supra, 14 NRC at 429 (¶ 118). The staff's testimony, however, reflects an earnest effort to look at the right factors -- the experience of numerous utilities, the recommendations of various TMI-2 investigations and studies, and the views of the American Nuclear Society. Tr. 11,984-90.

TMIA's assertion that William Wegner and the other consultants from BETA have no management training or experience is similarly unwarranted. Wegner served for 15 years as Deputy to Admiral Hyman Rickover, Director of the Department of Energy's Division of Naval Reactors. Wegner's responsibilities in that position were extensive. Perhaps most relevant here is that he developed the Navy's senior officer training program, the purpose of which was to prepare commanding officers to manage the engineering operations under their control. Wegner's colleagues at BETA also have impressive credentials that show their expertise

to testify on management issues. See Wegner, fol. Tr. 13,284, Attachment 1.[106]

TMIA questions William Lee's objectivity and credibility because of his prominent position in the nuclear industry. Yet it is that prominent position -- President of Duke Power Company, a recognized leader in the field by virtue of its experience in the design and construction, as well as operation, of commercial nuclear reactors -- that qualifies Lee to testify on the indicia of good management. See, e.g., LBP-81-32, supra, 14 NRC at 408, 430 (¶¶ 56, 120-121).[107] His testimony is favorable to licensee, as one would expect, especially in view of his role assisting Dieckamp soon after the accident. See p. 114, supra. See generally Lee, fol. Tr. 13,251. But we are unable to conclude that his testimony is so inherently biased or incredible as to render it unreliable.

TMIA argues that the Licensing Board should have gone beyond the proffered testimony, but it does not explain what

---

[106] Interestingly, TMIA in a later motion to reopen was more than willing to admit and rely on BETA's expertise. Through that motion, TMIA sought reopening on the basis of a more recent BETA Report, which criticized licensee's management on the basis of efficiency, not safety. See ALAB-738, supra, 18 NRC at 198-99.

[107] We thus distinguish Lee's testimony on management organization from his testimony on Issue 10, licensee's response to the TMI-2 accident, which we found not particularly probative or responsive. See p. 114-15, supra.

more the Board should or could have done. The record clearly shows the Board's active participation in the litigation of Issue 1. It requested licensee's high-level managers to appear and testify at the hearing, it was liberal with regard to the scope of cross-examination, and it questioned the witnesses extensively itself. LBP-81-32, supra, 14 NRC at 401, 431 (¶¶ 41, 125). See, e.g., Tr. 11,537-76, 13,263-81, 13,300-23. Further, the Board doggedly pursued the subsidiary issue of licensee's operational quality assurance program virtually on its own. LBP-81-32, supra, 14 NRC at 424-28 (¶¶ 107-115). Unlike the matters discussed in Section VI above, the Board did not leave open any fruitful areas of inquiry regarding licensee's management structure.

Most of TMIA's criticism of the Board's decision on Issue 1 is thus directed at the source of the evidence supporting that decision, rather than the substance of either the evidence or the decision. TMIA, however, challenges several particular Board findings. The first is that "[i]ndividual members of the management organization appearing before us seemed to have a clear understanding of their responsibilities, limitations, and the resources available to them." Id. at 410 (¶ 59). TMIA claims this is "irrelevant to a conclusion of management competence." TMIA's Brief at 21. TMIA's point has eluded us, for a manager's understanding of his or her responsibilities in

any organization is an integral part of overall management competence. TMIA also contends that the Board's favorable comment on the demeanor of licensee's managers at the hearing is likewise "irrelevant." In this connection, it argues that the Board erred in finding several of these managers competent. Ibid. But the Board's observations about the witnesses' demeanor were entirely appropriate and relevant to -- albeit not controlling on -- the matter of their competence.[108] As the Board explained,

> [c]onsidering the many days spent by some of them under cross-examination, the opportunities to reveal incompetence were abundant, but none of them appear[s] to be incompetent or intellectually unsuited for his assignment. They are very serious about their responsibilities but appear to be confident in their abilities.

LBP-81-32, supra, 14 NRC at 431 (¶ 127).[109]

B. Financial/Technical Relationship

As for Issue 6 -- whether financial considerations can have an improper effect on technical decisions -- TMIA again

---

[108] TMIA's objections to the Board's comments on witness demeanor here are inconsistent with its argument on the role of witness demeanor insofar as Michael Ross is concerned. TMIA's Brief at 33. See p. 34, supra.

[109] As for the four managers TMIA implies are incompetent, Arnold and Herbein are no longer employed by licensee GPU Nuclear (see note 45, supra); we have previously found no basis to question Shovlin's competence (see p. 106, supra); and although we have no basis to find Dieckamp not competent, we have determined that further hearing on the circumstances of his mailgram to Congressman Udall is warranted (see p. 133, supra).

complains that the Board erred in relying exclusively on the assertedly unreliable testimony of licensee and staff witnesses, particularly that of Herman Dieckamp. TMIA questions Dieckamp's statement that safety always takes precedence over economics.[110] It also contends that increased manpower (including in-house technical support) and expenditures, which licensee claims it devotes to TMI, do not necessarily mean safer operation.

We see no basis to disturb the Board's findings on Issue 6. Granted, there was little evidence on this issue (primarily that of Dieckamp), but no intervenor even proposed findings on it.[111] Unquestionably, Dieckamp's testimony is favorable to licensee, and not surprisingly so. That alone, however, does not render it unreliable. We have reviewed his statement and conclude, as did the Licensing Board, that there are enough "checks and balances" within

---

[110] According to TMIA, Dieckamp's statement in this regard conflicts with the evidence on licensee's "excessive" overtime practice. TMIA's Brief at 22. But as discussed at pp. 110-13, supra, licensee's past overtime practice was not found to be excessive, and, for the future, overtime will be permitted only in accordance with Generic Letter No. 82-12.

[111] The Board correctly noted that the limited attention devoted to this by the staff was neither "adequately helpful," nor "entirely correct." The Board did, however, accept the staff's assessment that financial considerations would not unduly influence licensee's technical decisions. LBP-81-32, supra, 14 NRC at 514-15 (¶¶ 389-390). See Staff Exh. 4, NUREG-0680 (Supp. 1), at 26-27.

the GPU budget process to assure that economics will not unduly affect technical necessity. Id. at 515-18 (¶¶ 392-400). See Dieckamp, fol. Tr. 13,437. We would agree with TMIA that increased manpower and expenditures do not necessarily guarantee that safety is licensee's paramount concern. On the other hand, as the Licensing Board recognized, it is some evidence of GPU's willingness to meet "the unique demands of its nuclear obligations." LBP-81-32, supra, 14 NRC at 518 (¶ 400). Moreover, the resolution of this issue must be viewed in the context of licensee's commitments and actions in the many other areas examined in this proceeding. We see no evidence on this record, and TMIA points to none, that would suggest that licensee has sacrificed the public health and safety for the sake of economy. But see Board Notification BN-83-152, supra note 97, at 2, and p. 157, infra.

VIII. Procedural Objections

Intervenors have raised a number of objections to the manner in which the hearing below was conducted. We have already addressed some of those objections in the context of particular issues to which they pertain. See, e.g., pp. 88-95, supra. We now turn to intervenors' remaining procedural complaints.

A. Intervenors' Lack of Resources

TMIA charges that the hearing process was a "fiasco." TMIA's Brief at 3. It stresses the wide imbalance of

resources between it, on the one hand, and licensee and the staff, on the other. In TMIA's view, the Licensing Board showed a "callous disregard" for its hardships and made no attempt to assist it. Id. at 2, 3.

TMIA's criticism of the Board and hearing process is simply not warranted. We have noted at numerous instances throughout this decision the Board's sensitivity to intervenors' lack of funds and expertise, as well as its active participation in assuring the fullest possible development of the record on almost all issues. But the fact of the matter is, the Board could do no more. In CLI-80-19, 11 NRC 700 (1980), the Commission (reluctantly) denied a specific request for intervenor funding in this case on the basis of advice from the Comptroller General and its own understanding of the appropriations legislation for fiscal year 1980. A subsequent Comptroller General letter decision, No. B-200585 (December 3, 1980), concluded that the fiscal year 1981 appropriations legislation for the NRC precluded intervenor assistance. Accordingly, the Commission Chairman directed that any such assistance cease, including the provision of free hearing transcripts. See Houston Lighting and Power Co. (Allens Creek Nuclear Generating Station, Unit No. 1), ALAB-625, 13 NRC 13, 14-15 (1981). Thus, the Board was prohibited by law from

"balancing" the resources of the parties. The very length of the record and the myriad Licensing Board and Appeal Board decisions in this proceeding, however, are testament to the meaningful role intervenors were permitted to play, and did in fact play.

B. Pace of the Hearing

Both TMIA and the Aamodts complain in general terms that the pace of discovery and the hearing itself (especially on the cheating matter) was too fast. But they provide no specifics to aid our review of their claim. For our part, we can only observe that the hearing stretched over a period of many months and seemingly adequate opportunity for discovery was provided. We also note again that, except for the specific areas identified in this decision, the record is fully developed and shows substantial participation by intervenors in cross-examination of many licensee and staff witnesses. Despite their admittedly limited resources, intervenors nevertheless appear to have kept "up to speed" for much of the hearing, suggesting that the pace was not unfairly rigorous.

The Aamodts complain further that they have been prejudiced by an oral ruling of the Licensing Board on January 18, 1982. That ruling denied them an extension of time in which to supplement their proposed findings on the cheating incidents. Aamodt Brief at 32. Again, we are

denied the specific dimensions of their argument. The record, however, reflects the following. All parties had agreed upon a schedule for filing proposed findings. Because they had not obtained access to all transcripts as promptly as they anticipated, the Aamodts sought and obtained from the Board (acting on behalf of the Special Master) two extensions of time to file. The Board, however, denied a further extension request. The Aamodts thus filed some findings but subsequently sought to file others. The Special Master denied the latter attempt, finding no good cause for their delay. The Aamodts tried once more, and again the Special Master found no basis to accept the late material. See Special Master Memorandum and Order of February 11, 1982 (unpublished); Special Master Memorandum and Order of April 14, 1982 (unpublished); Aamodt Proposed Findings (January 18, 1982) at 19-20.

The Aamodts have provided us with no reason to overturn these several Board and Special Master rulings. They had ample opportunity to plead their cause below and did not succeed. Further, they have failed on appeal to show or explain how they have in fact been prejudiced.[112]

---

[112] We note that the proposed findings were directed to the Special Master, whose decision was in large part compatible with the Aamodts' view of the reopened hearing on cheating.

Although it does not relate directly to the pace of the hearing, the Aamodts also complain that the public address system at some hearing sessions was "prejudicial" to members of the public. Aamodt Brief at 30. Although the Aamodts provide no particular citations to the record or evidence of such prejudice, the transcript shows an appropriate degree of sensitivity by the Board to this issue. See, e.g., Tr. 12,141-42. Appellate review can effectively provide no more. It is, of course, the hearing participants' obligation to alert boards to this type of problem at the time it occurs. It must be remembered, however, that the tradeoff for holding hearings near the reactor site is that the hearing facilities may well be less than optimum.

C. The Sequestration Order

During the reopened hearing on cheating, the Special Master issued a sequestration order at the request of some parties. The general purpose of the order was to prevent witnesses presently or formerly employed by licensee from discussing their testimony with one another. Tr. 23,532. The order thus provided that, except for certain exceptions not pertinent here, no prospective witness was to be in the hearing room while another witness was testifying. Such witnesses were also precluded from discussing before or after their testimony certain specified matters concerning the examination process. Special Master Sequestration Order of November 12, 1981 (unpublished).

On the last day of the hearing, the Aamodts orally moved to stay the hearing pending a separate evidentiary hearing on certain contacts between licensee's counsel and two licensee witnesses, allegedly in violation of the sequestration order. See Tr. 26,712-13. The Aamodts contended that this was evidence of what they believed was a pattern of improper coaching of witnesses by licensee's counsel. They inferred such coaching because many of licensee's witnesses were not, in their opinion, forthcoming in their testimony. Licensee, the staff, and the Commonwealth opposed the motion. Licensee's counsel vigorously denied the charges of impropriety. He claimed that the discussion with two licensee witnesses about the unexpected testimony of an NRC staff witness did not constitute a breach of the order.[113]

The Special Master denied the Aamodts' motion. Although he himself was disappointed in the quality of much of the testimony, he found no evidence of a pattern of improper witness coaching. He also concluded that licensee's counsel had acted on a good faith interpretation of the sequestration order. Tr. 26,788-99. A month later, the Aamodts sought reconsideration, and the Special Master

---

[113] The testimony concerned the incident involving Husted and P, discussed briefly at pp. 40-41, supra.

denied that as well. He determined that the relief requested -- a stay and collateral proceeding -- was disproportionate to the limited fact of counsel's one communication. The Special Master confirmed his views that there was no violation of the literal terms of the sequestration order, and that counsel had acted out of a good faith desire to obtain information useful in cross-examination of a staff witness who had provided direct testimony not previously revealed during discovery. Special Master Memorandum and Order of February 9, 1982 (unpublished).

The Aamodts argue on appeal that licensee violated the spirit, if not the letter, of the sequestration order, and that the Special Master's ruling was thus in error. We find no error in the Special Master's ruling. Clearly, there was no literal violation of the order, as the Aamodts concede. We are also inclined to find no violation of the spirit of the order. There is nothing in the discussions surrounding the adoption of the order that suggests the parties contemplated its application to the preparation of licensee's counsel for cross-examination of a staff witness. See, e.g., Tr. 23,532-55, 23,838-59, 23,910-11. On the other hand, those same discussions show the desire of licensee's counsel to comply with the letter and spirit of the order, while at the same time fulfilling his professional responsibilities to his client. Ibid. But

even if the action of licensee's counsel could reasonably be construed as contrary to the intent of the order, we believe the Special Master's measured response was appropriate. Licensee's counsel was bound by his own ethical obligations to prepare for cross-examination of the staff witness on his "surprise" testimony. Had that testimony been revealed in discovery or in a prefiled direct statement, licensee's counsel surely could have prepared for cross-examination by discussing it with his own witnesses. There is also no evidence of more than one such instance, or any real indication that counsel improperly coached any witness. See generally Consumers Power Co. (Midland Plant, Units 1 and 2), ALAB-691, 16 NRC 897, 918-19 (1982), reviewed declined, CLI-83-2, supra, 17 NRC 69 (1983). The Special Master thus rightly concluded that counsel had acted in good faith and no further inquiry or sanction is warranted.

IX. Motion to Reopen: Leak Rate Falsification at TMI-1

The final matter before us at this juncture is the Aamodts' motion to reopen the record to examine allegations of falsification of leak rate data at TMI-1. In ALAB-738, supra, we granted motions to reopen, filed by both TMIA and the Aamodts, for hearing on similar allegations concerning TMI-2 (the Hartman allegations) and remanded the matter to the Licensing Board. See 18 NRC at 183-92 for a discussion

of the allegations and our disposition of the motions.[114] Soon thereafter, we received a series of Board Notifications, in which the staff concluded, contrary to its earlier position in Staff Exh. 13, NUREG-0680 (Supp. No. 2), at 9-10, that there were indications of the same practices concerning leak rate testing at Unit 1 as had been discovered at Unit 2. See Board Notifications BN-83-138 (September 2, 1983); BN-83-138A (September 23, 1983); BN-83-138B (October 6, 1983); BN-83-138C (October 25, 1983). See also LBP-81-32 supra, 14 NRC at 557 (¶¶ 504-506). On January 24, 1984, not long after oral argument of these appeals, the Aamodts moved to reopen, primarily on the basis of these Board Notifications and their underlying documents.

UCS supports the Aamodts' motion.[115] The staff also supports it, on alternative theories. The staff believes that the issue of leak rate testing irregularities at TMI-1

---

[114] Although no party sought review of our decision, the Commission has indefinitely stayed that hearing. Commission Order of October 7, 1983, supra. One month later, a federal Grand Jury handed down an 11-count criminal indictment against licensee's corporate predecessor, Metropolitan Edison, in connection with the Hartman allegations. On February 28, 1984, Met Ed pleaded guilty to one count and no contest to six others. The remaining four counts were dismissed on the U.S. Attorney's recommendation. The company was fined and ordered to establish a $1 million fund for emergency planning. Notice to Commission, et al. (March 2, 1984), Attachment (Plea Agreement).

[115] TMIA filed no response to it.

is within the scope of the reopened hearing we have already ordered on the Hartman allegations. In the alternative, it argues that the Aamodts' motion meets the standards for reopening as we applied them in ALAB-738. Licensee opposes the Aamodts' motion solely on the basis that they have not met their considerable burden of showing that a different result might have been reached had this information been considered initially. Licensee's Response to Aamodt Motion (February 8, 1984) at 4.[116] Licensee contends that the Board Notifications do not contain sufficient facts to provide a basis for reopening. It thus urges us to await the outcome of the investigations that the staff indicated in the Board Notifications were under way. Id. at 3-4. Curiously, however, licensee volunteers that it was prepared to litigate Unit 1 leak rate testing practices at the reopened hearing on the Hartman allegations. Id. at 2.

We grant the Aamodts' motion and remand this matter to the Licensing Board for hearing. We note at the outset that we cannot agree with the staff's belief that alleged falsification of leak rate data at TMI-1 is encompassed within the reopened hearing on the Hartman allegations. To

---

[116] Thus, no party challenges the other two criteria considered for reopening -- the timeliness of the Aamodts' motion or the significance of the matter it raises. See Diablo Canyon, supra, 11 NRC at 879.

be sure, the matters are closely related. Hartman's allegations, however, were expressly limited to Unit 2.[117] We also noted differences in the classifications of the leakage pathways for the two units. ALAB-738, supra, 18 NRC at 192 n.30. Thus, there would have been no basis at that time for our reopening the record to explore leak rate practices at both units.

But now the staff has brought to our attention, through its Board Notifications, its actual change in position with regard to Unit 1 from that originally stated in Staff Exh. 13, NUREG-0680 (Supp. No. 2). We explained in ALAB-738, supra, 18 NRC at 189-90, our belief that, because the Licensing Board made its management competence decision subject to the then-ongoing Department of Justice investigation into the Hartman allegations referenced in NUREG-0680, it effectively determined that consideration of that matter might well have made a difference in the outcome.[118] The same necessarily follows for the new allegations concerning leak rate practices at TMI-1.

---

[117] During an interview, in fact, Hartman stated his belief that the operators at Unit 1 never had any problem getting "good" leak rate data. Faegre & Benson Report, Vol. Four, Hartman Interview at 76.

[118] Interestingly, licensee did not argue that intervenors failed to meet their burden on this point in their motions to reopen on the Hartman allegations. See ALAB-738, supra, 18 NRC at 189 n.20.

Indeed, as the staff notes, the implications of the new allegations are potentially more significant, inasmuch as they involve the very unit that is the subject of this restart proceeding. See NRC Staff's Answer to Aamodt Motion (February 9, 1984) at 5 n.3.

Our decision to grant the Aamodts' Motion is only reinforced by the Investigative Reports (# 1-83-028 and supplement) and underlying documents recently served on the parties and us.[119] The overall conclusion of the reports is favorable to licensee: neither a systematic pattern of falsification nor a motive to falsify the leak rate data was discovered. On the other hand, the reports disclosed (1) a lack of understanding concerning record keeping requirements; (2) ignorance (over a period of several years) by both operating staff and management of the existence and significance for leak rate calculations of a "loop seal" in the instrumentation system; and (3) inattention during the pre-accident period to work requests that would have highlighted the loop seal problem. These reports and documents are not before us as evidence. But we believe they are the type of material that is best scrutinized by the Licensing Board as part of its review of all of the

---

[119] These are the reports that licensee requested we await before ruling on the Aamodts' motion.

circumstances surrounding the leak rate testing practices at Unit 1. Licensee was prepared to address this matter at the reopened hearing. See p. 151, supra. Hence, it is logical that the Licensing Board consider it in conjunction with the hearing we have ordered on the Hartman allegations.[120]

X. Summary and Conclusions

We have considered all the myriad arguments raised on appeal and have reviewed the extensive record.[121] Many of those arguments are without merit. Others have been essentially mooted by the passage of time, personnel changes, or superseding regulatory requirements. But in

---

[120] Licensee has informed us that it has commissioned its own investigation on leak rate measurement practices at TMI-1 and TMI-2. Letter from D.B. Bauser to Appeal Board (February 7, 1984). Presumably, it would introduce the results of that inquiry into evidence at the hearing.

[121] Many of the points raised by intervenors were not properly preserved for appeal, not fully developed, not supported by citations to the record, or based on references to the record or other authority that did not support the points for which they were cited. Nonetheless, we have endeavored in this opinion to discuss specifically all discernible arguments. Those not addressed are without merit.

We also stress that the Licensing Board and Special Master issued a total of three very comprehensive, well written, and well organized opinions and numerous orders solely on management issues. There was thus no need for our own recitation of all the facts developed at the hearing, especially on issues not the subject of any appeal. That is not to say, however, that we have failed to abide by our commitment in ALAB-685, 16 NRC 449, 451-52 (1982), to consider the whole record. Matters not specifically addressed, in our view, do not warrant corrective action.

several important areas, we agree with intervenors that the record does not support the Licensing Board's favorable findings concerning licensee's management of TMI-1. We therefore find it necessary to remand this proceeding to that Board for further record development in those areas.

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,[122] 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

---

[122] Subject to a few exceptions, we are also in general agreement with most of the Board's findings regarding the various individuals implicated in the cheating. We support the conditions imposed by the Board in that regard and expect licensee to abide by the commitments reflected in its agreement with the Commonwealth.

A related development subsequent to the Board's decision on cheating -- the promotion of Charles Husted -- warrants the imposition of another condition. The record, in our view, gives us cause to question licensee's judgment in this matter. We therefore require that licensee not delegate any supervisory responsibilities to Husted insofar as the training of non-licensed personnel is concerned.

have sought further testimony, in light of the cheating incidents, from the OARP Review Committee, whose views the Board previously found so persuasive.

Another important area where the record is not as complete as it should be concerns the response of licensee's management to the TMI-2 accident. The Board was obliged to pursue this Commission-mandated issue as thoroughly as possible. To the extent that it did not satisfactorily resolve questions concerning the actions of Gary Miller and John Herbein in the flow of information the day of the accident, it erred. But because neither is now employed by licensee, we see no useful purpose in pursuing the matter at a further hearing. The record on this issue is also incomplete with regard to the circumstances surrounding a mailgram sent by GPU President Herman Dieckamp to Congressman Morris Udall. The Board's reliance on the NRC staff's assessment of this matter was not justified; the Board should have inquired more deeply on its own. Because Dieckamp remains an important corporate official, we believe the matter must be further explored, and accordingly we remand to the Board for additional hearing on this limited issue.

We are also persuaded that the record should be reopened for hearing on the allegations of improper leak rate practices at TMI-1. As we previously concluded in ALAB-738, supra, with regard to similar allegations at

TMI-2, these charges raise significant questions that may well have affected the Licensing Board's management decision, had it been fully apprised of the facts at the time.

We have several concluding observations. Appellate review requires us to base our judgment on the adjudicatory record, though we have not been reluctant to take note of newly supplied, essentially "objective" information that served to clarify a point or moot an issue. We are, of course, aware of several recent reports that are generally favorable to licensee's restructured, new management.[123] But these and other such subjective documents are not evidence and thus have not been fairly tested through litigation. We are likewise aware of several ongoing investigations by the NRC that cast a shadow over the record on several issues before us -- for example, the effect of financial considerations on technical judgments. See Board Notification BN-83-152, supra, Enclosure (NUREG-1020, Vol. 1, at 10-1 to 10-24). But unresolved allegations similarly cannot supply a reasoned basis for a decision. We

---

[123] Examples are the November 1983 report by Admiral Rickover, "An Assessment of the GPU Nuclear Corporation Organization and Senior Management and Its Competence to Operate TMI-1," and the NRC Staff's most recent Systematic Assessment of Licensee Performance (SALP Board Report) (April 2, 1984).

previously reopened the record in this proceeding for hearing on the Hartman allegations, and we further reopen here on related charges. Moreover, we find it necessary to remand for additional hearing before the Licensing Board on several important issues, including training. In sum, what we said in ALAB-738, supra, still holds true: "we cannot make any final judgment on appeal as to licensee's management competence and integrity without an adequate record." 18 NRC at 190. From our perspective, the final chapters of this proceeding are yet to be written.

This proceeding is reopened and remanded to the Licensing Board for further hearing in accordance with this opinion.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the
Appeal Board

Appendix A

Specific management competence issues (CLI-80-5, supra, 11 NRC at 408-09):

(1) Whether Metropolitan Edison's command and administrative structure, at both the plant and corporate levels, is appropriately organized to assure safe operation of Unit 1;

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

(3) [w]hat are the views of the NRC inspectors regarding the quality of the management of TMI Unit 1 and the corporate management, staffing, organization and resources of Metropolitan Edison;

(4) whether the Unit 1 Health Physics program is appropriately organized and staffed with qualified individuals to ensure the safe operation of the facility;

(5) whether the Unit 1 Radiation Waste system is appropriately staffed with qualified individuals to ensure the safe operation of the facility;

(6) whether the relationship between Metropolitan Edison's corporate finance and technical departments is such as to prevent financial considerations from having an improper impact upon technical decisions;

(7) whether Metropolitan Edison has made adequate provision for groups of qualified individuals to provide safety review of and operational advice regarding Unit 1;

(8) what, if any, conclusions regarding Metropolitan Edison's ability to operate Unit 1 safely can be drawn from a comparison of the number and type of past infractions of NRC regulations attributable to the Three Mile Island Units with industry-wide infraction statistics;

(9) what, if any, conclusions regarding Metropolitan Edison's ability to operate Unit 1 safely can be drawn from a comparison of the number and type of past Licensee Event Reports ("LER") and the licensee's operating experience at the Three Mile Island Units

with industry-wide statistics on LER's and operating experience;

(10) whether the actions of Metropolitan Edison's corporate or plant management (or any part or individual member thereof) in connection with the accident at Unit 2 reveal deficiencies in the corporate or plant management that must be corrected before Unit 1 can be operated safely;

(11) whether Metropolitan Edison possesses sufficient in-house technical capability to ensure the simultaneous safe operation of Unit 1 and clean-up Unit 2. If Metropolitan Edison possesses insufficient technical resources, the Board should examine arrangements, if any, which Metropolitan Edison has made with its vendor and architect-engineer to supply the necessary technical expertise;

(12) whether Metropolitan Edison possesses the financial resources necessary to safely operate Unit 1 in addition to cleaning up Unit 2;* and

(13) such other specific issues as the Board deems relevant to the resolution of the issues set forth in this order.

---

* The Commission later eliminated this as an issue for consideration at hearing. CLI-81-3, 13 NRC 291, 296-97 (1981).

Appendix B

Specific issues in the reopened proceeding on cheating (Licensing Board Memorandum and Order of October 14, 1981 (unpublished), supra, at 2-4):

1. The extent of cheating by TMI-1 operator license candidates on the NRC license examinations in April 1981, and on any other Licensee- or NRC-administered examinations, including but not limited to the following: the Kelly examinations (including Category T) in April 1980; Category T make-up examinations subsequently administered by the company; the ATTS mock examinations in early April 1981; and such other examinations as the Special Master shall deem relevant. These latter shall include any other Licensee-administered qualification or mock exam or NRC-administered exam since the accident at TMI-2.

2. The adequacy of the Staff's investigation of, and NRC response to, the cheating incident and rumors of cheating in the April 1981 NRC examinations.

3. The adequacy of Licensee's investigation of, and Licensee's response to, cheating or possible cheating in the examinations listed in Issue 1 above.

4. [Issue 4 has been combined with Issue 3.]

5. The extent of Licensee management knowledge of, encouragement of, negligent failure to prevent, and/or involvement in cheating in the above mentioned NRC and Licensee examinations.

6. The existence and extent of Licensee management involvement in cheating as alleged by the Aamodts in paragraph 7 in response to the Board's Order of August 20, 1981.

7. The existence and extent of Licensee management constraints on the NRC investigation of cheating and rumors of cheating in the NRC April 1981 examinations.

8. The adequacy of Licensee management response to the incident in July 1979 referred to in the IE investigation report and involving one of the two operators terminated as a result of cheating on the NRC April 1981 examinations.

9. The adequacy of Licensee's plans for improving the administration of future Licensee qualification examinations for licensed operators and candidates for operator licenses, including the need for independent administration and grading of such examinations.

10. The adequacy of the administration of NRC licensing examinations for TMI-1 personnel, including proctoring, grading, and safeguarding the integrity of examination materials; the adequacy of the Staff's review of the administration of Licensee's Category T examinations; and the adequacy of the Staff's plan for retesting operators and monitoring its NRC examinations to assure proper adherence to NRC testing requirements in order to assure that the purposes of the NRC examinations, because of the nature of the questions, cannot be defeated by cheating, the use of crib sheets, undue coaching or other evasive devices.

11. The potential impact of NRC examinations, including retests, and operator terminations on the adequacy of staffing of TMI-1 operations.

12. The sufficiency of management criteria and procedures for certification of operator license candidates to the NRC with respect to the integrity of such candidates and the sufficiency of the procedures with respect to the competence of such candidates.

Appendix C

TMIA's contention 5, in its final form, states (LBP-81-32, supra, 14 NRC at 479):

> It is contended that Licensee has pursued a course of conduct that is in violation of 10 CFR 50.57, 10 CFR 50.40, 10 CFR 50.36, 10 CFR 50.71 and 10 CFR 50 Appendix B, thereby demonstrating that Licensee is not "technically . . . qualified to" operate TMI Unit 1 "without endangering the health and safety of the public." This course of conduct includes:
>
> a. deferring safety-related maintenance and repair beyond the point established by its own procedures (see, e.g. A.P. 1407);
>
> b. disregarding the importance of safety-related maintenance in safely operating a nuclear plant in that it:
>
> 1. [deleted]
>
> 2. proposed a drastic cut in the maintenance budget;
>
> 3. [deleted]
>
> 4. fails to keep accurate and complete maintenance records related to safety items;
>
> 5. has inadequate and understaffed QA/QC programs related to maintenance;
>
> 6. extensively uses overtime in performing safety-related maintenance.