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# NUCLEAR REGULATORY COMMISSION ISSUANCES

## March 1984

This report includes the issuances received during the specified period from the Commission (CLI), the Atomic Safety and Licensing Appeal Boards (ALAB), the Atomic Safety and Licensing Boards (LBP), the Administrative Law Judge (ALJ), the Directors' Decisions (DD), and the Denials of Petitions for Rulemaking (DPRM).

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

U.S. NUCLEAR REGULATORY COMMISSION

Prepared by the Division of Technical Information and Document Control,
Office of Administration, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555
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## COMMISSIONERS

Nunzio J. Palladino, Chairman
Victor Gilinsky
Thomas M. Roberts
James K. Asselstine
Frederick M. Bernthal

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Alan S. Rosenthal, Chairman, Atomic Safety and Licensing Appeal Panel
B. Paul Cotter, Chairman, Atomic Safety and Licensing Board Panel

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# Commission Issuances

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**COMMISSIONERS:**

**Nunzio J. Palladino**, Chairman
**Victor Gilinsky**
**Thomas M. Roberts**
**James K. Asselstine**
**Frederick M. Bernthal**

**In the Matter of** **Docket No. 50-289-SP**

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

**March 28, 1984**

In response to an Appeal Board memorandum (ALAB-724, 17 NRC 559 (1983)), concerning the treatment to be accorded the issues raised in a Board Notification (BN-83-47), the Commission decides that the issue of whether the power-operated relief valve should be safety-grade, because of the potential for using it to mitigate the consequences of design basis steam generator tube accidents, has no reasonable nexus to the TMI-2 accident and is, therefore, outside the scope of the proceeding. The Commission also decides that the information in the Board Notification is not significant enough to warrant reopening the record *sua sponte*, even if it were within the scope of the proceeding.

## TECHNICAL ISSUE DISCUSSED

Uses of power-operated relief valve in depressurization in the event of a steam generator tube rupture.

# MEMORANDUM AND ORDER

On August 5, 1983, the Commission took review of that aspect of ALAB-724 (17 NRC 559 (1983)) which concerned Board Notification (BN) 83-47[1] and whether the power-operated relief valve (PORV) should be safety-grade because of the potential for using it to mitigate the consequences of design basis steam generator tube rupture (SGTR) accidents.[2] In particular, the Commission requested the parties to brief (1) whether the concerns raised by BN-83-47 are outside the scope of the TMI-1 adjudicatory proceeding, and (2) whether, if they are within the scope of the proceeding, the information contained in BN-83-47 warrants reopening the record *sua sponte*. The Union of Concerned Scientists (UCS), the licensee and the NRC staff filed briefs addressing these two questions. As explained below, the Commission has concluded that the concerns raised by BN-83-47 are outside the scope of the restart proceeding, and, even if they were not, that they do not warrant reopening the record.

## I. WHETHER THE CONCERNS RAISED BY BN-83-47 ARE WITHIN THE SCOPE OF THE RESTART PROCEEDING

### A. The Scope of the Restart Proceeding

The Commission, in the order establishing the restart proceeding, set forth the subjects to be considered at the hearing as follows:

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[1] In BN-83-47 the staff concluded that PWRs need "a capability for rapid primary system depressurization . . . in order to effectively mitigate the design basis steam generator tube rupture accident" by terminating long-term releases to the environment, and that "the components and systems to provide this depressurization capability should be safety-grade." As staff explained, where reactor coolant pump (RCP) flow is lost, Westinghouse and B&W plants rely on the pressurizer PORVs to accomplish depressurization, and the pressurizer PORVs in most plants are not safety-grade. Although staff further indicated that the depressurization function could be accomplished by the auxiliary pressurizer spray system, staff stated in BN-83-47 that the spray system is not safety-grade at TMI and, regardless, "the pressurizer PORV would be the preferred means of depressurizing the [reactor coolant system]." Staff qualified its analyses by indicating that these requirements only applied to reactors undergoing OL review and that the significance of BN-83-47 and possible corrective actions for operating reactors is yet to be determined.

Subsequently, in BN-83-110 staff clarified its position by indicating that there may be means short of meeting safety-grade design criteria for the PORV by which a licensee may justify the acceptability of its depressurization capability in the face of a design basis steam generator tube rupture event.

[2] The Appeal Board in ALAB-724 identified to the Commission two safety concerns which it believed were outside the scope of the proceeding: (1) whether the PORV should be safety-grade because of the potential for using it to mitigate the consequences of design basis SGTR accidents; and (2) a corrosion problem with the PORVs that could result in the PORV not functioning when needed.

(1) Whether the "short-term actions" recommended by the Director of Nuclear Reactor Regulation (set forth in Section II of this Order) are necessary and sufficient to provide reasonable assurance that the Three Mile Island Unit 1 facility can be operated without endangering the health and safety of the public, and should be required before resumption of operation should be permitted.
(2) Whether the "long-term actions" recommended by the Director of Nuclear Reactor Regulation (set forth in Section II of this Order) are necessary and sufficient to provide reasonable assurance that the facility can be operated for the long term without endangering the health and safety of the public, and should be required of the licensee as soon as practicable.

CLI-79-8, 10 NRC 141, 148 (1979).

The Licensing Board discussed the scope of the proceeding in its first special prehearing conference order, LBP-79-34, 10 NRC 828 (1979). In that order the Licensing Board rejected the licensee's argument that it could consider only the individual factual issues expressly stated in the Commission's August 9 order, or in the documents referenced in that order. The Licensing Board did agree with the licensee "that the Commission did not mean to encompass in this proceeding all of the lessons which have been, or some day may be learned from the TMI-2 accident." *Id.* at 830. The Licensing Board also rejected the argument of several intervenors that any issue pertaining to health and safety could be appropriately litigated in the hearing.

The Licensing Board found that it could accept either UCS' or the staff's view on the scope of the proceeding as reasonable. Staff had suggested that the scope should be governed by whether there was a clear and close analogue and/or some reasonable nexus between the issue sought to be raised and the TMI-2 accident. UCS had argued that the test was whether the issue raised can be related to both the TMI-2 accident and whether TMI-1 can be safely operated without posing an undue threat to the public health and safety.

Without explicitly setting forth a standard, the Board in its prehearing conference order noted that the problem was in applying the test once it is defined. The Board went on to discuss proposed contentions which started from an example related to the TMI-2 accident and from there sought to enlarge the scope of the example to embrace all possibilities in the class of events or circumstances represented by the example. For those contentions the Board stated the following:

> This class of contentions has been difficult to evaluate. On one hand we do not expect intervenors now to be able to specify each circumstance related to the TMI-2 accident which should be considered, nor do we believe that only these system components alleged to have contributed directly to the accident may now be considered. On the other hand, practical evidentiary considerations and due process require that there be some reasonable bounding of the example-type contentions.

> Frequently we have permitted a broadening of the contention to include the class of system components in the major safety system involved, most often the core cooling system and the containment isolation system. However, intervenors must be aware that this broadening may not produce the showing sought by the contention. The specificity of the contention will necessarily shape the specificity of the evidence produced in response. The discovery process should be used to refine these contentions so that only those circumstances reasonably related to the accident are identified for hearing.

10 NRC at 832.

The Commission in subsequent orders confirmed that the restart proceeding was not limited to the issues set forth in the original order (*see, e.g.*, CLI-80-16, 11 NRC 674), and that the test for admissibility was whether "there is a reasonable nexus between the issue and the TMI-2 accident." Unpublished order of March 14, 1980. This standard that contentions must have a reasonable nexus to the TMI-2 accident was repeated throughout the proceeding (*see, e.g.*, 14 NRC at 394), and was interpreted to include safety questions having a nexus to a small-break LOCA or a loss of main feedwater. *See, e.g.*, ALAB-729, 17 NRC 814, 822 n.7 (1983). The Licensing Board explained that this standard "is based on the facts that TMI-1 was reviewed and approved at the operating license stage and that, but for the accident, we would not be involved in this particular proceeding." 14 NRC at 1730.

### B. Parties' Positions

All parties agree that the standard for whether the issues raised by BN-83-47 are within the proceeding is whether they have a reasonable "nexus" to the TMI-2 accident. The parties disagree, however, on what constitutes a reasonable nexus to the accident and on whether the information in BN-83-47 has such a nexus.

#### *1. Union of Concerned Scientists (UCS)*

UCS argues that the material in BN-83-47 is within the proceeding under two key interrelated theories.[3] First, UCS states that the nexus standard is not limited to small-break LOCAs and loss-of-main-feedwater transients, rather that the nexus standard includes the lessons learned from the accident. UCS maintains that one such lesson learned

[3] UCS in addition to its two main theories also argues: (1) It is not clear that the TMI-2 accident did not involve an SGTR; and (2) the scope of the restart proceeding included consideration of the capability to limit doses to ensure compliance with 10 C.F.R. Part 100 criteria, the subject of BN-83-47.

concerns the role of equipment previously treated as unrelated to safety in the causation and mitigation of accidents, and that under this lesson the PORV should be safety-grade. UCS argues that BN-83-47 falls within this lesson learned and thus is within the proceeding.

Second, UCS maintains that BN-83-47 is within the proceeding because it relates to the three contexts in the restart proceeding in which the issue of whether the PORV needs to be safety-grade was litigated. The first context cited by UCS is its Contention 5.[4] UCS argues that the nexus of Contention 5 to the accident was the lesson learned that systems previously considered unrelated to safety do perform safety functions. In this connection UCS argued there were six functions of the PORV, two used to control coolant pressure, that required that it be safety-grade. In UCS' view, the information in BN-83-47 relates to a seventh function of the PORV requiring that it be safety-grade.

The second context cited by UCS concerns whether "feed and bleed" is an acceptable means of cooling the core. UCS attempted in the proceeding to show the pressurizer safety valves cannot be used to "bleed" in the event of an SGTR, and therefore that the PORV must be safety-grade.

The third context discussed by UCS involves UCS Contention 14, which asserted that systems which can be called upon to mitigate accidents should be required to meet safety-grade criteria.[5] UCS states that staff's position in response to this contention was that only systems or components required to perform critical functions — *e.g.*, to shut down the reactor or mitigate accidents — need be safety-grade. UCS maintains that BN-83-47 discloses that the PORV must be safety-grade because it is required to perform both of these functions, and, consistent with staff's own testimony, the Licensing Board therefore would have had to require that the PORV be safety-grade if BN-83-47 had been before the Board.

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[4] UCS Contention 5 in part stated:

> Proper operation of power-operated relief valves, associated block valves and the instruments and controls for these valves is essential to mitigate the consequences of accidents. In addition, their failure can cause or aggravate a LOCA. Therefore, these valves must be classified as components important to safety and required to meet all safety-grade design criteria.

[5] UCS Contention 14 in part read as follows:

> The accident demonstrated that there are systems and components presently classified as non-safety-related which can have an adverse effect on the integrity of the core because they can directly or indirectly affect temperature, pressure, flow and/or reactivity. . . . The Staff proposed to study the problem further. This is not a sufficient answer. All systems and components which can either cause or aggravate an accident or can be called upon to mitigate an accident must be identified and classified as components important to safety and required to meet all safety-grade criteria.

### 2. *Licensee*

Licensee maintains that the reasonable nexus standard means having a nexus to an accident involving a loss of main feedwater or small-break loss-of-coolant accident. Licensee argues that SGTR accidents and the need for rapid primary system depressurization capability, the subjects of BN-83-47, are unrelated to the accident. Licensee states that the only issues relating to the operability of the PORV raised in connection with the accident were concerned with the role of the PORV in causing, aggravating and mitigating a small-break LOCA. The capability to depressurize rapidly so as not to exceed Part 100 dose criteria is not among the PORV concerns which rose from the TMI-2 accident.

Licensee notes that no party raised a contention on the adequacy of the PORV or any other components or systems to mitigate SGTR events, and UCS did not advance SGTR events as a basis for its Contention 5. Licensee further notes that the Licensing Board accepted staff's analysis of event sequences as including all sequences with a nexus to the TMI-2 accident, and that analysis did not include SGTR events.

Finally, Licensee, citing *Rulemaking Hearing, Acceptance Criteria for Emergency Core Cooling Systems for Light-Water-Cooled Nuclear Power Reactors*, CLI-73-39, 6 AEC 1085, 1087 (1973), argues that SGTR accidents have not been treated as small-break loss-of-coolant accidents.

### 3. *Staff*

Staff asserts that no party in its contentions sought to raise any issue related to an SGTR accident. Staff further asserts that the restart proceeding included only issues related to the capability to cool the core adequately following a small-break LOCA and/or main feedwater transient, and that the concern of BN-83-47 at bottom is a concern about potential offsite doses that may result from failure to limit primary-to-secondary coolant loss through timely termination of the leakage.

## C. Analysis

The restart proceeding is an enforcement proceeding which is being held because of the TMI-2 accident. The purpose of this proceeding is not to litigate the overall safety of TMI-1, but rather to resolve questions arising from the accident. Thus, the issue presented here is whether the concerns raised by BN-83-47 have a reasonable nexus to the TMI-2 accident.

The basic concern in BN-83-47 is restricting primary-to-secondary leakage in the steam generator in order to avoid exceeding Part 100 dose criteria in the event of an SGTR; BN-83-47 does not address the possibility of uncovering the core or of leakage into the containment. Although the restart proceeding did not necessarily exclude all issues involving the potential for offsite leakage,[6] the Commission also does not believe it necessarily included every potential scenario for offsite releases which would result from any type of small-break LOCA or loss-of-main-feedwater transient. In each case the path potentially leading to offsite doses must have a reasonable nexus to the accident, and there is no reasonable nexus between the TMI-2 accident and primary-to-secondary leakage in the steam generator due to an SGTR.[7] The TMI-2 accident involved a main feedwater transient followed by a small-break LOCA, in particular, a stuck-open PORV, leading to leakage into the containment and partial uncovering of the core. The concerns in BN-83-47 are unrelated to this sequence of events.[8]

UCS nonetheless argues that BN-83-47 relates to contentions in the proceeding and therefore that it is within the scope of the proceeding. UCS argues that BN-83-47 relates to Contentions 5 and 14 and to the feed-and-bleed issue.[9] BN-83-47 on its face may appear to relate to UCS Contention 5, which concerned whether the PORV should be safety-grade. However, UCS did not argue that the PORV should be safety-

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[6] For instance, one contention that was resolved by the Licensing Board concerned initiation of containment isolation. Prior to the accident, TMI-1 and -2 were designed so that containment isolation occurred following receipt of a containment building high-pressure signal. The accident raised concerns that significant fuel damage can occur in the absence of containment high pressure, and hence the NRC staff required diversity in the parameters sensed for the initiation of isolation. Therefore initiation of containment isolation clearly has a reasonable nexus to the accident.

[7] The NRC memorandum cited by UCS to show that there was primary-to-secondary leakage in Steam Generator B during the accident indicates that this leakage was not due to an SGTR.

[8] The Commission also notes that not all accidents generically labelled "small-break LOCAs" have similar characteristics. For instance, SGTRs should be distinguished from LOCAs in the bypass system, and both should be distinguished from LOCAs in the main primary system piping. The differences between an SGTR and other types of small-break LOCAs include the following: An SGTR does not involve loss of primary coolant directly to the containment; for the same break area an SGTR does not result in as rapid a depressurization; an SGTR is better mitigated with reactor coolant pumps running; and, within the design basis, single tube failure, an SGTR does not challenge the containment.

[9] UCS Contention 14 dealt with systems classification and interaction, and staff testified in that regard that components necessary for mitigation purposes should be safety-grade. The Licensing Board accepted this definition, thus resolving Contention 14. UCS is now apparently asserting that under the staff's definition the information in BN-83-47 requires that the PORV be safety-grade. Staff in BN-83-47 did not state that use of the PORV was necessary to mitigate an SGTR, and hence UCS' interpretation is incorrect. In addition, Contention 14 did not address how the safety-grade standard should be applied for each piece of equipment in the plant. To hold otherwise would mean that parties under Contention 14 could litigate whether each piece of equipment in the plant needed to be safety-grade, regardless of any nexus to the accident.

UCS also argues that BN-83-47 relates to the feed-and-bleed issue. The only arguable connection between the two is that both concern use of the PORV. However, the potential use of the PORV to "bleed" bears no relationship to using the PORV to depressurize in the event of an SGTR.

grade because of the potential for using it to depressurize in the event of an SGTR. That some uses of the PORV were litigated in the proceeding does not mean that all potential uses of the PORV are within the proceeding.[10] The issue in each instance is whether the postulated scenario has a reasonable nexus to the TMI-2 accident. As explained above, the information in BN-83-47 does not have such a nexus.[11]

## II. WHETHER INFORMATION IN BN-83-47 WARRANTS REOPENING THE RECORD

### A. Parties' Positions

Staff and licensee argue that the information in BN-83-47 does not warrant reopening the record; UCS argues that it does.

UCS argues that the information in BN-83-47 is new and significant, and therefore warrants reopening the record. UCS states that consideration of the information in BN-83-47 regarding the need for rapid depressurization of the primary system in the event of an SGTR would have led the Licensing Board to reach a different result relative to design requirements for the PORV in order to be consistent with the staff's testimony regarding UCS Contention 14.

Licensee argues that reopening based on BN-83-47 would inject a new issue into the restart proceeding, and that the standard for such action must be "that a serious new safety concern exists which would warrant the immediately effective suspension of this operating license." Licensee concludes that BN-83-47 does not raise a safety concern meeting this standard.

Staff maintains the criteria for reopening must be met by the information in BN-83-47 itself, that other items in the proceeding regarding the PORV do not affect whether the information in that Board Notification warrants reopening. Staff states that the Commission should not *sua sponte* reopen unless

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[10] A contrary interpretation could lead to a never-ending proceeding. Under UCS' view, use of the PORV to mitigate any type of accident would fall within Contention 5, even if it had no conceivable connection with the TMI-2 accident. This would be inconsistent with the purposes of this proceeding.

[11] The Commission recognizes that in some instances the Licensing Board allowed contentions based on an example related to the accident to be broadened to include the class of systems components in the major safety system involved, and that arguably under that rationale Contention 5 could be read to include the concerns in BN-83-47. However, the Licensing Board recognized that this type of expansion was not required, and the Commission does not believe Contention 5 should be considered to include uses of the PORV beyond the defined scope of the proceeding.

(1) it can make an affirmative finding that the information in BN-83-47 demonstrates the existence of a problem that presents a grave threat to public safety, or (2) it believes that omission of the information in BN-83-47 from the evidentiary record would leave the record materially inaccurate or incomplete on a contested issue admitted to the restart proceeding, or (3) the information in BN-83-47 has created serious doubts about the correctness of a decision below on a contested issue admitted to the restart proceeding and the Commission believes the taking of supplementary evidence is required to resolve those doubts.

Staff maintains that the information in BN-83-47 does not rise to this level.

**B. Analysis**

In the Commission's view, the material in BN-83-47, as clarified in BN-83-110, does not warrant reopening the record *sua sponte*. BN-83-47 represents the preliminary view of the Division of Systems Integration (DSI) that pressurized water reactors undergoing licensing review should have a safety-grade means for depressurizing the primary system in the event of an SGTR. BN-83-47, which indicates that DSI is evaluating actions that may need to be taken on operating reactors is only a statement of a Division position. Thus, it does not necessarily represent even the view of the staff as a whole. Indeed, the issue is a generic one the resolution of which must therefore be reviewed by the Committee to Review Generic Requirements. The resolution must also be approved by the Executive Director of Operations. Further, BN-83-47 does not indicate that a safety-grade PORV is the only acceptable means for rapidly depressurizing the primary system, nor does it conclude that offsite doses would exceed Part 100 criteria in the event of an SGTR without such capability. Indeed, in BN-83-110 staff clarified that there may be means short of meeting safety-grade design criteria for the PORV by which a licensee may justify the acceptability of its depressurization capability in the face of a design basis SGTR event. It is the Commission's judgment that this preliminary viewpoint of the staff does not demonstrate an unacceptable risk to the public health and safety and does not raise an issue significant enough to warrant reopening the record *sua sponte*, even if it were within the scope of the proceeding.

Commissioner Gilinsky dissents from this decision. His views are attached.

It is so ORDERED.

For the Commission*

SAMUEL J. CHILK
Secretary of the Commission

Dated at Washington, D.C.,
this 28th day of March 1984.

## SEPARATE VIEWS OF COMMISSIONER GILINSKY (SECY-84-48, REVIEW OF ALAB-724)

Whether to require the pressurizer power-operated relief valves to be safety-grade is an important safety question as these valves may be relied upon to depressurize the primary system in several types of accidents. The Commission should have decided the merits of this question, instead of dismissing it on legalistic jurisdictional grounds.

*Commissioner Gilinsky was not present when this order was affirmed, but had previously indicated his disapproval.

# Atomic Safety and Licensing Appeal Boards Issuances

ATOMIC SAFETY AND LICENSING APPEAL PANEL

Alan S. Rosenthal, Chairman
Dr. John H. Buck, Vice Chairman*
Dr. W. Reed Johnson
Thomas S. Moore
Christine N. Kohl
Gary J. Edles
Dr. Reginald L. Gotchy
Howard A. Wilber

*Dr. Buck resigned from his position as Vice Chairman on March 30, 1984.

APPEAL BOARDS

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING APPEAL BOARD**

**Administrative Judges:**

**Alan S. Rosenthal**, Chairman
**Gary J. Edles**
**Howard A. Wilber**

**In the Matter of** **Docket Nos. 50-443-OL**
**50-444-OL**

**PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, *et al.***
**(Seabrook Station, Units 1 and 2)** **March 16, 1984**

Finding the standard for interlocutory review of a licensing board ruling not met, the Appeal Board denies an intervenor's request for directed certification of the Licensing Board's denial of its motion for dismissal of the operating license application for Unit 2 of the Seabrook facility sought on the ground that that Unit is only 22 percent completed.

## RULES OF PRACTICE: DIRECTED CERTIFICATION

In the exercise of its directed certification authority conferred by 10 C.F.R. 2.718(i), an appeal board will step into a proceeding still pending below only upon a clear and convincing showing that the licensing board ruling under attack either (1) threatens the party adversely affected by it with immediate and serious irreparable impact which, as a practical matter, could not be alleviated by a later appeal or (2) affects the basic structure of the proceeding in a pervasive or unusual manner. *Arizona Public Service Co.* (Palo Verde Nuclear Generating Station, Units 2 and 3), ALAB-742, 18 NRC 380 383 (1983); *Public Service Co. of Indiana*

(Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-405, 5 NRC 1190, 1192 (1977).

**OPERATING LICENSE PROCEEDINGS: TIMELINESS OF LICENSE APPLICATION**

The Commission's regulations are devoid of any specific requirement that the reactor reach a particular stage of completion before the filing of an operating license application.

## APPEARANCES

**Robert A. Backus**, Manchester, New Hampshire, for the intervenor, Seacoast Anti-Pollution League.

**Thomas G. Dignan, Jr.**, and **R.K. Gad III**, Boston, Massachusetts, for the applicants, Public Service Company of New Hampshire, *et al.*

**William F. Patterson, Jr.**, for the Nuclear Regulatory Commission staff.

## MEMORANDUM AND ORDER

1. This operating license proceeding involves Units 1 and 2 of the Seabrook nuclear facility. Two months ago, we upheld the Licensing Board's denial of an untimely petition for leave to intervene in the proceeding.[1] That petition had put forth a single claim: given the asserted fact that Unit 2 is only 22 percent completed, the application for an operating license for that unit is premature and, as a matter of law, should be turned down for that reason.

Our affirmance of the Licensing Board's rejection of the intervention petition rested not on the lateness of the hour *per se* but, rather, on another consideration. Examination of the record below revealed that, shortly after the petition surfaced, one of the existing parties to the proceeding — the Seacoast Anti-Pollution League (SAPL) — had filed a motion seeking the same relief respecting Unit 2 (dismissal of the

[1] ALAB-758, 19 NRC 7 (1984).

operating license application) on the strength of precisely the same prematurity claim. In common with the tardy petitioner, SAPL had relied upon 10 C.F.R. 50.57(a)(1), which requires, as a precondition to the issuance of an operating license, a finding that:

> Construction of the facility has been substantially completed, in conformity with the construction permit and the application as amended, the provisions of the [Atomic Energy] Act, and the rules and regulations of the Commission.

In an unpublished memorandum and order issued on January 13, 1984, the Licensing Board ruled against SAPL's position and accordingly denied the motion.

In the totality of these circumstances, we concluded:

> events clearly have overtaken [the tardy petitioner's] intervention effort. As matters now stand, his objective of having the Unit 2 prematurity issue placed before the Licensing Board has been achieved — albeit through the endeavors of someone else. True, on the SAPL motion the Board determined the issue against [the tardy petitioner's] position. There is no reason to suppose, however, that the Board would have decided it any differently had it considered his claim rather than SAPL's.[2]

In this connection, we went on to note our belief that, "[a]t the very least, the Licensing Board's analysis of the Unit 2 prematurity question in its January 13 memorandum and order is not manifestly (or even probably) erroneous."[3] By way of elaboration, we said that "this much is clear":

> First, the Licensing Board correctly held that it is not its responsibility, but that of the Director of Nuclear Reactor Regulation, to make the finding required by Section 50.57(a)(1) as a precondition to the issuance by the Director of an operating license. *Commonwealth Edison Co.* (Zion Station, Units 1 and 2), ALAB-226, 8 AEC 381, 410-11 (1974). Second, there is nothing in the Commission's regulations specifically providing that a reactor must have reached a particular stage of completion before an operating license application may be filed. Third, just 16 months ago the Commission denied a petition for rulemaking that sought amendments to the Rules of Practice that would have, *inter alia*, limited the scope of each operating license hearing to a single reactor unit even if that unit were one of several similar units constructed on a multi-reactor site. 47 Fed. Reg. 46,524 (1982). In support of his proposal, the petitioner had noted that the "time lag between inservice dates for individual reactors at multi-reactor nuclear plants has been increasing for many years." *Ibid.* In the Commission's view, however, that consideration did not provide a sufficient basis for requiring "an exclusive hearing on each reactor unit." *Id.* at 46,525.[4]

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[2] *Id.* at 11.

[3] *Id.*

[4] *Id.* at 11 n.18.

With only the most fleeting acknowledgement of these determinations,[5] SAPL now asks that we review the denial of its motion to dismiss in the exercise of the discretionary directed certification authority conferred by 10 C.F.R. 2.718(i).[6] We are told by SAPL that the necessary effect of the rejection of the prematurity claim is that the public (including itself) will be denied a fair hearing with respect to Unit 2. This is said to be so because (1) it is not possible to put forth contentions at this juncture with respect to vital safety systems not as yet installed in Unit 2; and (2) by reason of the delay in the construction of the unit, this proceeding is likely to be at an end before issues pertaining to that construction could be raised and litigated.[7]

In response, the applicants and the NRC staff maintain that the established standards for directed certification are not met here and that, in any event, the Licensing Board's ruling was correct.[8]

2. We have often had occasion to stress that

> interlocutory appellate review of licensing board orders is disfavored and will be undertaken as a discretionary matter only in the most compelling circumstances. More specifically, in the exercise of our directed certification authority conferred by 10 C.F.R. 2.718(i), we will step into a proceeding still pending below only upon a clear and convincing showing that the licensing board ruling under attack either
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> > (1) threaten[s] the party adversely affected by it with immediate and serious irreparable impact which, as a practical matter, could not be alleviated by a later appeal or (2) affect[s] the basic structure of the proceeding in a pervasive or unusual manner.[9]

SAPL does not assert here that it is threatened with serious immediate harm that could not be remedied on an appeal from the Licensing Board's eventual initial decision. Instead, it invokes the second criterion

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[5] SAPL Appeal of Denial of Motion to Dismiss Application for Seabrook Unit 2 (February 17, 1984) at 11.

[6] *See Public Service Co. of New Hampshire* (Seabrook Station, Units 1 and 2), ALAB-271, 1 NRC 478, 482-83 (1975). Although the term "appeal" appears in the caption, it is plain from the body of its filing that SAPL is invoking Section 2.718(i). In light of the general proscription against interlocutory appeals found in 10 C.F.R. 2.730(f), any claim of a right to have the challenged Licensing Board ruling reviewed at this juncture would have been unavailing.

[7] SAPL Appeal, *supra* note 5, at 1-7. In this regard, SAPL asserts that construction of Unit 2 has been "effectively suspended," with the consequence that there is no current completion date for that unit. *Id.* at 2-3. On March 1, 1984, however, counsel for applicants sent a letter to the Licensing Board to the effect that a newly established "interim schedule" projects fuel loading of Unit 2 on July 31, 1990.

[8] Applicant's Response to "SAPL Appeal of Denial of Motion to Dismiss Application for Seabrook Unit 2" (March 5, 1984); NRC Staff Response in Opposition to "SAPL Appeal of Denial of Motion to Dismiss Application for Seabrook Unit 2" (March 8, 1984).

[9] *Arizona Public Service Co.* (Palo Verde Nuclear Generating Station, Units 2 and 3), ALAB-742, 18 NRC 380, 383 (1983) (footnotes omitted). As indicated therein, the genesis of the quoted two-prong test was *Public Service Co. of Indiana* (Marble Hill Nuclear Generating Station, Units 1 and 2), ALAB-405, 5 NRC 1190, 1192 (1977).

alone.[10] It is plain upon analysis, however, that the inclusion of Unit 2 does not affect the basic structure of this proceeding in a pervasive or unusual manner.

As we observed in ALAB-758, the Commission's regulations are devoid of any specific requirement that the reactor reach a particular stage of completion before the filing of an operating license application. *See* p. 567, *supra*. This being so, it is hardly surprising that, over the years, the Commission has instituted and carried forward numerous operating license proceedings encompassing two or more units in quite different stages of completion.[11]

Further, we find not objectionable the practice of considering in a single proceeding those issues common to all units of a multi-unit facility. Indeed, the practice seems to us to make very good sense. In the proceeding at bar, many common issues have already been tried or will be heard at a future evidentiary session: *e.g.*, control room design, equipment environmental qualification, and various aspects of onsite and offsite emergency planning.[12] We know of no useful purpose that would be served by now resolving these issues for Unit 1 alone and then replowing the exact same ground at some later date in the context of Unit 2.

If we apprehend its position correctly, SAPL does not suggest otherwise. There is not a word of complaint in its appellate papers respecting the scope of the issues that are currently being explored in the proceeding. Rather, SAPL's concern appears to lie in another direction. As previously noted, its focus is the obvious present lack of opportunity to advance contentions related to the quality of as yet uncompleted Unit 2 construction and the possibility that the proceeding might come to an end before such an opportunity became available. *See* p. 568, *supra*.

That may well be a legitimate concern. And, if so, SAPL might have some basis for insisting that, with respect to Unit 2, the evidentiary record in this proceeding not be closed until after construction of that unit is much further advanced than it is today. But we need not — and do not — pass judgment upon that question at this time. For one thing,

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[10] SAPL Appeal, *supra* note 5, at 1.

[11] Among the several such proceedings currently in progress (in addition to the one at bar) are the three involving the two-unit Limerick, Perry, and Vogtle facilities: Docket Nos. 50-352 and 50-353 (Limerick); 50-440 and 50-441 (Perry); and 50-424 and 50-425 (Vogtle).

It is our understanding that (1) the two Limerick units are approximately 90% and 30% built and that there is at least a five-year differential in their current projected completion dates; (2) the two Perry units are approximately 92% and 42% built with a several year differential in their projected completion dates; and (3) the two Vogtle units are approximately 62% and 25% built with a similar differential in their projected completion dates.

[12] As the applicants stress, the designs of Units 1 and 2 are, for all practical purposes, identical. Applicants' Response, *supra* note 8, at 6.

to date no such relief has been explicitly sought by SAPL. For another, should SAPL move below to hold the record open on Unit 2 to await the substantial completion of construction of that unit, there will be time enough for the Licensing Board to act upon the motion when it is ready to close the record on Unit 1. If aggrieved by the Board's determination, SAPL can register its dissatisfaction on an appeal from the initial decision.

In short, there simply is no reason for our intercession on SAPL's behalf at the current stage of the proceeding. Apart from SAPL's failure to counter our determinations in ALAB-758 (*see* p. 567, *supra*), it is manifest that the inclusion of both Seabrook units in this proceeding neither represents a departure from established Commission practice nor affects the basic structure of the proceeding in a pervasive or unusual manner. Moreover, as just seen, there is another, and considerably more appropriate, avenue available to SAPL for seeking to protect its ability to put forth at a later date additional contentions associated with Unit 2 construction.[13]

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The Seacoast Anti-Pollution League's motion for directed certification of the Licensing Board's January 13, 1984 memorandum and order is *denied*.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the
Appeal Board

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[13] In addition to its motion to dismiss the application for an operating license for Unit 2, SAPL submitted an untimely contention advancing the same prematurity claim found in the motion. In its January 13 memorandum and order denying the motion, the Licensing Board also rejected the late-filed contention. The reasons we have assigned for not undertaking an interlocutory review of the denial of the motion apply equally to the rejection of the contention.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING APPEAL BOARD**

**Administrative Judges:**

**Thomas S. Moore**, Chairman
**Dr. John H. Buck**
**Dr. W. Reed Johnson**

**In the Matter of** **Docket Nos. 50-275**
**50-323**

**PACIFIC GAS AND ELECTRIC COMPANY**
**(Diablo Canyon Nuclear Power Plant, Units 1 and 2)**

**March 20, 1984**

Following the conduct of evidentiary hearings by the Appeal Board on the adequacy of the applicant's efforts to verify the design of the Diablo Canyon facility, the Appeal Board decides that the actions taken by the applicant provided adequate confidence that Unit 1's structures, systems and components are designed to perform satisfactorily in service and that any significant design deficiencies in that unit resulting from defects in the applicant's design quality assurance program have been remedied. The Appeal Board thus concludes that there is reasonable assurance that Unit 1 can be operated without endangering the health and safety of the public.

The Appeal Board withholds decision with respect to the adequacy of the design verification program for Unit 2.

## RULES OF PRACTICE: BURDEN OF PROOF

In order for the applicant to prevail on each factual issue, its position must be supported by a preponderance of the evidence. *See Tennessee*

*Valley Authority* (Hartsville Nuclear Plant, Units 1A, 2A, 1B, and 2B), ALAB-463, 7 NRC 341, 360 (1978), *reconsideration denied*, ALAB-467, 7 NRC 459 (1978); *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 405 n.19 (1976).

## PLANT DESIGN: STANDARD FOR DETERMINING ADEQUACY

To determine that an applicant's verification programs are sufficient to verify the adequacy of a plant's design, the applicant's efforts must be measured against the same standard as that set forth in the Commission's quality assurance criteria, 10 C.F.R. Part 50, Appendix B: whether the verification program provides "adequate confidence that a [safety-related] structure, system or component will perform satisfactorily in service." If the applicant's verification efforts meet this standard, then there will be reasonable assurance with respect to the design of the facility that it can be operated without endangering the health and safety of the public.

## QUALITY ASSURANCE/QUALITY CONTROL: DOCUMENTS

The Commission's regulations do not require that all pertinent quality assurance or quality control documents be consolidated and integrated into a single manual or set of manuals.

## TECHNICAL ISSUES DISCUSSED

Sampling Techniques (statistical and judgmental) and Scope;
Instrument Tubing Supports;
Containment Uplifting;
Modeling for Seismic Analysis (including the use of soil springs, fixed-base analysis, response of one building as imput into model of another, lumped mass-spring model, finite element models, degrees of freedom);
Soil Analysis (Seismic Refraction Tests and Cross-hole; and Up-hole Testing Techniques);
Seismic Response Spectra;
Fire Protection;
Jet Impingement Analysis;
Circuit Breakers (nameplate rating);
Design Drawings and Analyses (conformance with plant as built);
Component Cooling Water System Heat Removal Capacity;

Small Bore Piping and Support Design (computer-based analysis and span criteria);
Design Error Rate (adequate confidence versus perfection);
Hosgri Fault;
Westinghouse Quality Assurance Program;
Causes of Quality Assurance Failures.

### APPEARANCES

**Joel R. Reynolds, John R. Phillips** and **Eric R. Havian,** Los Angeles, California, and **David S. Fleischaker,** Oklahoma City, Oklahoma, for the San Luis Obispo Mothers for Peace, *et al.*, joint intervenors.

**John K. Van De Kamp,** Attorney General of the State of California, **Andrea Sheridan Ordin, Michael J. Strumwasser, Susan L. Durbin** and **Peter H. Kaufman,** Los Angeles, California, for George Deukmejian, Governor of the State of California.

**Robert Ohlbach, Philip A. Crane, Jr., Richard F. Locke** and **Dan G. Lubbock,** San Francisco, California, and **Arthur C. Gehr, Bruce Norton** and **Thomas A. Scarduzio, Jr.,** Phoenix, Arizona, for Pacific Gas and Electric Company, applicant.

**Lawrence J. Chandler** and **Henry J. McGurren,** for the Nuclear Regulatory Commission staff.

## DECISION

On April 21, 1983, we granted the motions of the joint intervenors and the Governor of California to reopen the record in this operating license proceeding. Instead of remanding to the Licensing Board for that purpose, we acquiesced in the request of the parties that we hear the further evidence ourselves. This decision sets forth our findings of fact and conclusions of law based upon that evidence.

### I. HISTORY OF PROCEEDING

A. In July 1981, the Licensing Board issued a partial initial decision authorizing the Director of Nuclear Reactor Regulation to issue a

license to the Pacific Gas and Electric Company (PG&E or applicant) to load fuel and to conduct low power tests up to five percent of rated power at its Diablo Canyon Nuclear Power Plant, Units 1 and 2.[1] After the Commission's favorable immediate effectiveness review for Unit 1 (conducted pursuant to 10 C.F.R. 2.764(f)),[2] the Director issued a low power license for that unit on September 22, 1981.[3]

Shortly thereafter, while preparing a response to an agency request for information, the applicant discovered errors in the assignment of seismic design spectra for equipment and piping in portions of the containment for Unit 1. These errors, combined with the identification by the NRC staff of serious weaknesses in the implementation of the applicant's quality assurance program, led the Commission to suspend conditionally the applicant's low power license. The license suspension was to remain in effect pending the applicant's satisfactory completion of an independent design verification program focusing upon the pre-1978 work of the service-related contractors utilized in the seismic design process of safety-related structures, systems and components for Unit 1.[4]

In addition to the Commission's enforcement action, the staff instructed the applicant to provide it with the results of a further independent verification program for Unit 1 to enable the staff to authorize operation above low power levels. This verification was to be aimed at the pre-June 1978 service-related contractors used by the applicant in the nonseismic design of safety-related structures, systems and components, the applicant's internal design activities, and the post-1977 service-related contractors utilized by the applicant for both seismic and nonseismic design of structures, systems and components.[5]

In order to secure reinstatement of its license and eventual authorization for full power operation, the applicant initiated a verification program to meet the Commission's order and the staff's directive. As subsequent events would reveal, the applicant's verification efforts expanded far beyond those originally envisioned and took more than two years to complete.

While the verification was ongoing, and while the joint intervenors' appeal from the Licensing Board's low power decision was pending before us, the joint intervenors, on June 8, 1982, filed a motion to reopen the record on the issue of the adequacy of the applicant's quality

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[1] *See* LBP-81-21, 14 NRC 107 (1981).
[2] *See* CLI-81-22, 14 NRC 598 (1981).
[3] License No. DPR-76.
[4] *See* CLI-81-30, 14 NRC 950 (1981).
[5] *See* Applicant Exhibit (App. Exh.) 87, letter from H. Denton, NRC, to M. Furbush, PG&E (Nov. 19, 1981).

assurance program. That motion was based essentially upon the same information that prompted the Commission's enforcement action and the various deficiencies identified by the verification program up to that time.

Besides opposing the joint intervenors' motion on the merits, the applicant claimed that the Commission's enforcement order conditionally suspending its license had divested us of jurisdiction to reopen the record. Although unpersuaded by this argument, we certified the jurisdictional question, among others, to the Commission in order to avoid any unnecessary delay in the licensing process were it ultimately to be accepted.[6] In due course, the Commission responded that it had not intended, and did not now intend, to divest the adjudicatory boards of jurisdiction to act on the motions and that they should be treated in accordance with applicable case law.[7]

We then directed the certification to us of a similar motion that had been filed by the Governor of California on August 2, 1982 with the Licensing Board.[8] After hearing argument on the motions, we concurred with the concessions of the applicant and the staff that, with respect to the issue of design quality assurance, the motions of the joint intervenors and the Governor met the standards for reopening the record.[9] Accordingly, we granted the motions on April 21, 1983.[10]

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[6] *See* ALAB-681, 16 NRC 146 (1982).

In addition, we asked whether the Commission wished to relieve the adjudicatory boards of jurisdiction with regard to quality assurance issues at Diablo Canyon and whether the Commission had any other instructions with regard to the reopening motions.

[7] *See* CLI-82-39, 16 NRC 1712 (1982).

[8] *See* Order of January 5, 1983 (unpublished).

When the Governor filed his reopening motion with the Licensing Board, the Board had yet to issue its decision resolving all contested issues necessary for full power operation. Subsequently, on August 31, 1982, the Board issued its initial decision authorizing full power operation. *See* LBP-82-70, 16 NRC 756. There the Board noted that its action did not affect the applicant's license suspension and that it would hold the Governor's reopening motion in abeyance to await the answer to the jurisdictional questions previously certified to the Commission in ALAB-681. *Id.* at 760 and 763. All parties filed exceptions to the Licensing Board's initial decision and those appeals are currently pending before us. In addition, the Commission still must conduct its immediate effectiveness review of that Licensing Board decision.

[9] The motions of the joint intervenors and the Governor also sought reopening on the issue of the adequacy of the applicant's construction — as opposed to design — quality assurance program. Because of the manner in which the issue was presented, we deferred ruling on it. *See* Memorandum and Order of April 21, 1983 (unpublished). Thereafter, the joint intervenors and the Governor filed new motions to reopen the record on the construction quality assurance issue. In ALAB-756, 18 NRC 1340 (1983), we set out the reasons for denying these motions.

[10] *See* Memorandum and Order of April 21, 1983 (unpublished).

The granting of the motions to reopen the record had no effect on the Licensing Board's previously issued partial initial decision authorizing fuel loading and low power testing (LBP-81-21, 14 NRC 107 (1981)) or initial decision authorizing full power operation (LBP-82-70, 16 NRC 756 (1982)). Our action neither vacated nor stayed these decisions. We subsequently affirmed the Licensing Board's low power decision. *See* ALAB-728, 17 NRC 777 (1983). Similarly, the reopening of the record in the operating license proceeding had no effect on the Commission's enforcement action suspending the applicant's low power license.

Although the motions to reopen were predicated on deficiencies in the applicant's design quality assurance program and the applicant's failure to comply with 10 C.F.R. Part 50, Appendix B, the real issue in the proceeding quickly moved beyond that point.[11] As noted in our prehearing order of August 16, 1983,

> the history and nature of the design quality assurance issue at Diablo Canyon make this reopened proceeding unusual. Normally, an effectively functioning design quality assurance program ensures that the design of a nuclear power plant is in conformance with the design criteria and commitments set forth in an applicant's PSAR [Preliminary Safety Analysis Report] and FSAR [Final Safety Analysis Report]. In the case of Diablo Canyon, however, this confidence has been seriously eroded by the existence of significant evidence that the design quality assurance program was faulty (i.e. it failed to comply with 10 C.F.R. Part 50, Appendix B). Hence, there is now substantial uncertainty whether any particular structure, system or component was designed in accordance with stated criteria and commitments.[12]

The order then indicated we would take our lead from the Commission and permit the applicant's various verification efforts "to substitute for, and supplement, the applicant's design quality assurance program in order to demonstrate that the Diablo Canyon plant is correctly designed."[13] It concluded by stating that the "real issue . . . has, in effect, moved beyond the question of what deficiencies existed in the applicant's Diablo Canyon design quality assurance program to the question whether the applicant can demonstrate that [its verification efforts] verify the correctness of the Diablo Canyon design."[14]

Trial of the thirty-nine contested issues regarding the adequacy of the applicant's verification efforts commenced October 31, 1983 in Avila Beach, California near the reactor site and consumed fifteen hearing

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[11] Indeed, as the applicant's counsel stated at the argument on the motions to reopen,

> [w]e are willing to stipulate that there — that there are, may have been, and have been deficiencies in design QA [Quality Assurance]. That is behind us. There is no sense in litigating design QA. Where does that get anybody? It doesn't accomplish anything.

Transcript (Tr.) of April 14, 1983 oral argument at 215. *See* Order of August 16, 1983 (unpublished).

[12] Order of August 16, 1983 (unpublished) at 4-5. The analysis of the issues involved in the reopened proceeding outlined in the August 16 order was subsequently incorporated into our August 26, 1983 prehearing conference order.

[13] Order of August 16, 1983 (unpublished) at 5.

[14] *Id.* at 6.

days.[15] The applicant presented twenty-five witnesses,[16] the staff fourteen, the joint intervenors one, and the Governor three.[17] The hearing produced some 3700 pages of transcript and better than 6000 pages of exhibits. At the conclusion of the hearing, the parties were ordered, pursuant to 10 C.F.R. 2.754, to file proposed findings of fact and conclusions of law and were admonished that the failure to file proposed findings on any issue would be deemed a waiver of that issue.[18] The last of the parties' proposed findings was filed January 4, 1984. The joint intervenors and the Governor both failed to file proposed findings on sixteen issues.[19] In addition, the joint intervenors failed to file proposed findings on an issue that the Governor abandoned in his findings.[20] These issues are therefore waived, leaving twenty-two issues for resolution.[21]

In order to prevail on each of the remaining factual issues, the applicant's position must be supported by a preponderance of the evidence.[22] We do not decide, however, whether each element of the Commission's November 19, 1981 enforcement order (or other subsequent directives) has been met. That task is for the Commission itself.[23] Rather, we must

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[15] We accepted fifty-six issues of those originally sought to be litigated in the reopened proceeding by the joint intervenors and the Governor. *See* Orders of August 26 and October 7, 1983 (unpublished). Prior to the hearing, the joint intervenors and the Governor withdrew seventeen, leaving thirty-nine contested issues. *See* Withdrawal of Certain Contentions by Governor Deukmejian and Joint Intervenors (Oct. 24, 1983); Withdrawal of Certain Additional Contentions by Governor Deukmejian and Joint Intervenors (Oct. 31, 1983). As numbered in our August 26, 1983, prehearing conference order, the following issues remained at the time of the hearing: 1(a), (b), (c), (d), (e); 2(a), (b), (c), (d); 3(f)(i), (ii), (iii), (iv), (v), (o), (p), (q), (r), (s), (t); 4(a), (b), (h), (i)(1), (2), (j)(1), (2), (k), (l), (q), (r), (s), (t), (u); 5; 6; 7; 8; and 9. These issues are set forth in Appendix A of this decision.

[16] Seven of the applicant's witnesses were members of the Independent Design Verification Program (IDVP), *see* pp. 578-79, *infra*.

[17] The applicant and the staff witnesses testified as panels. Because of the number of issues in the proceeding, the issues were treated discretely and the composition of the panels varied accordingly. A list of the witnesses, their education and their present position appears in Appendix B of this decision.

[18] Tr. D-3239. *See Detroit Edison Co.* (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-709, 17 NRC 17 (1983).

[19] Those issues are as follows: 2(d); 3(f)(ii), (p), (s), (t); 4(a), (b), (h), (i)(2), (j)(1),(2), (k), (q), (r), (s), (u).

[20] The joint intervenors failed to file proposed findings on issue 3(f)(i) dealing with the boundary motion inputs for the applicant's soil structure interaction analysis of the containment building. *See* Joint Intervenors' Proposed Findings of Fact and Conclusions of Law (JI PF) (Dec. 23, 1983). The Governor's proposed findings now accept the applicant's results. *See* Proposed Findings of Fact and Conclusions of Law of Governor Deukmejian (Gov. PF) at 39-40 (Dec. 24, 1983).

[21] The issues remaining for decision are as follows: 1(a), (b), (c), (d), (e); 2(a), (b), (c); 3(f)(iii), (iv), (v), (o), (q), (r); 4(j)(1), (l), (t); 5; 6; 7; 8; and 9.

[22] *See Tennessee Valley Authority* (Hartsville Nuclear Plant, Units 1A, 2A, 1B, and 2B), ALAB-463, 7 NRC 341, 360 (1978), *reconsideration denied*, ALAB-467, 7 NRC 459 (1978); *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), ALAB-355, 4 NRC 397, 405 n.19 (1976).

[23] The Commission's order suspending the applicant's low power license until the successful completion of a prescribed verification program was a Commission enforcement action. Because the applicant did not challenge that action, and the Commission did not otherwise direct, no enforcement proceeding was begun. Nor did the Commission, when responding to our certified questions, indicate that its en-

*(Continued)*

independently determine whether the verification programs and their results placed before us in the reopened operating license proceeding are sufficient to verify the adequacy of the Diablo Canyon design. To do this, the applicant's efforts must be measured against the same standard as that set forth in the Commission's quality assurance criteria, 10 C.F.R. Part 50, Appendix B: whether the verification program provides "adequate confidence that a [safety-related] structure, system, or component will perform satisfactorily in service." If the applicant's verification efforts meet this standard, then there will be reasonable assurance with respect to the design of the Diablo Canyon facility that it can be operated without endangering the health and safety of the public.

B. A summary of the development and content of the Diablo Canyon verification efforts is helpful to an understanding of our resolution of the issues in Part II, *infra*.

Immediately after the discovery of the seismic design errors at Diablo Canyon, the applicant retained Robert L. Cloud and Associates, Inc. (Cloud Associates) to develop and implement an internal verification program to assess the adequacy of the plant's seismic design.[24] The initial Cloud Associates' review indicated that the design problems were more pervasive than at first thought.

Subsequent to the issuance of the Commission order[25] calling for the establishment of an extensive and structured verification effort, the applicant, on December 4, 1981, proposed a program managed by Cloud Associates that would include the services of R.F. Reedy, Inc. (Reedy Inc.) for quality assurance verification and Teledyne Engineering Services (Teledyne) for overall review of the program and its implementation. This effort was to be directed at the seismic design work performed for the applicant under pre-June 1978 service-related contracts and was labeled the Phase I program.[26] Thereafter, in response to the broader matters raised in the staff letter, the applicant also submitted a Phase II program. This program included an examination of the

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forcement action should become part of the operating license proceeding. *See* note 7, *supra* and accompanying text. Therefore, we believe it is clear that the Commission did not intend to leave enforcement of its order to the reopened licensing proceeding. Thus, the elements of the verification program contained in the Commission's enforcement order, like those contained in the November 19, 1981 staff letter to the applicant (*see* note 5, *supra*), may prove useful in assessing the overall adequacy of the applicant's verification program, but in these circumstances, they do not control our determination of the sufficiency of the applicant's verification efforts.

[24] App. Exh. 90, Diablo Canyon Nuclear Power Plant-Unit 1, Final Report, Independent Design Verification Program, Vol. I (1983) (hereinafter IDVP Final Report), at I.2-1 to -2.

[25] *See* CLI-81-30, *supra*, 14 NRC at 950.

[26] App. Exh. 90, IDVP Final Report, Vol. I, at I.3-1. *See also* letter of December 4, 1981 from M. Furbush, PG&E, to H. Denton, NRC.

nonseismic work performed for the applicant under pre-June 1978 service-related contracts, the applicant's own internal design activities, and all the nonseismic and seismic work performed for the applicant under post-1977 service-related contracts. The Phase II program also added the Stone and Webster Engineering Corporation (Stone and Webster) to the other organizations already proposed to conduct this review.[27]

The Commission's order required that the companies conducting the verification program possess the necessary technical competence and that they be independent of the applicant.[28] On March 4, 1982, the Commission approved the Phase I program but required that Teledyne be the program manager because Cloud Associates had previously done substantial work for the applicant.[29] In accordance with this Commission action, Teledyne prepared an Independent Design Verification Program (IDVP) Phase I Program Management Plan which integrated the earlier Cloud Associates' plan and included requirements for Teledyne's acceptance of work done prior to its takeover as program manager on March 25, 1982.[30] Under Teledyne's direction, Cloud Associates would perform the review of seismic, structural and mechanical design and Reedy Inc. would review quality assurance.[31] The Phase I Plan included only the safety-related (Diablo Canyon Design Class I) buildings, equipment, piping and components that had been requalified in consideration of the Hosgri 7.5M earthquake.[32] The plan described the initial sampling and the requirements for any additional verification and sampling.[33] In a

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[27] App. Exh. 90, IDVP Final Report, Vol. I, at 1.3-2. *See also* letter of January 13, 1982 from M. Furbush, PG&E, to H. Denton, NRC.

[28] CLI-81-30, *supra*, 14 NRC at 957.

[29] App. Exh. 156, SECY-82-89, and App. Exh. 158, Memorandum from W. Dircks to S. Chilk indicating Commission approval.

[30] App. Exh. 88, IDVP Program Management Plan, Phase I, Revision I (July 6, 1982) (hereinafter IDVP Phase I Management Plan); App. Exh. 90, IDVP Final Report, Vol. I, at 1.3-5.

[31] App. Exh. 88, IDVP Phase I Management Plan, at 17; App. Exh. 90, IDVP Final Report, Vol. I, at 1.3-5.

[32] App. Exh. 88, IDVP Phase I Management Plan, Appendix D at 2; App. Exh. 90, IDVP Final Report, Vol. I, at 1.3-8.

[33] When a criterion used in the IDVP verification process was not met, the IDVP issued an Error or Open Item (EOI) File to track the resolution of the IDVP concern. Following further investigation, the IDVP would classify the item as either a deviation (*i.e.*, a departure from standard procedure but not a mistake) or one of four categories of error (*i.e.*, A, B, C, D). The safety significance, if any, of an error was not part of the classification scheme. Rather, an error was considered class A if design criteria or operating limits of safety-related equipment were not met and physical modifications or changes in operating procedures were required. An error was considered class B if it met the definition of class A but could be resolved by more realistic calculations or retesting, instead of physical modifications. A class C error was one in which incorrect engineering or incorrect installation of safety-related equipment was found, but no design criteria or operating limits were exceeded. An error was considered class D if safety-related equipment was not affected. An EOI File remained open until the IDVP determined that the item was in conformance with licensing criteria. App. Exh. 88, IDVP Phase I Management Plan, at 25, and Appendix E; App. Exh. 89, IDVP Program Management Plan, Phase II (June 18, 1982) (hereinafter IDVP Phase II Management Plan), at 24; App. Exh. 90, IDVP Final Report, Vol. I, at 3.6-2 to -6.

letter dated April 27, 1982, the NRC staff approved the IDVP Phase I Plan.[34]

Several months later, Teledyne developed an IDVP Phase II Management Plan and submitted it to the NRC.[35] This plan encompassed nonseismic, service-related contracts performed prior to June 1978, the applicant's internal design activities, and all service-related contracts after January 1978.[36] The participants and their general responsibilities were the same as those in the Phase I Plan but Stone and Webster was added to perform the review of nonseismic safety systems and analyses.[37] On December 9, 1982, the Commission approved the Phase II Plan.[38]

Shortly after receiving approval of the Phase I program, the applicant retained Bechtel Power Corporation to work with it and act as Completion Manager for the Diablo Canyon facility. To align the verification activities with this development, the applicant developed an Overall Management Plan that, *inter alia*, adopted the IDVP Phase I Program Management Plan.[39] Under the Overall Management Plan, the joint Bechtel-PG&E team was referred to as the Diablo Canyon Project (DCP) and it was responsible for executing the Internal Technical Program (ITP). The purpose of the ITP was to (a) provide an additional design verification effort for the assurance of the overall adequacy of the design of the plant; (b) develop data and information in support of the IDVP; (c) respond to IDVP open items and findings; and (d) implement design modifications or other corrective actions arising from the verification program.[40]

Under the Phase I program, the seismic verification effort was initially based upon a sampling process.[41] The early findings of the sampling program led the applicant to review the entire scope of certain engineering activities. In order to save time and best assure final NRC approval of the verification effort, the applicant decided in the summer of 1982 to expand the seismic program to evaluate the total seismic design of safety-related structures, systems, and components.[42] This broad review

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[34] App. Exh. 90, IDVP Final Report, Vol. I, at 1.3-5.

[35] *Id.* at 1.3-6.

[36] App. Exh. 89, IDVP Phase II Management Plan, at 1.

[37] *Id.* at 8.

[38] App. Exh. 157, SECY-82-414; App. Exh. 159, Memorandum from W. Dircks to S. Chilk indicating Commission approval.

[39] App. Exh. 90, IDVP Final Report, Vol. I, at 1.4-1.

[40] *Id.* at 1.4-1 to -2.

[41] *Id.* at 1.4-2.

[42] *Id.*; App. Exh. 91, ITP Design Verification Program Phase I Final Report (Oct. 19, 1983) (hereinafter ITP Phase I Final Report), at 1.5.2-1 to -2.

*(Continued)*

enveloped the findings of the previous IDVP and ITP seismic reviews and made it unnecessary to review older analyses and calculations that were to be redone by the ITP. In view of the enlarged ITP seismic review,[43] the IDVP program was changed from one of sampling original designs to one of verifying the ITP's seismic work. The IDVP examined the scope, criteria and methodology of the ITP work for consistency with the license application and then verified samples of that work.[44] In addition, the staff reviewed the seismic verification efforts of the ITP and the IDVP on a continuing basis.

The IDVP also selected samples of the original engineering design work for the Phase II nonseismic verification.[45] The samples were reviewed and analyzed by the IDVP against verification criteria from the program management plan. If the criteria were not satisfied, the initial samples were reanalyzed or additional samples were identified for verification. When the IDVP identified a potentially generic concern, the ITP was required to perform a review for that concern for all applicant-designed, safety-related systems.[46] The IDVP then evaluated these ITP reviews and documented their findings in Interim Technical Reports (ITRs) for the staff to review. In addition to the nonseismic reviews performed by the ITP at the direction of the IDVP, the ITP independently conducted a functional design review that covered a portion of each of

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This phase of the work by the Bechtel-PG&E team is referred to as the Corrective Action Program (CAP). Thus, there are several labels which may be applied to work carried out by that group (*i.e.*, DCP, ITP, CAP). Because our previous references to the work done by the Bechtel-PG&E team in the proceeding have been to the ITP, we shall continue to use ITP as a catchall phrase to denote work done both by the applicant subsequent to November 1981 as well as by the Bechtel-PG&E team.

[43] The complete ITP seismic review program is described in the ITP Phase I Final Report, App. Exh. 91.

[44] App. Exh. 90, IDVP Final Report, Vol. I, at 3-5-7.

The seismic design review resulted in thousands of minor modifications to steel frame structures and supports for piping, raceways, instrumentation, instrument tubing and equipment. App. Exh. 91, ITP Phase I Final Report, at 1.8.6-2 and Appendix 1E. A large number of modifications must be expected when seismic response spectra are changed, because many similar structural components are included in each individual seismic analysis and each component may be affected by a change in the seismic response spectra. For example, several pipe support modifications could result from a single change in one pipe analysis and that piping design may be repeated hundreds of times. *See id.* at 2.2.1-22 to -36 (Table 2.2.1-3), 2.2.1-37 to -51 (Table 2.2.1-4), 2.2.2-17 to -24 (Table 2.2.2-1). *See also* Moore Tr. D-412.

[45] App. Exh. 90, IDVP Final Report, Vol. I, at 1.3-8 to -9. The entire IDVP verification program (*i.e.*, seismic and nonseismic) is documented in sixty-three interim technical reports (App. Exhs. 93 to 155) and a four-volume final report that contains the IDVP's conclusions (IDVP Final Report) (App. Exh. 90).

[46] Only a few of the findings from the nonseismic design review resulted in modifications to plant systems and the alterations were minor. App. Exh. 92, ITP Phase II Final Report Design Verification Program (hereinafter ITP Phase II Final Report), at 3-2 to -3. For example, minor modifications were performed involving the following: (1) rerouting of certain electrical circuits to assure circuit independence; (2) electrical changes to the control room ventilation and pressurization system to allow the single failure criterion to be met for Unit 1 without the availability of Unit 2 power supplies; (3) auxiliary feedwater system alterations to prevent inadvertent overpressurization of certain components; (4) strengthening of doors; and (5) installing flow limiters and dampers. *Id.* at 3-3 to -31.

the applicant-designed, safety-related nonseismic systems.[47] Unlike the seismic review, the entire design of applicant-designed, safety-related systems was not reviewed.

## II. FINDINGS ON CONTESTED ISSUES

As previously noted, the real issue in this reopened proceeding is whether, in view of the conceded weakness of the Diablo Canyon design quality assurance program, the applicant's verification efforts demonstrate that the safety-related structures, systems and components of the plant are properly designed (*i.e.*, conform to the various licensing criteria for the facility). Although the applicant presented evidence to establish that it verified the design of both Diablo Canyon Units 1 and 2, we make no findings with respect to Unit 2. The two units are nearly identical from a design standpoint, but the applicant's verification efforts for Unit 2 differ from those for Unit 1. Significantly, the IDVP had no direct involvement in the Unit 2 verification program. Rather, the applicant has established an internal review organization for Unit 2 to evaluate deficiencies identified for Unit 1 and, if appropriate, to correct these deficiencies as they appear in Unit 2. The Unit 2 verification is still ongoing and has not been finally reviewed by the staff. Nor has the staff issued a safety evaluation report supplement on the Unit 2 verification. In the circumstances, we believe it is most appropriate to sever the question of the Unit 2 design verification from the proceeding and decide at this time only the issues related to Unit 1.

A. In issues 1 and 2, the Governor and joint intervenors challenge the scope of the applicant's verification program and, in effect, dispute the ability of the applicant's verification efforts to provide the same assurance of proper design as a satisfactory quality assurance program.

Specifically, in issues 1(a) and (b), the joint intervenors and the Governor assert that the scope of the IDVP review was too narrow because it did not verify samples from each design activity and from each design group performing a particular design activity. Issues 2(a) and (b) raise the same questions but with regard to the ITP verification efforts. The joint intervenors and the Governor also contend in issues 1(c) and 2(c) that the IDVP and ITP verification efforts were flawed because they did not have statistically valid samples from which to draw conclusions. Because there was a marked difference in the manner in

[47] The modifications required by the ITP's functional design review are described in the ITP Phase II Final Report. App. Exh. 92 at 2-5 and Appendix B.

which the seismic and nonseismic verifications were conducted, we first treat the seismic verification by the IDVP and the ITP, then in section 2, we deal with the nonseismic verification.[48]

1. The ITP essentially redid all of the seismic design for safety-related structures, systems and components, while the IDVP oversaw and verified selected samples of the work.[49] The ITP reanalyzed the design of portions of the containment, the auxiliary building, the fuel handling building, the turbine building and the intake structure. All large bore piping and pipe supports were reanalyzed, and small bore piping and pipe supports were reviewed either by sampling or on a generic basis. The ITP reviewed or reanalyzed the safety-related mechanical, electrical, and instrumentation and control equipment to assure that these components were seismically qualified. In addition, the ITP examined the design of all safety-related electrical raceways and heating, ventilation, and air conditioning (HVAC) ducts and supports. Finally, the ITP sampled the safety-related instrument tubing and supports to ensure their seismic qualification.[50] Thus, with respect to the seismic design, the work of the ITP became the design of record.[51]

The ITP's seismic design work was done under a quality assurance program that met the provisions of 10 C.F.R. Part 50, Appendix B.[52] In addition, this work was independently verified by the IDVP. In each of the areas of seismic design addressed by the ITP, the IDVP verified the work by reviewing selected samples. The exact approach taken by the IDVP varied depending upon the nature of ITP work.[53] For all reviews, however, the IDVP first compared the scope of the ITP work with the applicable license criteria, and then ascertained that the analytical methods used by the ITP were valid, verifying such items as modeling techniques, model constraints, assumptions and the levels of model sophistication. In each seismic design area, the IDVP selected a sample

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[48] *See* note 67, *infra*, for discussion of issue 1(d). The remaining parts of 1 and 2, issues 1(e) and 2(d), pertain to Unit 2. *See* p. 582, *supra*.

[49] Anderson *et al.* [This panel consisted of R. Anderson, G. Cranston, G. Moore, L. Shipley and W. White.] Tr. fol. D-224 at 5-6, 9-10; Cooper *et al.* [This panel consisted of W. Cooper, R. Cloud, J. Krechting and R. Reedy.] Tr. fol. D-1459 at 1/2-12 to -20; App. Exh. 100, ITR 8, at 1-2.

[50] Anderson *et al.* Tr. fol. D-224 at 6; Seed *et al.* [This panel consisted of R. Anderson, H. Seed, L. Shipley and W. White.] Tr. fol. D-652 at 7-8; App. Exh. 91, ITP Phase I Final Report, at 1.5.1-3 to -4.

[51] Cooper *et al.* Tr. fol. D-1459 at 1/2-13.

[52] The adequacy of the quality assurance program covering the ITP's work is discussed subsequently. *See* pp. 613-17, *infra*.

[53] App. Exh. 100, ITR 8, at 1-2.

The ITP seismic verification work was divided into three categories according to the methods used: complete reanalysis (*e.g.*, Fuel Handling Building); review of existing analyses followed by reanalysis of deficient items (*e.g.*, large bore piping); and reviews of samples to demonstrate conservative design (*e.g.*, small bore piping). *Id.*

of calculation packages for detailed review. The review was designed to investigate the specific concerns that the IDVP developed during earlier IDVP reviews, and to ensure the complete evaluation of the process utilized by the ITP. The calculation packages were verified by design review or by performing independent analyses, or a combination of these techniques. IDVP samples consisted of in-progress and completed ITP work. In certain instances, questions arose which caused additional samples to be evaluated by the IDVP. For each area of ITP work reviewed, the IDVP issued an ITR documenting the results of its review.[54] Thus, the final seismic design derived from the ITP's efforts and the IDVP review of those efforts subjected the design of Diablo Canyon to a measurably greater level of scrutiny than could have been provided by a quality assurance program complying with Appendix B.[55]

The Governor asserts, however, that the seismic verification was insufficient because the ITP's redesign efforts did not encompass all elements of the seismic design. Specifically, he claims that small bore (less than 2-inch diameter) piping was requalified not by 100 percent review, but through a program of generic reviews and sampling, and that instrument tubing supports were also requalified by sample calculations. He charges that the ITP reviewed equipment only if the response spectrum governing its seismic design had changed and, even then, the ITP only

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[54] Cooper *et al.* Tr. fol. D-1459 at 1/2-13 to -20.
The following ITRs document the IDVP review of the ITP seismic verification work:

| Applicant Exhibit # | ITR Number | Subject |
|---|---|---|
| 142 | 50 | Containment Annulus |
| 143 | 51 | Containment Annulus |
| 144 | 54 | Containment Building |
| 145 | 55 | Auxiliary Building |
| 146 | 56 | Turbine Building |
| 147 | 57 | Fuel Handling Building |
| 148 | 58 | Intake Structure |
| 149 | 59 | Large Bore Piping |
| 150 | 60 | Pipe Supports |
| 151 | 61 | Small Bore Piping |
| 152 | 63 | HVAC Ducts, Electrical Raceways, Instrument Tubing and Associated Supports |
| 153 | 65 | Rupture Restraints |
| 154 | 67 | Equipment |
| 155 | 68 | Soils |

[55] Moreover, the nature and breadth of the seismic design review (*i.e.*, essentially 100 percent) eliminates any reasonable argument that the review was flawed because statistically valid sampling techniques were not used.

evaluated safety-related equipment designed by the applicant, not others.[56]

None of the Governor's challenges detracts from the adequacy of the applicant's seismic verification programs. Small bore piping at Diablo Canyon was designed by computer-based analysis or by the use of span criteria.[57] The ITP verification was carried out by "generic" reviews,[58] and by sampling.[59] The ITP reported the results of some 80 piping analyses, involving approximately 1,550 piping spans,[60] carried out under the generic and sampling programs.[61] Noting the ITP's use of computer-based dynamic analysis and its limited use of the less conservative span rules, the IDVP concluded that the ITP methods and coverage were acceptable and the ITP analysis ensured that small bore piping was properly designed.[62] We agree. There is no need to test every repetitive pipe configuration. The ITP's broad coverage in its generic and sampling reviews was sufficient to assure adequacy of the piping design.

The seismic design of instrument tubing supports, like that of small bore piping, need not be verified by 100 percent reanalysis. There are only a few basic seismic designs of instrument tubing supports, although there are many applications of each design. The ITP selected for review a sample of eighty-eight supports that represented worst case and enveloping situations. Of these supports, the analyses indicated that two were inadequate as a result of their specific cantilevered configuration. All tubing supports in the plant were then examined for this configura-

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[56] Gov. PF at 29-31.

[57] Span criteria are analytically determined rules which govern the spacing between seismic supports in a run of piping (*i.e.*, the length of the span of pipe between supports). App. Exh. 122, ITR 30, at 6 and A-6; "Seismic Evaluation for Postulated 7.5M Hosgri Earthquake" (Hosgri Report), Amendment No. 50 to operating license application (June 3, 1977), Vol. II, at 8-3 to -4 and Figure 8-1. The span rules were revised by the ITP to include the effect of insulation and spectra revisions, and to provide more user guidance. App. Exh. 91, ITP Phase I Final Report, at 2.2.2-6.

[58] The "generic" program encompassed small bore piping and piping analyses issues identified by the IDVP and ITP reviews as having a potential for causing modifications. *Id.* at 2.2.2-1. Specifically, the program included the following piping configurations: those previously analyzed by dynamic analysis; those in which safety-related valves are supported by pipes; those subject to thermal or seismic movement of anchors; those at boundaries between code requirements; and those pipes subject to thermal stresses previously qualified by span rules. *Id.* at 2.2.2-4 to -6. The generic review program was carried out primarily by dynamic analyses. *Id.* at 2.2.2-8 to -9.

[59] *Id.* at 2.2.2-1.

Under the sampling program a number of piping configurations designed using span criteria were selected to undergo dynamic analysis as well. The selection of samples was made to address a number of specific design configurations and issues not included in the generic review, and to demonstrate the qualification of piping that was designed using span criteria. *Id.* at 2.2.2-2 to -3, -6 to -8, -10 to -11.

[60] The computer analysis of a piping configuration generally includes many (typically ten to fifty) supports. Thus, a single piping analysis checks the design adequacy of many pipe spans. *See id.* at 2.2.2-17 to -24 (Table 2.2.2-1).

[61] *Id.* at 2.2.2-8 to -11, 2.2.2-17 to -24 (Table 2.2.2-1).

[62] App. Exh. 151, ITR 61, at 54, 60.

tion and no other deficient cantilevered supports were found.[63] The IDVP review of the ITP effort confirmed that the analyzed tube support configurations included worst case situations, and concluded that the tube supports throughout the plant were adequate.[64] Once again, we agree with the IDVP's conclusion. Because of the repetitive nature of the instrument tubing support design, there is no need to test every support. The breadth of the ITP review, which included worst case analysis, was sufficient to ensure proper instrument tube support design.

Finally, with respect to the Governor's last challenge to the sufficiency of the seismic review, we find that the seismic qualification of safety-related equipment was not deficient. The ITP determined new seismic response spectra for all structures except the containment shell. In reviewing the equipment for qualification to the new spectra, the ITP reviewed all safety-related equipment, even that in the containment, so that no equipment was overlooked.[65] Nor was the seismic review flawed because the IDVP did not review the qualification of safety-related equipment designed by Westinghouse. We deal with the question of the sufficiency of Westinghouse-designed equipment subsequently.[66] Suffice it to say at this point that Westinghouse itself performed an adequate seismic design review of the equipment and systems it supplied.

We conclude, therefore, that the seismic redesign process carried out by the ITP and reviewed by the IDVP provides adequate confidence that the seismic design of the structures, systems and components at Diablo Canyon Unit 1 is proper and meets licensing criteria.[67]

2. Unlike the seismic verification under which essentially all of the Diablo Canyon seismic design was reviewed, the applicant's nonseismic design review efforts were less ambitious. Although both the IDVP and

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[63] App. Exh. 91, ITP Phase I Final Report, at 2.6-1 to -4.

[64] App. Exh. 152, ITR 63, at 47, 54; App. Exh. 90, IDVP Final Report, Vol. II, at 4.6.8.2-1 to -4.

[65] Seed *et al.* Tr. fol. D-652 at 7-8, 61-64; App. Exh. 91, ITP Phase I Final Report, at 2.3-1.

Mechanical equipment was checked by one of three methods: flexible items (having natural frequency less than 33 Hertz) were subjected to dynamic analysis; rigid items were qualified to equivalent static loads or by dynamic analysis; and some equipment was qualified by testing on a shake table. App. Exh. 91, ITP Phase I Final Report, at 2.3.1-5; App. Exh. 154, ITR 67, at 10, 17, 29. Similar methods were used to verify the electrical and HVAC equipment items. App. Exh. 91, ITP Phase I Final Report, at 2.3.2-2, 2.3.3-2 to -3.

[66] *See* pp. 608-10, *infra*.

[67] In issue 1(d), the Governor also challenges the sufficiency of the IDVP seismic review program claiming that, instead of independently verifying analyses for Diablo Canyon, it merely checked data inputs to the applicant's design models. The record is replete with instances in which the IDVP carried out its own calculations, both in the seismic and nonseismic areas of the verification. The evidence also demonstrates that design reviews carried out in lieu of independent analyses were far more extensive than a mere checking of input data. Cooper *et al.* Tr. fol. D-1459 at 1/2-16, -19 to -20, -28 to -29, -34 to -35; Cloud Tr. D-1939-41, D-1944-45. Moreover, we find that the IDVP's approach of verifying samples by a combination of reanalysis and design review is sufficient to provide adequate verification of design. The value of independent recalculations is not disputed, but there is no indication that this approach is essential to provide assurance of design efficacy. Cloud Tr. D-1937-38; Roesset Tr. D-2247-48.

the ITP verified portions of the nonseismic design of the facility, their combined efforts did not encompass the entire nonseismic safety-related design. For example, neither the IDVP nor the ITP verified samples from each design activity and each design group performing that activity, as alleged to be necessary by the Governor and the joint intervenors in issues 1(a) and (b), and 2(a) and (b). Nor did the IDVP and ITP select the portions of the nonseismic design work they reviewed on a statistically valid basis (*i.e.*, they did not randomly sample the universe of engineering design decisions), as urged by the Governor and the joint intervenors in issues 1(c) and 2(c). Because the nonseismic review was not all encompassing and not based on statistically valid sampling techniques, the Governor and the joint intervenors claim that the applicant's verification program is so seriously flawed that it cannot properly be used as a basis for reaching conclusions about the unreviewed portions of the nonseismic design. The applicant and the staff, on the other hand, assert that the scope and nature of the applicant's nonseismic design review are more than sufficient to support the conclusion that the Diablo Canyon design meets applicable licensing criteria.

Specifically, the Governor and the joint intervenors assert that because the design samples selected by the verification program were chosen deliberately on the basis of certain engineering judgments, and not randomly, the sample selection process was biased. Thus, the argument continues, no statistically valid conclusion regarding probabilities of errors or error rates can be drawn for the unreviewed portions of the nonseismic design; and, in order to verify satisfactorily the nonseismic design, the applicant must go back and either randomly sample the universe of nonseismic design decisions or review 100 percent of it.

This argument essentially overlooks the standard by which the applicant's program is to be judged. We must determine whether the nonseismic verification program provides "adequate confidence" that the nonseismic design of safety-related structures, systems and components is proper so that such structures, systems and components will perform satisfactorily in service.[68] This qualitative standard is not numerically

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[68] Pointing to the Commission's regulations, 10 C.F.R. 50.57(a)(1), the Governor and the joint intervenors repeatedly assert in their proposed findings that the applicant's verification program, in order to be sufficient, must demonstrate that the design of Diablo Canyon meets its license application requirements or licensing criteria. The application requirements and licensing criteria for Diablo Canyon, like any nuclear power plant, are spelled out in the various documents comprising the operating license application including, most prominently, the applicant's Final Safety Analysis Report (FSAR). The FSAR is a multivolume description of the entire facility containing literally thousands of so-called "licensing criteria" ranging from safety significant ones to insignificant and extremely minor specifications or descriptions of details that have no safety implications. *See* 10 C.F.R. 50.34(b). In their proposed findings of fact, the Governor and the joint intervenors do not distinguish between safety significant and nonsafe-

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quantifiable into expressions of probability of errors or error rates, as the Governor and the joint intervenors would have it. Even if a statistically valid error rate were available to forecast the errors in the unreviewed portions of the nonseismic design,[69] in all but certain obvious situations, such a rate would be of little utility in judging the adequacy of the verification of the nonseismic design of Diablo Canyon. In part, this is because no acceptable rate of design errors for nuclear power plants has ever been determined.[70] Thus, the ultimate determination regarding the adequacy of the plant's design remains a qualitative judgment and we must turn to the verification work that was performed to ascertain whether its scope and quality are sufficient to provide the requisite assurance of design adequacy.[71]

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ty significant licensing criteria. For example, the Governor and joint intervenors argue, relying on the staff's and the applicant's witnesses, that the nonseismic design does not meet licensing criteria because it is a virtual certainty that there remain undetected design errors in the unreviewed portions of the design. JI PF at 14-16; Gov. PF at 5-8, 9-11. But the witnesses relied upon by the Governor and joint intervenors all testified that not only was it likely there remained some design errors, but that it was extremely unlikely any of the errors were safety significant. Cloud Tr. D-1543, D-1545; Schierling Tr. D-2662-63, D-2665; Knight Tr. D-2706. In effect, the Governor and joint intervenors champion form over substance. We reject their position. The central issue with respect to the proper design of Diablo Canyon, or any other facility, is the conformance of the design to the significant and substantive safety requirements and licensing criteria. To conclude otherwise would ignore reality and substitute "perfection" for the regulatory standards of "adequate confidence" and "reasonable assurance." *See* p. 578, *supra*.

[69] Dr. Stanley Kaplan, an engineer and applied mathematician, appeared as an expert witness for the applicant. Dr. Kaplan used the results of the nonseismic design verification work of the IDVP and applied Bayesian techniques to predict an error rate for the original design of the plant (*i.e.*, errors per design element). Also, using the judgment of the engineers associated with the verification effort that the errors identified by the verification were minor and of little safety significance, Dr. Kaplan applied his methodology to determine the likelihood of safety significant design errors remaining in the unsampled portions of the nonseismic design. Kaplan and Anderson Tr. fol. D-1161 at 56-63. Dr. Kaplan, however, cautioned (*id.* at 45) that his "numerical results are to be interpreted with a large grain of salt . . . ." *See id.* at 17-22.

The Governor's and the joint intervenors' expert witnesses, Drs. Apostolakis and Samaniego — both statisticians — reject out of hand Dr. Kaplan's projected error rate because it was calculated using nonrandomly selected samples. Samaniego Tr. D-2394-95; Apostolakis Tr. D-2343. Because we find little utility in the determination of error rates (or their accuracy) for the qualitative judgment we must make on the adequacy of the verification program for the nonseismic design, we need not decide the validity of Dr. Kaplan's calculations.

[70] Kaplan and Anderson Tr. fol. D-1161 at 67-70; Apostolakis Tr. D-2254, D-2369; Knight *et al.* [This panel consisted of J. Knight, H. Schierling and J. Wermiel.] Tr. fol. D-2649 (Contention 2) at 7-8.

According to the Governor and joint intervenors, the evidence indicates that, in spite of the verification program, there remain errors in the unreviewed portions of the nonseismic design that represent failures to meet licensing criteria. This fact, they claim, renders the verification program inadequate. Gov. PF at 9-11, 38-39; JI PF at 14. Thus, the Governor and the joint intervenors apparently would accept only a zero error rate. *See* note 68, *supra*.

[71] While it is unnecessary to consider the statistical question in more depth, we note our skepticism that a statistically valid design verification program, as thorough as the applicant's verification efforts, could have been developed and implemented. No such program has ever been developed for a nuclear power plant. Apostolakis Tr. fol. D-2313 at 12, Samaniego Tr. D-2408-10, D-2451. Although theoretically possible, implementation presents formidable obstacles such as identifying and stratifying the many thousands of design decisions that went into the facility so they may be randomly sampled. Kaplan and Anderson Tr. fol. D-1161 at 5-6; Apostolakis Tr. D-2335-44. It must be borne in mind that the subject

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The IDVP and the ITP each took a different approach to verify the nonseismic design work. The IDVP chose for review three specific safety-related systems that included work from all the applicant's internal design groups and the service-related contractor who performed the most significant nonseismic design work.[72] It also selected two areas of safety-related analysis applicable to many other systems.[73] The majority of the IDVP's nonseismic verification involved the performance of independent calculations or analyses using models generally different than

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under investigation is the design adequacy of a complex facility consisting of a multitude of engineered systems, each with its own function and each with some potential for interacting in various ways with the other plant systems. Each "design element" or design decision for a particular system involves input from previous determinations for that system and for interacting systems. We are not persuaded that random sampling of such elements is necessarily the most effective means for addressing design adequacy. Rather, a coherent sampling scheme devised in view of a system's characteristics, its function, and its interaction with other systems appears to us to be a more acceptable method for ascertaining the adequacy of the design of a nuclear power plant. Cooper *et al.* Tr. fol. D-1459 at 1/2-14, -24 to -25; Anderson *et al.* Tr. fol. D-224 at 25-27.

[72] Cooper *et al.* Tr. fol. D-1459 at 1/2-24.

[73] Specifically, the IDVP selected the auxiliary feedwater (AFW) system, the control room ventilation and pressurization (CRVP) system, and the safety-related portion of the 4160 volt (V) electric distribution system for review. As stated by the IDVP:

> The AFW system was selected because its design represents an interrelationship of several design criteria and interfaces. Specifically, it involves interface with NSSS [Nuclear Steam Supply System] vendor criteria, with containment design criteria, interface of PGandE internal design organizations, and the methodology of determining a water system's mechanical, electrical, and control component design criteria. In addition, AFW systems often appear in the dominant accident sequences in various probabilistic risk assessment programs.
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> The CRVP system was selected because it too represents an interrelationship of several design criteria and interfaces. Specifically, it involves interface with a service-related contractor, interface of PGandE internal design organizations, and interface with the control room habitability criteria. It also represents a contrast of design methods since it is an air system rather than a water system.
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> The safety-related portion of the 4160 V electrical distribution system was selected because it is the basic power supply for safety-related electrical equipment. It also represents an interrelationship of several design criteria and involves the interfaces among several PGandE internal design organizations.
>
> The three sample systems were designed by different engineering groups within PGandE, thus providing for evaluation of a broad spectrum of the PGandE engineering organization.
>
> In addition, the IDVP selected two areas of safety-related analyses for review: the integrated dose analyses, and the temperature, pressure and humidity analyses as they affect environmental qualification of equipment. These analyses were selected since this work was done almost exclusively by three service-related contractors and utilized by PGandE. The service-related contractors were different and their work involved a flow of design information through PGandE engineering groups.
>
> For the three selected sample systems, a complete vertical verification of the system design was performed. The applicable licensing criteria were identified, and a system design chain was developed. The system's design was then reviewed to determine if the licensing criteria were satisfied. The review included the aspects of mechanical, electrical and instrumentation and control design.
>
> In addition, the IDVP performed the following verifications of the sample systems. The IDVP verified the fire protection provided for the sample systems, including the separation, fire barriers, suppression and detection systems provided in areas containing sample system components. The IDVP verified that the AFW and CRVP systems were adequately protected from the effects of a high energy line break (HELB), high energy line crack (HELC), and moderate energy line break (MELB).

Cooper *et al.* Tr. fol. D-1459 at 1/2-21 to -23.

those employed in the original design.[74] When the IDVP identified a concern (*e.g.*, a design error) that it believed was generic (*i.e.*, having the potential for being repeated in other systems), this concern was then addressed by the ITP for *all* applicant-designed systems.[75] In turn, the ITP's verification work was sampled by the IDVP and the results reported in an ITR.[76]

The IDVP verification samples for nonseismic design encompassed the work of the primary applicant engineering design groups (civil, mechanical, electrical, instrumentation and control, and heating and ventilation). It also covered the work of the three major service contractors in the nonseismic area: Quadrex (formerly Nuclear Services Corporation) — jet impingement and pipe whip analysis; EDS Nuclear Inc. — heating and ventilation system design and other activities; and Radiation Research Associates — radiation dose calculations.[77]

In addition to reviews resulting from the identification of concerns by the IDVP in the nonseismic design area, the ITP independently per-

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[74] *Id.* at 1/2-35.

[75] The ITP addressed the following concerns identified by the IDVP:

> all areas of analyses of pressure, temperature and humidity due to HELB; selection of system design pressure and temperature; selection of differential pressure across power operated valves; redundancy of power supplies for shared systems; separation and single failure criteria for mutually redundant circuits; and jet impingement effects of HELB inside containment.

*Id.* at 1/2-24.

[76] App. Exhs. 137 to 141.

[77] App. Exh. 90, IDVP Final Report, Vols. I and II, at 4.2.2-6 to -8, 4.7.1-1 to 4.7.7-5.

The IDVP did not review the work of all service contractors. For example, it did not review the work of Westinghouse, Western Canada Hydraulic Laboratories (Western Canada), Stafco Associates (Stafco), and the IDVP contractors, Cloud Associates and Teledyne. App. Exh. 90, IDVP Final Report, Vol. I, at 4.1.4-3; Reedy Tr. D-1486. We have reviewed each of these excluded contractors and conclude that because of the circumstances in each case, the exclusions were reasonable and do not render the verification efforts inadequate as claimed by the Governor and joint intervenors. As we discuss *infra*, pp. 608-10, Westinghouse had its own properly functioning quality assurance program that assured the adequacy of both the services it performed and the equipment it designed for the applicant. Although Western Canada did not have a proper quality assurance program (App. Exh. 157, SECY-82-414, Encl. 5 at 5), Western Canada's work in vortex analysis — the same work it performed for the applicant — had been audited in a generic review and found sufficient by the NRC staff. App. Exh. 101, ITR 9, at A52; Cooper Tr. D-1478-79, D-1481-82, D-1750-51. Stafco assisted in the preparation of a list of safety-related structures, systems and components and in updating the FSAR. Because Stafco did not perform design work, it was properly excluded from the design verification program. Reedy Tr. D-1486, D-1488. Finally, with respect to the IDVP participants, Teledyne had a satisfactory quality assurance program that attests to the sufficiency of its design work. App. Exh. 157, SECY-82-414, Encl. 5 at 4. In any event, the ITP reviewed the seismic work previously performed for the applicant by Teledyne. App. Exh. 91, ITP Phase I Final Report, at 2.2.3-5. Cloud Associates, on the other hand, did not have a quality assurance program. App. Exh. 157, SECY-82-414, Encl. 5 at 5. Of the three projects Cloud Associates performed for Diablo Canyon (a review of pipe whip restraints, a systems interaction program, and a research program on seismic capability of nonseismic design components), only pipe whip restraint comprised design work that would normally have been subject to review by the IDVP, but was excluded because Cloud Associates was a member of the IDVP. App. Exh. 90, IDVP Final Report, Vol. I, at 4.1.4-3; App. Exh. 156, SECY-82-89, Encl. 1 at II, p. 4. That Cloud Associates was not reviewed is not now important. As part of the complete seismic review, the ITP re-evaluated all rupture restraints inside and outside containment to assure they were properly designed and installed. Staff Exh. 37, SSER 19, at C.4-2 to -3. Thus, the exclusion of these five service-related contractors does not render the applicant's verification efforts insufficient.

formed a functional design review of the applicant-designed, safety-related mechanical, electrical and ventilation systems. The instrumentation and controls for mechanical systems, and all of the safety-related mechanical, electrical and ventilation systems were reviewed to assure adequate protection against a series of postulated hazards.[78] This nonseismic evaluation was performed in accordance with an NRC-approved quality assurance program meeting the criteria of Appendix B.[79]

While the scope of the nonseismic review of the Diablo Canyon safety-related systems was not as complete as the seismic review, an appreciable portion of the nonseismic design was verified.[80] There were errors identified that required reanalysis and, in some instances, physical modifica-

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[78] Anderson *et al.* Tr. fol. D-224 at 17-19; Kaplan and Anderson Tr. fol. D-1161 at 64-66.

[79] Anderson *et al.* Tr. fol. D-224 at 7; Staff Exh. 36, SSER 18, at C.2-3 to -4; Dick *et al.* [This panel consisted of C. Dick, M. Jacobson, S. Skidmore and T. de Uriarte.] Tr. fol. D-847 at 9.

The Governor seeks to have us discount (as an applicant trial ploy not worthy of belief) that portion of the ITP review work that was not performed for, and reviewed by, the IDVP. Gov. PF at 31-34. The Governor argues that prior to the hearing none of this ITP work was represented by the applicant as an additional verification effort and, in any event, the ITP review was neither documented to the same extent as the IDVP reviews, nor done to the same depth as the IDVP work. But the existence of the separate ITP review is evident from the applicant's semi-monthly reports as early as February 1982, and contrary to the Governor's assertions, the applicant's June 1983 Phase II Final Report clearly identifies this ITP review effort. App. Exh. 92, ITP Phase II Final Report, at iv. Moreover, the fact that the verification work is not documented in the same fashion as the work carried out in conjunction with the IDVP is a reflection of the fact that the latter program had reporting requirements imposed upon it by the Commission and the NRC staff. The ITP review work is recorded in the applicant's files and open items (*i.e.*, errors) found during the course of this review are discussed in the Phase II final report. Anderson Tr. D-1426. App. Exh. 92, ITP Phase II Final Report, at 3-22 to -31. Thus, absent a valid showing that the work is flawed, or an objection to its admission as evidence, neither of which was made, the ITP's functional design review stands as significant evidence of the adequacy of the Diablo Canyon nonseismic design.

[80] The applicant's witness Anderson estimated that the total nonseismic design review (IDVP plus ITP) encompassed about seventy-five percent of the engineering work at Diablo Canyon. Tr. D-1419-20, D-1425. He readily admitted, however, that his figure could be characterized as rather "soft." Tr. D-1441, D-1426-27, D-1429-33. The Governor and the joint intervenors take issue with Mr. Anderson's estimate. Gov. PF at 31-35; JI PF at 2-3. They object because the figure is an estimate, not a precise number, and because the ITP functional design review component of Mr. Anderson's estimate was neither mandated nor reviewed by the IDVP. They assert that if the latter component of the estimate is discarded, the IDVP only reviewed twenty-three percent of the design elements of the nonseismic work. This argument overlooks the review by the ITP performed at the direction of the IDVP (*see* p. 590, *supra*), and as previously indicated, there is no reasoned basis for discarding the ITP functional design review. *See* note 79, *supra*, and accompanying text. Further, Mr. Anderson's seventy-five percent estimate dealt with total *engineering work* covered by both the IDVP and ITP reviews, not *design elements*. Anderson Tr. D-1419-20, D-1427, D-1436, D-1438-39. The two are vastly different. There are numerous design elements of varying significance in the engineering work involved in a project of this magnitude.

Moreover, it is not the exact quantification of work reviewed that is critical. The important consideration is that the scope and implementation of the nonseismic verification program was sufficient to test thoroughly the design process in order to discover any defects in that process. Here, the applicant's verification program encompassed three systems in their entirety (covering the spectrum of applicant's in-house design groups and the interrelationships of all significant design criteria and interfaces) and parts of all the remaining nonseismic systems. This slice of the nonseismic design process was sufficient to uncover any significant inadequacies in the design process.

tions were necessary in order to comply strictly with licensing criteria,[81] but all the errors were judged to be of minor safety significance.[82]

The IDVP's sampling method involved a complete (vertical) review of three dissimilar systems, followed by an analysis by the ITP (across all systems horizontally) to search for generic problems suggested by errors found in the vertical review. By using this approach, the IDVP was able to obtain a broad and comprehensive understanding of the nonseismic design of Diablo Canyon Unit 1.[83] As a result of this review, the IDVP concluded that while there may exist errors in the unsampled portion of the design, the likelihood of the existence of a safety significant error was small.[84]

To a certain degree, this judgment was tested by the ITP's own review and found valid. The ITP review sampled an additional portion of the safety-related, nonseismic design of the plant and, once again, it found only a small number of errors, none of which was safety significant. This led the ITP to conclude, with a high degree of assurance, that the nonseismic design of the plant was adequate.[85]

We are not without some puzzlement as to why, having reviewed so much of the plant, the applicant did not carry through to a total review of the nonseismic design. In light of the history of the Diablo Canyon facility and the considerable time and resources already expended by the applicant on the verification programs, such an additional undertaking might well have proven a provident step in order to dispel the inevitable speculation as to the adequacy of the unreviewed portions of the nonseismic design. Nevertheless, on the basis of all the evidence, we find that the verification efforts of the IDVP and ITP were sufficient to provide adequate confidence that the nonseismic design criteria have been

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[81] *See* notes 46 and 47, *supra*.

[82] The Governor and joint intervenors object to this characterization of the nonseismic design errors that were discovered because no formal analysis was performed to assess their seriousness or their potential for reducing the plant's margin of safety. Gov. PF at 16-17, JI PF at 15. They contend that the latter determination requires the performance of a probabilistic risk assessment. *See* Apostolakis Tr. fol. D-2313 at 10-11. But neither the Governor nor the joint intervenors presented any direct evidence to dispute the expert opinions of the staff and applicant witnesses that none of the errors found by the verification program was safety significant. Anderson *et al.* Tr. fol. D-224 at 12-14; Anderson Tr. D-345-46, D-1420; Knight Tr. D-2696-97, D-2819; Cooper *et al.* Tr. fol. D-1459 at 1/2-32. We find that the expertise of the applicant's and the staff's witnesses in the design, construction and operation of nuclear power plants qualifies them to evaluate the safety significance of such nonseismic errors, at least to the point of determining whether the errors warrant a quantitative evaluation. While we agree that as a general proposition only a formal analysis can provide a quantitative assessment of an error's significance, our review of the nonseismic errors identified by the IDVP and ITP leads us to concur in the judgment of the applicant's and the staff's experts that the errors are of minor safety significance.

[83] Cooper *et al.* Tr. fol. D-1459 at 1/2-25.

[84] *Id.* at 1/2-32.

[85] Anderson *et al.* Tr. fol. D-224 at 19-21; App. Exh. 92, ITP Phase II Final Report, at 5-1.

met for Unit 1. Through sampling which covered all the engineering disciplines and types of analyses, and which encompassed a major portion of the plant's design, the IDVP and ITP concluded that the original design process was efficacious. The NRC staff concurred with this conclusion. The errors found were few, of minor significance, and did not indicate a pervasive weakness in any design area. We concur in the judgments of the ITP, IDVP and staff that the level of assurance provided by the applicant's verification efforts is comparable to that which would be afforded by a properly functioning quality assurance program.[86]

B. Issue 3(f)(iii) concerns a possible phenomenon known as "uplifting." In theory, uplifting may occur when a seismic event produces a high horizontal acceleration. In some circumstances this acceleration tends to produce a shift in the center of mass of a rigid structure, perhaps to the extent of causing a building tilt. In a rigid building such as the Diablo Canyon containment, if uplifting occurs, one side of the base mat would lift away from the underlying rock or soil thereby causing increased vertical acceleration in the structure. No specific analysis was done by the ITP or IDVP concerning the effect on equipment of increased vertical acceleration caused by uplift. Only the effect of uplift on the containment mat was studied by the ITP.[87] Joint intervenors and the Governor assert that the applicant should have analyzed the effects of uplift on equipment qualification in the Diablo Canyon containment.[88]

The uplift phenomenon is a relatively recent concept that evolved from discussions among seismologists, rather than from observation of seismic events.[89] It has never been identified as a source of actual damage to a structure and there is no NRC regulation or staff guidance requiring that the seismic analyses for a nuclear power plant include this phenomenon.[90]

The Governor's expert witness, Dr. Jose M. Roesset, opined that some uplifting of the Diablo Canyon containment would occur at the

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[86] We note that, in theory, a design quality assurance program will provide 100 percent review of the design work. The record is clear, however, that such a program can never assure that there will be no design errors. Anderson and Kaplan Tr. D-1176-81; Hubbard Tr. D-2130-31, D-2134-35; Apostolakis Tr. D-2376-77. Indeed, Appendix B only provides that the purpose of a quality assurance program is "to provide adequate confidence that a [safety-related] structure, system or component will perform satisfactorily in service." *See* 10 C.F.R. Part 50, Appendix B, Introduction. Here, the applicant's verification program has provided that level of confidence.

[87] White Tr. D-828.

The applicant's analysis of the possible uplift of the containment mat found that the maximum stress on the reinforcing steel was within allowable limits stated in the FSAR and Hosgri Report. Seed *et al.* Tr. fol. D-652 at 71-72.

[88] Gov. PF at 43-45; JI PF at 20-21.

[89] Seed Tr. D-687-88; Roesset Tr. fol. D-2206 at 6.

[90] White Tr. D-669-71, D-680-82; Seed Tr. D-684; Cloud Tr. D-1890; Polk Tr. D-2506.

peak ground acceleration established for the site.[91] According to Dr. Roesset, such uplift would amount to only a fraction of an inch and would cause only a small (approximately ten percent) increase in vertical acceleration. Such uplift also would result in a negligible increase in seismic displacement and velocity.[92] He noted further that most of the effects of uplift are beneficial.[93]

The applicant's expert witnesses were unwilling to concur in Dr. Roesset's opinion that uplifting of the Diablo Canyon containment would occur at design basis ground accelerations.[94] Rather, these experts were only willing to concede that uplift was possible at such accelerations.[95] But, like Dr. Roesset, the applicant's experts (as well as those of the staff) agreed that should uplift occur at Diablo Canyon it would amount to only a fraction of an inch and would cause only very small increases in the vertical acceleration of the reactor building.[96] Thus, there is agreement among all the expert witnesses that the effects of uplift on the vertical accelerations of the Diablo Canyon reactor building would be extremely small.

The equipment inside the containment is seismically qualified for a total acceleration obtained by taking the square root of the sum of the squares of each of three accelerations (two horizontal and one vertical).[97] A small increase in the vertical acceleration on the order of that resulting from any uplift of the Diablo Canyon containment (*i.e.*, ten to fifteen percent) would cause an insignificant increase in the total

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[91] Roesset Tr. fol. D-2206 at 7-8.

In part, Dr. Roesset based his opinion on the work of R.P. Kennedy that indicated an increase in the response spectra of a high temperature gas-cooled reactor (HTGR) in the high frequency range, and on the work of J.P. Wolf that indicated the possibility of uplift of a "typical reactor" building at a peak ground acceleration of 0.167g if the containment were on a rock base. Roesset Tr. fol. D-2206 at 7. *See* Kennedy, Short, Wesley and Lee, *Effect of Non-Linear Soil Structure Interaction Due to Base Slab Uplift on the Seismic Response of a High-Temperature Gas-Cooled Reactor (HTGR)*, 38 Nuclear Engineering and Design, No. 3 (1976); Wolf and Skrikeru, Seismic Excitation with Large Overturning Moments: Projecting Base Mat or Lifting-off?, paper presented at the Conference on Structural Analysis, Design and Construction in Nuclear Power Plants, Porto Alegre, Brazil (Apr. 1978).

[92] Roesset Tr. D-2273-74, D-2276-77.

[93] Roesset Tr. fol. D-2206 at 8; Tr. D-2271.

[94] Seed Tr. D-687; White Tr. D-668-69; Holley Tr. D-1874-76; Biggs Tr. D-1881.

[95] *See e.g.*, White Tr. D-671, D-675; Seed Tr. D-687; Holley Tr. D-1874-75.

In general, the applicant's expert witnesses did not endorse Dr. Roesset's opinion that uplift would occur because, if the mathematical model was expanded to include all of the relevant factors, uplift would most likely not be shown to occur. In other words, the less detailed model relied upon by Dr. Roesset necessarily predicts the phenomenon. White Tr. D-668, D-671; Holley Tr. D-1874-76. *See also* Polk Tr. D-2503. In reality, uplift has never been found to occur in a structure. White Tr. D-669-70; Seed Tr. D-684. To model the uplift phenomenon properly would be an exceedingly complex and time-consuming task. Seed Tr. D-687-39, D-694; White Tr. D-682, D-691. Moreover, the Diablo Canyon reactor building base mat is constructed with a deep concrete key poured into a rock foundation that would have to be torn before uplift could occur. White Tr. D-691; Seed and White Tr. D-695-96.

[96] White Tr. D-672, D-682; Holley Tr. D-1876; Biggs Tr. D-1882-83; Miller Tr. D-2507-08; Kuo Tr. D-2504-05.

[97] Biggs Tr. D-1882-83; Kuo Tr. D-2514; Cloud Tr. D-1886-87.

acceleration obtained from the combination of the horizontal and vertical accelerations.[98] This result is reduced even more because the uplift acceleration is not in phase with the seismic vertical acceleration and cannot be considered additive to the peak vertical acceleration.[99] Moreover, the equipment inside the containment is already seismically qualified within margins more than sufficient to accommodate any increase in vertical acceleration as a result of uplift.[100] We find, therefore, that, even if uplift should occur, its detrimental effects would be insignificant. The applicant need not include as part of its seismic verification any seismic modeling and analysis of the effects of uplift on equipment inside the reactor building.

C. Issues 3(f)(iv) and (v) concern the modeling of soil springs for the Diablo Canyon auxiliary building. The term "soil springs" is applied to the methodology used in seismic analysis to represent motion resistance and damping characteristics of the foundation media around a structure. In other words, the soil media is assumed to act like a spring in a seismic event. Here, the Governor and joint intervenors complain that the soil properties used to establish soil spring constants were not properly specified and that the use of soil springs did not adequately account for all soil structure interactions.

At Diablo Canyon, the auxiliary building has foundations at elevations 85 feet and 100 feet above sea level. In modeling the building for the seismic reanalysis, the ITP assumed the base to be rigid at the lower (85-foot) elevation and soil springs were used to represent the intervening rock between that level and the 100-foot level. The Hosgri Report and the FSAR allow a rigid or fixed-base analysis for stiff rock, indicated by a shear wave velocity at or above 3500 feet per second (fps).[101] Soil springs are used to model less stiff soil.

The ITP, relying on data supplied by Harding Lawson Associates,[102] determined the shear wave velocity at 100 feet to be about 2700 fps, supporting the use of soil springs at this elevation.[103] The ITP had examined

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[98] Biggs Tr. D-1882-83; Kuo Tr. D-2514.

[99] Biggs Tr. D-1885; Roesset Tr. D-2282.

[100] Cloud Tr. D-1886-87; Knight Tr. D-2512-14.

Dr. Roesset called for an analysis of the effects of uplift on the equipment inside containment for the "sake of completeness." Tr. D-2273-74. But he conceded that he did not know what equipment was in containment and how it was qualified for vertical acceleration. Tr. D-2214-15.

[101] *See* FSAR Section 3.7A at 6.

Soil stiffness may be determined from measured values of shear wave velocity of the soil.

[102] The engineering firm of Harding Lawson Associates did the major soils analyses (*i.e.*, geotechnical studies) for the Diablo Canyon site. A review conducted as part of the seismic verification program found that Harding Lawson Associates had not implemented a quality assurance program for the soil work for Diablo Canyon. App. Exh. 155, ITR 68, at 2.

[103] Seed *et al.* Tr. fol. D-652 at 20-21; White Tr. D-700-01.

the Harding Lawson data and found it to be reasonable and comparable to data obtained by other companies doing work involving the soil under the auxiliary building.[104] As part of its review, the ITP performed parametric studies in which the soil geometry and the soil springs under the 100-foot foundation were varied for a number of stiffness values. The shear wave velocities ranged from 6,000 fps (very rigid) to 2,000 fps (less rigid), with the value 2,775 fps serving as the base case.[105] The results of these analyses showed that there was little variation in the shear stresses for the auxiliary building walls and that generally the base case yielded the highest values.[106] In other words, the auxiliary building was found to be qualified for shear forces associated with all credible soil stiffness properties.

Because Harding Lawson Associates had not implemented a quality assurance program for their work at Diablo Canyon, the IDVP developed an extensive program to verify the soils work.[107] That program again verified the reasonableness and reliability of the soils data.[108] The IDVP also reviewed the ITP's auxiliary building analysis and found it acceptable.[109] We find that the ITP properly addressed the soil properties in its modeling of the auxiliary building and that the model used was appropriate.

The Governor and the joint intervenors assert, however, that the ITP erred by using soil springs in modeling the auxiliary building at the 100-foot elevation. They claim a fixed-base analysis at that elevation should have been used and that such an analysis would show increased shear wall forces that have not been analyzed.[110] The Governor's and joint intervenors' position is not supported by the evidence.[111] The foun-

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[104] White Tr. D-774; Seed and White Tr. D-811-13.

[105] App. Exh. 145, ITR 55, at 20, 21 (Table 3), 23 (Table 5); Seed and White Tr. D-700-06.

[106] White Tr. D-706; App. Exh. 145, ITR 55, at 23 (Table 5).

[107] App. Exh. 155, ITR 68, at 2, 4-5; Cloud Tr. D-1942-43, D-1997-99, D-2013-14.

[108] Cloud Tr. D-2002-03, D-3124; Cloud *et al.* [This panel consisted of R. Cloud, J. Biggs, M. Holley and R. Wray.] Tr. fol. D-1843 at 3-8.

[109] App. Exh. 90, IDVP Final Report, Vol. I, at 4.4.2-9 to -10; Cloud Tr. D-1848-49.

The IDVP performed parametric calculations similar to the ITP's to determine the spring constants and their results were in reasonable agreement with those of the ITP. App. Exh. 145, ITR 55, at 25; Cloud Tr. D-1905. The staff also concurred in the ITP's conclusions. Kuo *et al.* [This panel consisted of J. Knight, P. Kuo, H. Polk, C. Miller, A. Philippacopoulos, C. Costantino and P. Wang.] Tr. fol. D-2463 at 16-18.

[110] Gov. PF at 40-41; JI PF at 21-22.

[111] Although the Governor and the joint intervenors do not identify the source for their claim, they apparently reach their conclusion that the ITP should have used a fixed-base analysis for the 100-foot elevation by taking out of context from App. Exh. 145, ITR 55, at 24 (Table 7), "IDVP Soil Parameters," the IDVP's best estimate of 3500 feet per second shear wave velocity for the auxiliary building foundation material. They ignore, however, the IDVP's explanation of those soil parameters and the IDVP's conclusion that the values of the soil springs used by the ITP were acceptable. App. Exh. 145, ITR 55, at 25.

dation material at elevation 100 feet has a shear wave velocity of 2500 to 2700 fps (not 3500 fps as the Governor and the joint intervenors assert); accordingly, the ITP's use of soil springs in its modeling for that elevation is justifiable.[112] Moreover, the parametric studies performed as part of the seismic reanalysis demonstrate that there would be a negligible change in shear wall forces even if the foundation at the 100-foot elevation were to be considered fixed. All such forces are well within the margins for which the shear walls are qualified.[113]

D. Issue 3(o) questions the modeling of the fuel handling building. Specifically, it challenges the use of the translational and torsional response of the auxiliary building as input to the fuel handling building and the number of dynamic degrees of freedom used in the model.

The fuel handling building is, in essence, a small superstructure to the auxiliary building and will experience the motion of the auxiliary building during a seismic event.[114] The ITP therefore modeled the auxiliary building, including the fuel handling building, and then used the appropriate response of that building as input to a separate model of the fuel handling building in order to determine local responses.[115] The IDVP concluded that the modeling was consistent with good engineering

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[112] *See* p. 595, *supra*.

The Governor's expert agreed that if the soil properties printed in App. Exh. 145, ITR 55, at 23 (Table 5) were correct, then the ITP's analysis was proper. Roesset Tr. D-2217-19, D-2249-50. Subsequently, one of the applicant's expert witnesses rechecked those numbers and found them correct. Cloud Tr. D-3111.

[113] App. Exh. 145, ITR 55, at 21 (Table 3), 23 (Table 5); Cloud *et al.* Tr. fol. D-1843 at 3-9; Biggs Tr. D-1907-08; White Tr. D-713-19.

Alternatively, the Governor and the joint intervenors argue that the ITP should have considered a softer soil spring in modeling the auxiliary building because the material underlying the foundation has a shear wave velocity of only 1500 fps. They claim that, in the event of an earthquake, the auxiliary building would be subject to rotational effects (*i.e.*, a rocking motion) because the structure is embedded at different elevations in soils of widely varying stiffness. Gov. PF at 41-43; JI PF at 21-22. This argument, like the other, is unsupported by the evidence and footed on an inappropriate reference. The Governor and joint intervenors rely upon App. Exh. 155, ITR 68, Figure 15 at 81 to conclude that the material underlying the auxiliary building is soft. But this figure applies to the soil underneath the diesel fuel oil tanks, not the auxiliary building. App. Exh. 155, ITR 68, at 28-30; Cloud Tr. D-3110-11; White Tr. D-3136. Further, the seismic refraction tests used to produce the data in Figure 15 are not as reliable as cross-hole and up-hole testing techniques used to generate the data relied upon by the ITP. Cloud Tr. D-1996-2002, D-3112, D-3122, D-3125; White Tr. D-3136; Roesset Tr. D-2269. Accordingly, the ITP need not have considered such a soft soil spring in its modeling.

[114] Seed *et al.* Tr. fol. D-652 at 81-82; Cloud *et al.* Tr. fol. D-1843 at 3-18.

[115] Seed *et al.* Tr. fol. D-652 at 81-82; Cloud *et al.* Tr. fol. D-1843 at 3-18.

The seismic analysis of the auxiliary building, including the fuel handling building superstructure, was performed by using a lumped mass-spring model. Seed *et al.* Tr. fol. D-652 at 81. The model used a five percent eccentricity of mass to account for the effects of accidental torsion and the appropriate translational time-history was applied at its base. *Id.*

The fuel handling building was decoupled from the auxiliary building and analyzed separately using three-dimensional finite element models. The seismic input motions at the base of these models consisted of acceleration time-histories (translational and torsional) from the auxiliary building dynamic analysis developed at the center of mass at elevation 140 feet. The geometric eccentricity of the fuel handling building relative to the 140-foot elevation center of mass was accounted for by applying the translational time-history together with the eccentric distance times the torsional time-history. *Id.*

practice and acceptable.[116] The staff concurred in the IDVP's conclusion.[117]

In order to analyze the fuel handling building, the ITP first developed a large static model, which was then divided into two smaller dynamic models. The total number of degrees of freedom was reduced to make the analysis more manageable.[118] This reduction was accomplished by using standard industry procedures.[119] A sufficient number of dynamic degrees of freedom were included to determine adequately peak accelerations.[120] We find, therefore, that the modeling of the fuel handling building was appropriate.[121]

E. Issue 3(q) concerns the soils analyses for the buried diesel fuel oil tanks at the facility site. The soils analyses for the diesel fuel tanks, like those for the auxiliary building dealt with in issue 3(f)(iv), were done by Harding Lawson Associates.[122] They performed the original seismic qualification analyses for the diesel tanks. In 1983 as part of the ITP seismic verification, Harding Lawson reanalyzed them.[123] The IDVP then reviewed the Harding Lawson requalification analyses and conducted several alternative analyses including parametric studies covering a range of soil properties for the backfill around the diesel fuel tanks.[124]

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[116] Cloud *et al.* Tr. fol. D-1843 at 3-18 to -19.

[117] Kuo *et al.* Tr. fol. D-2463 at 21.

[118] Staff Exh. 36, SSER 18, at C.3-26; Seed *et al.* Tr. fol. D-652 at 81-83; Cloud *et al.* Tr. fol. D-1843 at 3-18 to -19.

[119] Cloud *et al.* Tr. fol. D-1843 at 3-18 to -19. *See also* NUREG-0675, Supplement No. 20, Safety Evaluation Report related to the operation of Diablo Canyon Nuclear Power Plant, Units 1 and 2 (Dec. 1983) at C.3-6 to -7.

[120] Cloud *et al.* Tr. fol. D-1843 at 3-19.

[121] At the time of the hearing, no written confirmation of a certain aspect of the ITP's input into the model of the fuel handling building had yet been provided to the staff, as the staff had requested. Miller Tr. D-2528-29. On the basis of the applicant's oral representation, the staff concluded that the ITP procedures were acceptable. Kuo *et al.* Tr. fol. D-2463 at 20-21. Because no written confirmation had been received from the applicant, however, the Governor states that "no findings are yet possible." Gov. PF at 45. That is not the case. The applicant has fully met its burden of proof on this issue. The fact that the staff sought written confirmation from the applicant that separate time histories were applied at the base of each column in the fuel handling building model is irrelevant. Though it is without effect on our findings, we note that the written confirmation requested by the staff has since been provided by the applicant. *See* letter from J. Schuyler, PG&E, to G. Knighton, NRC, dated November 17, 1983, at 2-3. Moreover, by not filing adequate proposed findings on the issue, the Governor, in effect, has waived it. The joint intervenors filed no proposed findings on this issue. *See* note 18 and accompanying text, *supra*.

[122] Because Harding Lawson had not implemented a quality assurance program for their original work at Diablo Canyon, the IDVP performed an extensive review of the soils work for the fuel tanks and found it reasonable and acceptable. Cloud *et al.* Tr. fol. D-1843 at 3-23 to -24; App. Exh. 90, IDVP Final Report, Vol. II, at 4.9.2-1 to -2, -6 to -9; App. Exh. 155, ITR 68, at 28-30, 36-37, 41. That soils work was also reviewed by the ITP. White Tr. D-767, D-774; Seed Tr. D-770, D-772-73.

[123] App. Exh. 155, ITR 68, at 33-34.

[124] *Id.* at 34-40; Cloud *et al.* Tr. fol. D-1843 at 3-23.

The IDVP found the Harding Lawson work acceptable and concluded that the diesel tanks meet licensing criteria.[125]

The Governor and the joint intervenors assert, however, that the variation in the Harding Lawson soils data for the backfill around the diesel tanks, and the variation between the data for the rock underlying the fuel tanks and that under the auxiliary building, demonstrate that the original data are unreliable and should not be used for qualifying the tanks.[126] We disagree. The Harding Lawson soils data were checked and rechecked, and the IDVP's parametric studies demonstrate that the qualification of the fuel tanks is not sensitive to the variation in the backfill soil properties about which the Governor and the joint intervenors complain.[127]

The properties of the rock under the diesel tanks and auxiliary building vary because the structures are in different locations.[128] The seismic analyses for the fuel tanks included properties for the underlying rock obtained using seismic refraction tests. These tests are considered to be relatively unreliable for the Diablo Canyon site, and would give results indicating the rock is less rigid (softer) than is actually the case.[129] The use of soft rock properties in the seismic analysis results in greater calculated strains in the tanks than would the use of more rigid rock. Thus, the analyses performed were conservative.[130] Additionally, the rock below the tanks has a small effect on the tanks' response.[131] Accordingly, we find that the data used for the diesel fuel tank analyses were adequate to demonstrate that the tanks are properly qualified.[132]

F. Like issue 3(q), issue 3(r) also questions the soils analysis of backfill material.[133] In particular, the Governor and the joint intervenors challenge the soils analysis of the backfill covering the circulating water

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[125] App. Exh. 155, ITR 68, at 41; App. Exh. 90, IDVP Final Report, Vol. II, at 4.9.2-6 to -9; Cloud *et al.* Tr. fol. D-1843 at 3-24.

[126] Gov. PF at 46-48; JI PF at 22-23.

[127] App. Exh. 155, ITR 68, at 29, 37, 41; Cloud *et al.* Tr. fol. D-1843 at 3-23 to -24; Cloud Tr. D-1982-83, D-1988.

[128] Cloud Tr. D-1998, D-3112, D-3122-23; White Tr. D-3136.

[129] Cloud Tr. D-1998-99; *see* note 113, *supra.*

[130] Cloud Tr. D-2001, D-3124-25.

[131] App. Exh. 155, ITR 68, at 41.

[132] The joint intervenors also question the soil properties underlying the diesel fuel oil tanks. The joint intervenors have misapprehended the data. They compare an equation for compressional wave velocity for the rock under the diesel fuel tanks (App. Exh. 155, ITR 68, at 38) with one that expresses shear wave velocity under the circulating water intake conduits and auxiliary saltwater piping (App. Exh. 155, ITR 68, Figure 25 at 91). These equations must be converted to the same component of wave velocity before any comparision is made.

[133] Gov. PF at 48-52; JI PF at 23-24.

intake (CWI) conduits and the auxiliary saltwater (ASW) piping used in the seismic qualification of these components.[134]

The soils analysis for the ITP's seismic qualification of the CWI conduits and the ASW piping was performed by Harding Lawson Associates. As we have previously found, the Harding Lawson soils work was reviewed by the IDVP and found acceptable.[135] In this instance, Harding Lawson took test borings of the backfill and then performed laboratory tests on the specimens to arrive at soil property values.[136] The IDVP reviewed the seismic analyses and found that the Harding Lawson soil and rock properties were acceptable and that the CWI conduits and ASW piping meet licensing criteria.[137]

The Governor and the joint intervenors charge that the soils data do not represent the actual backfill at the site over the conduits and piping, because no correction factor was applied to the data to adjust for the sample disturbance that occurs when laboratory values for soil properties are used. If a correction factor were applied, they claim, the soil properties would be different than the ones used in the qualification analysis.[138] The properties of the backfill over the CWI conduits and ASW piping about which the Governor and the joint intervenors complain are negligible factors, however, in the seismic qualification of these components.[139] The conduit and pipes are surrounded by rock on the sides and bottom (*see* note 134, *supra*) and the rock determines the seismic response of these components, not the backfill on top of them.[140] Because the effect of the backfill on the seismic response of these compo-

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[134] Each of the two circulating water intake conduits (one for each unit) is a 16 ft. by 30 ft. reinforced concrete structure containing two parallel, essentially square, tunnels (approximately 12 ft. by 12 ft.). The conduits parallel one another and extend approximately 1600 feet from the turbine building to the intake structure. The conduits are located in trenches excavated into rock and covered on top with some twenty feet of backfill. Two 24-inch diameter steel auxiliary saltwater pipes, placed one over the other, run parallel to and on one side of each of the CWI conduits in a narrow, shallow trench. One side of the trench is formed by the concrete sidewall of the CWI and the other by rock. The bottom of the trench consists of a concrete lip projecting from the CWI concrete sidewall. The ASW pipes are attached to this concrete lip at 40-foot intervals and are surrounded in the trench by compacted sand. The ASW pipes are then covered with the same backfill material as the CWI conduits. App. Exh. 155, ITR 68, at 42 and Figure 21, at 87; Seed Tr. D-837-40.

[135] *See* p. 596, *supra*.

[136] App. Exh. 155, ITR 68, at 42-45.

As part of the seismic analyses, the data were used to plot soil shear modulus against strain and soil damping ratio as a function of strain. App. Exh. 155, ITR 68, at 89-90 (Figures 23 and 24). Those test data were then matched to a standard soils curve (*i.e.*, Seed & Idriss 1970 sand curve) and that curve was employed in the qualification analyses. Seed *et al.* Tr. fol. D-652 at 85-86.

[137] App. Exh. 90, IDVP Final Report, Vol. II, at 4.9.2-10; App. Exh. 155, ITR 68, at 51.

[138] Gov. PF at 50-52; JI PF at 23-24.

[139] Seed *et al.* Tr. fol. D-652 at 86; White Tr. D-805; Seed Tr. D-836-40, D-3142-43.

[140] Seed *et al.* Tr. fol. D-652 at 86; Seed Tr. D-836-39, D-3142-43.

Indeed, the Governor's expert conceded that the effect on the seismic response of backfill over the conduits and piping was small. Roesset Tr. D-2254, D-2256.

nents is insignificant, it was acceptable for the ITP and IDVP to use the Harding Lawson data without correction factors in the seismic qualification of the CWI conduits and the ASW piping.

G. The joint intervenors allege in issue 4(i)(1) that the IDVP unjustifiably accepted a deviation from the FSAR fire protection licensing criteria for the room containing the motor driven auxiliary feedwater (AFW) pumps, because there is a large pipe chase covered with a grate in the ceiling of that room.[1] This purported deviation was discovered by the IDVP during its review of the auxiliary feedwater system and resulted in the issuance of EOI 8038. The EOI was issued because the description of the AFW pumproom in the FSAR, if read literally, was subject to misinterpretation (*i.e.*, the ceiling was described only as a 2-foot thick concrete slab), and the existence of the ceiling pipe chase appeared to violate the FSAR fire zone separation licensing criteria.[142]

The ITP responded to the IDVP's concern by submitting a fire hazards analysis demonstrating that a fire is unlikely to propagate through the pipe chase because of the actual combustible loading in the pumproom, the movement of air through the ceiling opening and the curbing surrounding the pipe chase in the area above. The ITP analysis confirmed that the plant was originally designed to meet the fire zone separation criteria with the open pipe chase in the AFW pumproom ceiling.[143] The IDVP concurred in the ITP's analysis. It agreed that the FSAR fire zone commitment had been met and that a fire in this area of the facility would not adversely affect the safe shutdown functions of the AFW system.[144] On the basis of the uncontroverted evidence of the origins of this purported deviation and the ITP's fire propagation analysis, we find — like the IDVP — that there is no deviation from licensing criteria because of the open pipe chase in the AFW pumproom.[145]

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[141] The Governor failed to file proposed findings of fact on issue 4(i)(1). *See* note 18, *supra* and accompanying text.

[142] Krechting and Cooper Tr. fol. D-2040 at 4-16; App. Exh. 110, ITR 18 at 4-1, 5-3. *See* "Fire Protection Review, Units 1 and 2 Diablo Canyon Site" (Amendment No. 51 to operating license application) at 4-18 to -19.

[143] Connell *et al.* [This panel consisted of R. Anderson, E. Connell and G. Moore. W. Vahlstrom was subsequently added to the panel. Tr. D-531.] Tr. fol. D-487 at 22; App. Exh. 110, ITR 18, at 4-1, 5-3.

[144] App. Exh. 110, ITR 18, at 4-1, 5-3.

[145] The joint intervenors presented no witnesses or documentary evidence on this issue and did not cross-examine any of the applicant's witnesses on it. They claim, nevertheless, that the FSAR fire zone separation license criteria are not met based solely on a selective use of staff witness Kubicki's answers to their questions on cross-examination. *See* JI PF at 24-25. They assert that the existence of the open pipe chase precludes a complete fire barrier. Because the staff had no knowledge of the air flow patterns for the AFW pumproom, and it is possible for the products of combustion to travel through the pipe chase thereby propagating fire to another part of the plant, the joint intervenors contend there is no assurance the licensing criteria are met. *Id.* In addition to its other flaws, the joint intervenors' argument ignores the uncontradicted testimony of the applicant's witnesses that there are insufficient combustibles

*(Continued)*

H. Issue 4(l) addresses the adequacy of the applicant's analysis of possible jet impingement effects on the design and qualification of safety-related equipment and piping inside the containment. Because a break or crack in a line carrying high energy steam or water might result in damaging jets from the failed pipe, the NRC has long required that safety-related structures, systems and components in the vicinity of potential break locations be analyzed for (and, if necessary, protected from) the effects of jet impingement.[146] In like manner, the Diablo Canyon FSAR requires that the applicant protect all safety-related structures, systems and components from the damaging effects of jet impingement.[147]

When the IDVP reviewed Diablo Canyon records, however, no documentary evidence of jet impingement analyses for safety-related systems, structures and components inside containment was found. Consequently, EOI 7002 was issued.[148] In response to this EOI, the ITP performed an extensive analysis of jet impingement effects of high energy line breaks.[149] That ITP analysis was verified by the IDVP on a sampling basis. In addition, the verification included a review of the ITP reanalysis procedure, a review of the ITP field review (including an independent walkdown to verify identification of safety-related targets) and a review of the ITP safety evaluation of impinged targets.[150] On the ba of its verification (reported in ITR 48), the IDVP concluded that the ITP analysis met the FSAR licensing criteria.[151]

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in the pumproom for a fire to propagate. Connell *et al.* Tr. fol. D-487 at 22. More important, however, is the fact that we do not rely upon the staff's testimony to reach our conclusion that there is no deviation from the FSAR fire zone separation criteria.

We note that the staff did not review the IDVP's analysis in reaching its conclusion that the open pipe chase in the ceiling of the AFW pumproom did not present a deviation from licensing criteria. Kubicki Tr. D-2873. Rather, the staff conducted an independent review of the Diablo Canyon fire protection program using 10 C.F.R. Part 50, Appendix R (Fire Protection). As a result, the staff concluded that the pipe chase opening did not represent a significant degradation of the level of fire safety in the room and that any fire propagation would not represent a significant threat to adjoining areas. This conclusion was based on the defense in depth concept, administrative controls limiting combustibles, the existence of firewalls and the availability of automatic and manual fire protection systems. Kubicki Tr. D-2874-75.

[146] *See* 10 C.F.R. Part 50, Appendix A, General Design Criterion (GDC) 4.

[147] FSAR Section 3.6.

[148] App. Exh. 140, ITR 48, at 3-1.

It should be noted that the degree of analysis and documentation of jet impingement required today is greater than for earlier-designed plants such as Diablo Canyon. Connell *et al.* Tr. fol. D-487 at 26.

[149] Connell *et al.* Tr. fol. D-487 at 25-26; Krechting and Cooper Tr. fol. D-2040 at 4-21 to -22.

[150] Krechting and Cooper Tr. fol. D-2040 at 4-21 to -22.

[151] App. Exh. 140, ITR 48, at 7-1.

After identifying several potential problems and seeking additional information from the applicant, the staff agreed that the applicant met the FSAR jet impingement licensing criteria. Staff Exh. 36, SSER 18, at C.4-29; Staff Exh. 37, SSER 19, at C.4-2. But the staff has yet to close its review of the applicant's jet impingement analysis. The matter still under investigation, however, is not pursued in issue 4(l). Staff Exh. 37, SSER 19, at C.4-2.

The Governor and the joint intervenors challenge the ITP analyses and the IDVP conclusion that the applicant has met the FSAR jet impingement licensing criteria, claiming that analyses were not performed for postulated breaks in each line inside the containment required by the FSAR.[152] In accordance with its interpretation of the FSAR, the ITP performed jet impingement analyses for high energy lines with a temperature above 200°Fahrenheit(F) *and* pressure above 275 pounds per square inch gage (psig).[153] The Governor and the joint intervenors assert that the FSAR actually requires jet impingement analysis for postulated breaks in all lines exceeding 200°F *or* 275 psig. The difference between the two interpretations results in the exclusion of three lines inside containment from the ITP's analysis that the Governor and the joint intervenors would include.[154] Thus, those three lines were not analyzed as part of the ITP jet impingement analyses. These three lines were, however, "looked at" informally by the ITP.[155]

We believe the most prudent interpretation of the FSAR is that one which requires jet impingement analysis on lines having a temperature above 200°F *or* a pressure above 275 psig.[156] Therefore, in order to comply with the FSAR licensing criteria, the applicant must formally analyze (*i.e.*, in the same fashion it analyzed the other lines inside containment) the three lines identified by its witness.[157] The applicant must report the results of its analyses to the staff and, if necessary, make any appropriate modifications prior to commercial operation.[158]

I. In issue 4(t), the joint intervenors assert that the IDVP accepted without proper justification a deviation from licensing criteria because the short circuit current for the circuit breakers on three 4160 volt (V)

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[152] Gov. PF at 54-56; JI PF at 25-27.

[153] Connell *et al.* Tr. fol. D-487 at 25-26; Connell Tr. D-584.

[154] Connell Tr. D-613-14.

[155] Connell Tr. D-616-17.

[156] The most rational, technically based criteria for postulating line breaks for the purpose of jet impingement analysis appear in the FSAR section that addresses lines outside of containment. Recognizing that jets may result from line cracks or breaks, this section requires such failures to be postulated for lines with service temperature above 200°F, or design pressure exceeding 275 psig. *See* FSAR at 3.6-16 to -17. This same rationale should control the analyses inside containment.

[157] Because the applicant's witness Connell did not elaborate upon his remark that these three lines "have been looked at, but they are not part of the formal jet program re-analysis . . ." (Tr. D-616-17) and there is no other evidence concerning these lines, we are unable to conclude on the basis of the record evidence that the applicant has complied with the FSAR licensing criteria.

[158] Although the applicant's witness did not identify the three lines inside the containment by name, it appears the lines were identified by the applicant in its response of October 12, 1983 to the NRC staff concerning the ITP jet impingement analyses. *See* letter from J. Schuyler, PG&E, to D. Eisenhut, NRC, dated Oct. 12, 1983 at 1-2; *see also* Staff Exh. 37, SSER 19, at C 4-2. If our assumption is correct that the lines are the excess letdown line, reactor coolant pump seal vent and leakoff lines, and reactor coolant pump seal water injection line, then it appears that the lines are small diameter ones with relatively low energy content that would not be expected to fail or to produce high energy jets.

safety-related switchgear buses was calculated to be greater than the nameplate ratings on the breakers.[159] This situation was identified by the IDVP during the nonseismic design review of the 4160 V electrical distribution system and became the subject of EOI 8022.[160] The nameplate rating of the 4160 V circuit breakers is listed as 33 kiloamperes (kA), but the calculated short circuit current that the breakers might be required to interrupt is 39kA.[161] The IDVP declared the matter resolved when the ITP provided it with 1976 test data and a letter from the breaker manufacturer indicating the breakers can be relied upon to interrupt current up to 45kA.[162]

The joint intervenors object to the IDVP's resolution of this matter.[163] They assert that breakers are normally warranted only for the nameplate rating and, because it is not known whether the manufacturer is willing to warrant greater capacity for the breakers, we should find that the applicant's failure to install breakers with an adequate nameplate rating constitutes a violation of licensing criteria.

The FSAR, however, requires only that the applicant protect the emergency power supply with circuit breakers adequate to interrupt the calculated short circuit current.[164] Here, the manufacturer's 1976 test data demonstrate that the breakers in question will perform above the nameplate rating and interrupt the required short circuit current.[165] Moreover, in February 1983 the manufacturer explicitly responded to the applicant's inquiry concerning the interrupting capacity of the breakers stating that the breakers in question will interrupt 45kA.[166] It is clear, therefore, that the nameplate rating of the breakers in question is only a nominal rating and that the breakers will perform their intended function.[167] Accordingly, we find that the IDVP did not accept any deviation from licensing criteria.

J. In issue 5, the Governor and the joint intervenors charge that the applicant's verification program has failed to substantiate that the Diablo

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[159] The Governor failed to file proposed findings of fact on issue 4(t). *See* note 18 and accompanying text, *supra*.

[160] App. Exh. 116, ITR 24, at 5-1.

[161] Moore Tr. D-524.

[162] Krechting and Cooper Tr. fol. D-2040 at 4-30; Krechting Tr. D-2052-55.

[163] JI PF at 27-28.

[164] *See* FSAR Section 3.1.

[165] Connell *et al.* Tr. fol. D-487 at 35; Moore Tr. D-524-25; Vahlstrom Tr. D-532.

[166] Krechting Tr. D-2054-55.

The question whether the manufacturer will warrant the breakers is, in fact, irrelevant, because nothing in the appropriate FSAR licensing criteria concerns manufacturer warranties. Hence, it is unnecessary for us to reach the question whether the manufacturer's 1983 written response to the applicant's inquiry is an express warranty.

[167] Moore Tr. D-524-26.

Canyon facility, as built, conforms to the actual design drawings and analyses.[168] In particular, they assert that a number of past deficiencies in the PG&E program, combined with more recent purported lapses in configuration control uncovered by the IDVP, establish the applicant's continuing failure to reconcile design documents with the plant as built. Although the evidence indicates a past weakness in this area, the applicant's revised configuration control procedures under which all modifications have been done, coupled with the extent of the verification efforts of the ITP and the IDVP, demonstrate that the applicant's reconciliation of design documents is in conformity with Appendix B.[169]

As part of its seismic design verification program, the ITP performed field walkdowns of the Diablo Canyon structures, equipment, piping, and electrical, pipe and HVAC supports to ensure that the design documents of record reflected the actual physical conditions of the plant. Any deviations identified by the ITP were incorporated into the design documents of record.[170] Similarly, as part of its nonseismic review of design pressures and temperatures, and redundant electrical circuits, the ITP conducted field verifications of the design documentation of PG&E designed safety-related systems.[171]

Further, the applicant modified its configuration control procedures in 1981 and again in 1983 to improve past weaknesses in reconciling design documents with the plant as built.[172] The present procedure (Engineering Department Procedure 3.6 ON) deals with the initiation, processing, approval and documentation of design changes during the operating life of the plant. Specifically, it requires Priority I drawings of design changes (*i.e.*, documents pertaining to safety-related structures, systems and components that are required for the safe operation and maintenance of the plant) be revised to reflect as-built conditions within thirty days of the engineering department's acceptance of the design change completion package. All other drawings must be revised within ninety days.[173] The modification work performed at the site has conformed to this new procedure.[174] Experience under the procedure has shown that the construction department generally provides to the engineering department the as-built information within two weeks of the

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[168] Gov. PF at 56-59; JI PF at 28-33.
[169] 10 C.F.R. Part 50, Appendix B, III and VI.
[170] Anderson *et al.* Tr. fol. D-224 at 31; Moore Tr. D-363-64.
[171] Anderson *et al.* Tr. fol. D-224 at 31; Moore Tr. D-363-64. *See* App. Exh. 90, IDVP Final Report, Vol. II, at 4.8.3-1, 4.8.6-1.
[172] Moore Tr. D-362; App. Exh. 161, Engineering Department 3.6 ON and 3.7.
[173] App. Exh. 161, Procedure 3.6 ON (May 14, 1983) at 1, 10 and Procedure 3.7 at Attachment A; Moore Tr. D-348.
[174] Anderson *et al.* Tr. fol. D-224 at 32.

completion of the modification. The engineering department's acceptance requires one to three additional weeks depending on the nature of the modification.[175]

The IDVP also performed extensive field inspections to verify that the plant, as analyzed, is in conformity with the plant, as built, respecting both its seismic and nonseismic design. In its initial reviews of the seismic design of the facility, the IDVP conducted field verifications to validate the physical configurations. This verification was repeated on a sampling basis after the ITP's seismic reanalysis and the completion of necessary modifications.[176] The IDVP authenticated the as-built condition of the auxiliary feedwater system, control room ventilation and pressurization system, and the 4160 V electrical distribution system (*i.e.*, the nonseismic systems it reviewed). It verified samples of the nonseismic review work performed by the ITP at the IDVP's direction and substantiated the as-built condition of all modifications resulting from the IDVP's nonseismic verification program.[177] On the bases of its verification efforts, the IDVP concluded that, with respect to the portions of the facility it field verified, the as-built plant properly implemented the essential design elements.[178] Finally, the IDVP audited the applicant's process for controlling the update of engineering documents which included both the method for controlling design changes and the update of documents to reflect the as-built condition. It concluded that the program was being effectively implemented.[179]

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[175] Moore Tr. D-354-56, D-360-61.

[176] Cooper *et al.* Tr. fol. D-1459 at 5-2 to -4; Anderson *et al.* Tr. fol. D-224 at 31-32; App. Exh. 142, ITR 50, at 17-19, 24; App. Exh. 143, ITR 51, at 7, 19; App. Exh. 144, ITR 54, at 5; App. Exh. 145, ITR 55, at 46; App. Exh. 146, ITR 56, at 33; App. Exh. 147, ITR 57, at 22; App. Exh. 148, ITR 58, at 18; App. Exh. 149, ITR 59, at 3-3; App. Exh. 150, ITR 60, at 8; App. Exh. 151, ITR 61, at 8-9, 13-15; App. Exh. 152, ITR 63, at 14-19; App. Exh. 153, ITR 65, at 8. *See also* App. Exh. 128, ITR 36, at 4-9; App. Exh. 130, ITR 38, at 2-1, 3-2 to -6, 4-3, 6-1.

[177] Cooper *et al.* Tr. fol. D-1459 at 5-1 to -2; Anderson *et al.* Tr. fol. D-224 at 32; App. Exh. 106, ITR 14, at 3-9 to -11; App. Exh. 110, ITR 18, at 3-1 to -2; App. Exh. 111, ITR 19, at 7; App. Exh. 112, ITR 20, at 2-3, 6-3; App. Exh. 113, ITR 21, at 2-2, 3-1; App. Exh. 114, ITR 22, at 2-2, 6-2; App. Exh. 115, ITR 23, at 3-1 to -8; App. Exh. 116, ITR 24, at 1-2, 3-4 to -5; App. Exh. 117, ITR 25, at 3-1 to -4; App. Exh. 118, ITR 26, at 3-1 to -4; App. Exh. 119, ITR 27, at 3-1 to -3; App. Exh. 120, ITR 28, at 3-1 to -4; App. Exh. 140, ITR 48, at 6-9 to -14; App. Exh. 141, ITR 49, at 4-1, 5-1.

[178] Cooper *et al.* Tr. fol. D-1459 at 5-4.

[179] Cooper *et al.* Tr. fol. D-1459 at 5-3 to -4; Reedy Tr. D-1640.

The Governor questions the IDVP's conclusion that the applicant's procedure is being effectively implemented. He asserts that the initial audit was unable to substantiate the implementation of the applicant's design control process because of a lack of information and that the follow-up audit did not attempt to verify the procedure because it was limited solely to verifying the correction of a number of other specific deficiencies found in the initial audit. Gov. PF at 58-59. The initial audit was unable to verify the process. Reedy Tr. D-1636; Gov. Exh. 48 at 33; Gov. Exh. 49 at 33. The follow-up audit was not limited to the matters claimed by the Governor. The applicant's quality assurance expert was emphatic that the follow-up audit specifically verified the efficacy of the applicant's process. Reedy Tr. D-1636-37. We credit that testimony. Further, the applicant's primary difficulty in the area of configura-

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The Governor and the joint intervenors, however, point to a number of purported as-built discrepancies reported by the IDVP in various ITRs and assert that, as in the case of applicant's past weaknesses in this area,[180] these errors demonstrate that the applicant's configuration control process is still inadequate.[181] None of these asserted deficiencies had any quality assurance implications or demonstrated a pattern of inadequate configuration control procedures.[182] Indeed, the Governor's expert upon whose claims the Governor's assertions are based, conceded that, in general, the applicant's as-built drawings reflect the actual physical configuration of the plant.[183]

The Governor and the joint intervenors also cite these as-built discrepancies as evidence that certain analyses did not conform to the as-built configuration of the plant.[184] In some instances, however, the discrepancy was the result of a worst-case assumption being used in the analysis which would not necessarily reflect as-built conditions.[185] In a large majority of the cases cited as examples of configuration control discrepancies, the IDVP determined that the plant's licensing criteria were met when the as-built condition was analyzed. In a few instances, modifications were required. Our review of these discrepancies reveals that many of them were attributable to modeling differences. Further, our review leads us to conclude, as did the IDVP, that this type and number of discrepancies are not unusual for the scope of activities undertaken.[186] Nor do we believe these discrepancies represent a pattern of inadequate configuration control. Accordingly, we are satisfied that

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tion control was its inability to revise affected documentation in a timely manner. Gov. Exh. 11 at 10. Thus, we do not view the applicant's May 1983 amendment of engineering procedure 3.6 ON to prescribe thirty- and ninety-day limits on conforming documents (*see* pp. 605-06, *supra*) as inconsistent with the IDVP's March 1983 audit conclusion that the configuration control process was being effectively implemented.

[180] As we previously stated, the evidence indicates the applicant had difficulties with configuration control. Gov. Exh. 11, Institute of Nuclear Power Operations Startup Assistance Visit to Diablo Canyon Nuclear Power Plant (Feb. 12, 1982), at 10; Moore Tr. D-361-62; Morrill Tr. D-2948-49. We note, however, that a number of the documents relied on by the Governor and joint intervenors to establish these past deficiencies fail in that regard. Their reliance on a Brookhaven National Laboratory analysis of vertical response of the containment annulus structure (JI Exh. 130) is misplaced. Rather, that report uncovered a modeling discrepancy, not an as-built discrepancy. JI Exh. 130 at 11; Knight Tr. D-2948. Similarly, Gov. Exh. 36 (EDS Nuclear, Inc. Project Summary Report, June 7, 1982)) does little to enhance their position. That report describes an EDS review of the quality control manuals of each of the applicant's departments to determine the self-sufficiency of each manual. *See* p. 616, *infra*. The EDS review was not an audit of the applicant's configuration control process. de Uriarte Tr. D-3148-49; Stokes Tr. D-3189.

[181] Gov. PF at 57; JI PF at 29-31. *See* Hubbard Tr. fol. D-2084 at Tables 5-1 and 8-1.

[182] Reedy Tr. D-1640-41; Morrill Tr. D-2948-49.

[183] Hubbard Tr. D-2157.

[184] Gov. PF at 57; JI PF at 29-31; *See* Hubbard Tr. D-2156.

[185] Hubbard Tr. D-2157.

[186] App. Exh. 90, IDVP Final Report, Vol. III, at 5.6-4.

applicant's reconciliation of design documents with the facility and with the design analyses is in compliance with the Commission's regulations.

K. In issue 6, the joint intervenors and the Governor charge that the applicant failed to verify that the design of Westinghouse-supplied, safety-related equipment met licensing criteria. Westinghouse was the vendor of the nuclear steam supply system (NSSS) at Diablo Canyon. As part of the verification program, the IDVP reviewed the Westinghouse-PG&E interface for the use of Hosgri spectra, but the applicant's verification program did not specifically validate the qualification of Westinghouse-supplied equipment. Accordingly, the joint intervenors and the Governor claim there is no meaningful assurance that the Westinghouse design of safety-related equipment at Diablo Canyon meets applicable licensing criteria.[187]

Contrary to this claim, however, the assurance that the Westinghouse-supplied equipment meets licensing criteria is provided by the Westinghouse quality assurance program. That program was sufficient during the time the NSSS was designed and at subsequent times when the Hosgri spectra reevaluations were performed. Consequently, the applicant's verification efforts were not deficient even though the scope of its program did not include review of Westinghouse-supplied equipment.

Inasmuch as the construction permit for the first Diablo Canyon unit was issued in 1968, much of the Westinghouse design work on the NSSS took place prior to the promulgation of the agency's quality assurance regulations, 10 C.F.R. Part 50, Appendix B.[188] During that period Westinghouse nuclear design work was carried out in compliance with the requirements of MIL Q 9858, which was the quality assurance specification used by the navy nuclear program and includes most of the requirements later incorporated into Appendix B.[189] Subsequent to the issuance of Appendix B, the Westinghouse program was conformed to the regulation but this modification did not change the basic characteristics of the Westinghouse program.[190]

The Westinghouse quality assurance program has been audited many times by utilities, architect-engineers and professional organizations, as well as the NRC.[191] Indeed, a number of NRC audits of the Westinghouse program occurred while the vendor was performing the reanalysis of the Diablo Canyon NSSS for the Hosgri spectra in the late 1970's and

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[187] JI PF at 33-36; Gov. PF at 59-62.
[188] Haass Tr. fol. D-2906 at 2.
[189] Kreh Tr. D-1151.
[190] *Id.* at D-1131.
[191] *Id.* at D-1129-31.

then again in the early 1980's. There is no record of unsatisfactory performance.[192] In addition, Westinghouse has designed the NSSS for some fifteen, four-loop nuclear power plants similar to Diablo Canyon which have been licensed by the NRC.[193]

The Governor and the joint intervenors point, however, to several asserted design errors at Diablo Canyon which they claim proves the inadequacy of Westinghouse's quality assurance program.[194] First, they point out that Westinghouse inappropriately used tau-filtered spectra[195] instead of unfiltered spectra in its design reanalysis for the Hosgri spectra. As a result of the IDVP interface review, two areas where Westinghouse inappropriately applied tau-filtered spectra in the Hosgri reanalysis were discovered. But this was a communication (*i.e.*, interface) problem between the applicant and Westinghouse, not a problem with the vendor's quality assurance program. Once the information was interpreted by Westinghouse, it was applied in analyses in these two areas consistent with the vendor's properly functioning quality assurance program.[196]

Second, the Governor and the joint intervenors assert that a review by Brookhaven National Laboratory[197] of the IDVP interface verification found that thirty percent of the samples reviewed by the IDVP contained errors. This claim misconstrues the Brookhaven report. That report simply states that in thirty percent of the samples, the Westinghouse spectra did not completely envelop the Hosgri spectra.[198] Because Westinghouse has a generic seismic design, site specific spectra may exceed

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[192] *Id.* at D-1089, D-1114, D-1116, D-1129; Wiesemann Tr. D-1115.

[193] Hoch *et al.* [This panel consisted of J. Hoch, R. Wiesemann and E. Krehl Tr. fol. D-1088 at 3-4.

Additional confirmation of the adequacy of the Westinghouse quality assurance program is provided by the IDVP's recent verification of the PG&E-Westinghouse interface for the transmittal and use of the Hosgri spectra. The IDVP found that the appropriate information had been transmitted to Westinghouse and that, with one minor exception, the vendor correctly implemented the Hosgri data in their qualification and evaluation process. App. Exh. 90, IDVP Final Report, Vol. I, at 4.1.3-1; App. Exh. 103, ITR 11, at 18. Similarly, as part of its nonseismic review of the AFW system, the IDVP again examined this interface and concluded that Westinghouse correctly used the applicant-calculated design parameters provided to the vendor for accident analyses. App. Exh. 90, IDVP Final Report, Vol. I, at 4.1.3-1 to -2; App. Exh. 114, ITR 22, at 3-1, 3-4.

[194] Gov. PF at 60; JI PF at 33-35.

[195] For an explanation of the tau effect, *see Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-644, 13 NRC 903, 962-65 (1981), *petitions for review denied*, CLI-82-12A, 16 NRC 7 (1982).

[196] App. Exh. 103, ITR 11, at 18-19; Cooper *et al.* Tr. fol. D-1459 at 6-1 to -2; Wiesemann and Krehl Tr. D-1136-41.

The Governor also charges that the Westinghouse quality assurance program was deficient because there was inadequate identification of the specific Diablo Canyon unit for design information transmitted between the applicant and Westinghouse. The NSSS vendor, however, had its own number and letter designation system for documents that distinguished between the two units. Reedy Tr. D-1650.

[197] Gov. Exh. 12, Summary and Evaluation Report, PG&E-Westinghouse Seismic Interface Review.

[198] *Id.* at 4-5.

the generic ones — the situation noted in the Brookhaven review. Where that occurs, the affected equipment is specifically evaluated by Westinghouse to ensure conformance with the site specific spectra.[199]

Finally, the Governor and the joint intervenors charge that recent modifications to the main control board were necessary because of errors by Westinghouse in its original seismic qualification analyses. The modifications, however, were solely the result of changes in the seismic floor response spectra for the auxiliary building.[200]

Thus, none of the matters asserted by the Governor and the joint intervenors demonstrates that the Westinghouse quality assurance program was not adequate at the time of the original NSSS design or the subsequent reanalyses for the Hosgri spectra. The applicant's verification effort was not flawed by its exclusion of Westinghouse-supplied equipment and the verification program could justifiably rely upon the existence of the Westinghouse quality assurance program to ensure the adequacy of the nuclear steam supply system.

L. In issue 7, the Governor and joint intervenors claim that the verification program did not identify the root causes of the failures of the applicant's design quality assurance program and did not determine if such failures raise generic concerns. They correctly assert that without the identification of the causes of the various design errors, and a determination whether the errors have generic implications, there can be no confidence that further design errors do not exist.[201]

The root causes of the failures in the Diablo Canyon's design quality assurance program have been, however, adequately identified and analyzed as part of the applicant's verification efforts. In November 1981, the applicant began "lookback" reviews of its own quality assurance program and that of its service-related contractors.[202] From these reviews, the applicant determined that the basic causes for its own quality assurance failures were its inadequate control of changes in FSAR descriptions, inadequate control of documents, and inadequate documentation of design inputs.[203] For service-related contractors, the applicant found the basic causes were PG&E's failure to require quality assurance controls prior to mid-1978, its failure to control transmitted information, its inadequate record disposition and its inadequate inter-

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[199] Wiesemann Tr. D-1121, D-1135-36.
[200] Hoch Tr. D-1122-23.
[201] Gov. PF at 62-68; JI PF at 36-37.
[202] Dick *et al.* Tr. fol. D-847 at 1-2.
[203] *Id.* at 3.

face control.[204] In response to the basic causes identified by its review, the applicant then took appropriate corrective action.[205]

The IDVP and the ITP also evaluated the causes of the errors and deficiencies that were discovered in the design of Diablo Canyon. In addition to a group of isolated random causes, the IDVP identified two basic reasons for design errors: failure to control design interfaces and inadequate documentation of the original and revised design.[206] Further, the IDVP concluded that several factors related to the fact that the plant was designed over a fifteen year period during which requirements, criteria and engineering techniques were changing also contributed to design problems.[207] The IDVP then evaluated the cause of each EOI and generally documented this evaluation in the EOI files.[208] Each EOI was also reviewed for quality assurance implications.[209] Because the IDVP assumed the applicant's quality assurance program had been deficient, whenever they opened an EOI file the IDVP looked for generic (plant-wide) implications, which necessarily included consideration of the cause of an error.[210] Similarly, the ITP identified, as causes for errors in its seismic design, the evolution of technology, criteria and requirements, difficulties with interfaces and communications, and several random factors.[211] For seismic design errors, the ITP then correlated each Class A and B error identified by the IDVP and each Open

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[204] *Id.*

[205] *Id.* at 3-5.

[206] Cooper *et al.* Tr. fol. D-1459 at 7-1 to -2; App. Exh. 90, IDVP Final Report, Vol. III, at 6.3-1, 6.3.2-1, 6.3.3-1, and 6.3.4-1.

[207] Specifically, the IDVP found that:

> (1) Safety-related systems for DCNPP-1 were seismically designed twice to meet two sets of design criteria, and with a substantial interval of time between the two designs. (2) In addition to two complete designs, the plant had substantial additional design work performed as a result of recent NRC IE [Inspection and Enforcement] bulletins and TMI [Three Mile Island] requirements. (3) This multiple design work has occupied 15 years of calendar time. (4) Seismic design technology had advanced from a rudimentary effort in 1967 to a reasonably mature, systematic and sophisticated process today. In the natural course of this evolution, methodology and criteria have changed significantly. (5) Nuclear plant design naturally requires the transfer of large amounts of design information from one design group to another. In the case of DCNPP-1, these design interfaces existed in especially large numbers both within PGandE and between PGandE and independent firms. (6) Design document control practices in use at the time of the original design were not consistent with the eventual duration and complexity of the design process.

App. Exh. 90, IDVP Final Report, Vol. III, at 6.3-2.

[208] Cooper Tr. D-1722.

[209] Reedy Tr. D-1642-43.

[210] Cooper *et al.* Tr. fol. D-1459 at 7-3 to -5; Hubbard Tr. D-2160; Jacobson Tr. D-987.

[211] App. Exh. 91, ITP Phase I Final Report, at 1.8.2-2 to -3, 1.8.3-1 to 1.8.5-1; Dick *et al.* Tr. fol. D-847 at 5.

awareness, PG&E's management cannot escape responsibility for a quality assurance program that initially allowed for design errors of the type and number identified at Diablo Canyon by the verification program. The evidence indicates, however, that by the late 1970's significant improvements were being made in the applicant's quality assurance program.[218] Since that time, the applicant has instigated many more changes in its quality assurance program and carried out an extensive and unparalleled design verification program.[219] The painful lessons PG&E's management has learned from the huge expediture of resources required to verify the adequacy of the Diablo Canyon design have produced a present approach to quality assurance that is much improved and currently satisfactory.[220] As it must accept responsibility for past failings, PG&E management must also be credited for the significant improvements in its quality assurance program. For this reason, the failure of the applicant's verification program to include in its list of causative factors the past failings of PG&E management toward quality assurance is not fatal and does not alter our conclusion that the root causes have been sufficiently identified.

M. In issue 8, the Governor and the joint intervenors maintain that the ITP did not timely develop and implement an adequate quality assurance program for performing its verification functions and the necessary physical modifications to the Diablo Canyon facility, and that the IDVP failed to oversee the ITP's program.[221]

From the time of its initiation in November 1981 until August 1982, the ITP carried out its design verification work under the PG&E quality assurance program. An NRC inspection in November 1981 found the structure of this program acceptable although some implementation deficiencies existed in the program.[222] When the Bechtel-PG&E team was formed in 1982, the managements of the two companies decided to use the Bechtel quality assurance program for the project. The applicant's program was not chosen because of the controversy surrounding PG&E quality assurance triggered by the suspension of its low power license. Rather, because Bechtel was the manager of the completion project and its quality assurance program had been accepted at other facilities by the NRC, the Bechtel program (*i.e.*, the Bechtel Topical Report) was adopted and appropriately modified to reflect, *inter alia*, the organizational struc-

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[218] Dick *et al.* Tr. fol. D-847 at 3-5; de Uriarte Tr. 887-88; Staff Exh. 38, SECY-82-89, Encl. 1 at 1 n.1.
[219] Anderson *et al.* Tr. fol. D-224 at 16-21; Dick *et al.* Tr. fol. D-847 at 9-11.
[220] *See* pp. 613-17, *infra*.
[221] Gov. PF at 68-73; JI PF at 37-45.
[222] Dick *et al.* Tr. fol. D-847 at 9; de Uriarte Tr. D-895; Skidmore Tr. D-3170.

ture of the ITP.[223] Under the amended Bechtel program, however, the applicant's engineering procedures were used as implementing, or second tier, procedures.[224] The modified Bechtel quality assurance program was conditionally approved by the NRC on August 2, 1982, and placed in effect on August 20, 1982. Final NRC acceptance was granted on September 22, 1982. All design modifications performed by the ITP after the August 20 date were done under the modified Bechtel program.[225]

After the ITP became a joint Bechtel-PG&E project, the relationship between the ITP and the applicant was essentially that of an architect-engineer and applicant. Before the Bechtel-based quality assurance program was put into effect, the applicant reviewed it for compliance with Appendix B and the applicant's licensing commitments. Once the program was adopted, the applicant's quality assurance department performed continuous audits of the ITP's activities.[226] The applicant also audited the IDVP contractors to ensure that each one had implemented an adequate quality assurance program to control the verification activities. Similarly, the applicant audited the IDVP-ITP interface to verify that it was adequately controlled.[227]

In order to ensure that the modified Bechtel quality assurance program was properly implemented, the ITP initially trained and indoctrinated all personnel performing quality-related activities in the requirements of the program and, while the verification was ongoing, performed further training to remedy any program weaknesses identified by audits and other oversight activities. Throughout the program, numerous additional audits of the ITP verification program were performed by the applicant's quality assurance department, the ITP's own quality assurance personnel, Bechtel's San Francisco Power Division Quality Assurance, and the IDVP.[228] And, as a result of the various audit findings, the ITP took appropriate remedial and corrective actions.[229] Similarly, the staff reviewed the ITP's quality assurance program through a series of inspections while the verification activities were in progress.[230] The results of the audits and inspections demonstrate that the ITP's quality assurance

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[223] Dick *et al.* Tr. fol. D-847 at 10, 15-16; Dick Tr. D-1016-18.
[224] Dick *et al.* Tr. fol. D-847 at 13-14; de Uriarte Tr. D-1015.
[225] Dick *et al.* Tr. fol. D-847 at 10-11.
[226] *Id.*; Skidmore Tr. D-851-52.
[227] Dick *et al.* Tr. fol. D-847 at 11-12.
[228] *Id.* at 17-19; Cooper *et al.* Tr. fol. D-1459 at 8-1 to -5.
[229] Dick *et al.* Tr. fol. D-847 at 18.
[230] Morrill Tr. fol. D-2906 at 4-5.

program was effectively implemented.[231] No serious deficiencies were identified by the audits and the staff issued no notices of violation with respect to the ITP quality assurance program. In total, the various audits revealed less than 100 findings or conditions needing correction for a project involving 1200 technical people performing design work over an eighteen-month period.[232]

The Governor and the joint intervenors charge, however, that the design verification work performed under the PG&E quality assurance program (*i.e.*, the program in effect from November 1981 until August 1982) is suspect because the PG&E program was inadequate. Additionally, they assert that deficiencies identified by audits of the ITP quality assurance program (*i.e.*, the modified Bechtel program in effect after August 1982) show that that program also was insufficient.[233] A preponderance of the evidence does not support either position of the Governor and the joint intervenors.

The Governor and the joint intervenors rely upon two reports by PG&E consultants, Project Assistance Corporation (PAC)[234] and EDS Nuclear, Incorporated (EDS),[235] to support their claim that the applicant's quality assurance program in effect until August 1982 was inadequate. Both reports are generally critical of the relationship and coordination between the basic corporate quality assurance manual and the various subordinate departmental manuals and other quality assurance documents. The two reports do not represent, however, the results of audits or evaluations of the pre-August 1982 PG&E quality assurance program.[236] Rather, each of the reports deals with a very limited review of the applicant's corporate quality assurance manual or the individual department quality control manuals.

The Commission's regulations do not require that all pertinent quality assurance or quality control documents be consolidated and integrated into a single manual or set of manuals. Under the applicant's quality assurance program none of the quality assurance and quality control manuals is self-sufficient (*i.e.*, each must be read in conjunction with other documents). Because the PG&E quality assurance program is comprised of many documents and a large number of procedures, the applicant retained PAC to review the company quality assurance manual and

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[231] *Id.* at 5-6; Dick *et al.* Tr. fol. D-847 at 20; Cooper *et al.* Tr. fol. D-1459 at 8-3 to -5.
[232] Dick *et al.* Tr. fol. D-847 at 20-21.
[233] Gov. PF at 68-73; JI PF at 37-45.
[234] Gov. Exh. 35.
[235] Gov. Exh. 36.
[236] Stokes Tr. D-3147; Gouveia Tr. D-3149; de Uriarte Tr. D-3148-49, D-3173-74.

outline the scope of the work necessary to make the manual self-sufficient.[237] PAC examined the corporate quality assurance manual, which consists of 40 procedures out of some 2400 procedures that make up the entire program,[238] and made a number of findings critical of the applicant's organization.[239] But the items identified by PAC as missing from the corporate manual can be found in other documents in the program.[240] Indeed, the PAC report indicated that, within the company, complete — yet separate — quality assurance programs were being implemented by various organizations.[241] Similarly, EDS was retained by the applicant to review the individual department quality control manuals to determine the work necessary to make each manual self-sufficient and properly coordinated with the other manuals.[242] Once again, EDS was critical of the applicant's organization,[243] but the applicant's review of the EDS findings identified no violations of 10 C.F.R. Part 50, Appendix B.[244] Accordingly, these two limited reviews do not establish, as the Governor and the joint intervenors would have it, that the applicant's quality assurance program in effect from the beginning of the verification program until August 1982 was inadequate. Hence, the verification design work performed under the PG&E program is not inferentially suspect.[245] Moreover, 95 to 100 percent of the design work that resulted in modifications to the Diablo Canyon facility was performed after August 1982.[246]

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[237] de Uriarte Tr. D-3148-49.

[238] Gouveia Tr. D-3149-51.

[239] Gov. Exh. 35 at 4-6.

[240] Gouveia Tr. D-3151-52; de Uriarte Tr. D-3152.

[241] Gov. Exh. 35 at 5.

[242] de Uriarte Tr. D-3149; Stokes Tr. D-3154.

[243] Gov. Exh. 36, Attachment at 1-2.

[244] de Uriarte Tr. D-3156.

[245] The Governor and the joint intervenors assert, based on the testimony of a staff witness, that the PG&E quality assurance program in effect from November 1981 until August 1982 was also deficiently implemented. Gov. PF at 69; JI PF at 37. Although there were deficiencies in the implementation of the PG&E program, staff witness Morrill pointed out that as a result of staff inspections conducted prior to the verification program the deficiencies were known by the applicant and that corrective actions were taken and largely completed by mid-1982. Because of this, the staff witness did not consider the program implementation from November 1981 to August 1982 inadequate; rather he found it deficient only in certain particulars. Morrill Tr. D-3025-26.

[246] Moore Tr. D-3157-60.

The ITP's decisions to redo certain designs without reliance on any previous review work, were made over a period spanning the date when the modified Bechtel quality assurance program was adopted. The individual decisions were made at the following times: fuel handling building — May 1982; auxiliary building — June 1982; intake structure — June 1982; piping — July 1982; raceways and heating, ventilating and air conditioning (HVAC) supports — July 1982; containment annulus — January 1983. Additionally, the decisions on all Phase II reviews (including HVAC technical reviews, electrical reviews and mechanical reviews) were made in August 1982. *Id.*

Nor do the conditions identified by the various audits of the ITP quality assurance program (*i.e.*, the modified Bechtel program in effect after August 1982) demonstrate that the program was inadequate as charged by the Governor and joint intervenors. Among others, the Governor and joint intervenors point to the twenty-four conditions identified by the IDVP in its initial audit of the ITP quality assurance program as establishing the inadequacy of the program. On the basis of that audit, and the subsequent follow-up audit of the previously identified conditions, the IDVP concluded that the ITP quality assurance program was being effectively implemented and none of the identified conditions would have an impact on the control of design for the ITP work.[247] Our review of the conditions noted by the IDVP, as well as the other audit findings relied upon by the Governor and the joint intervenors, convinces us that none of the conditions, singularly or in combination, shows that the ITP quality assurance program was inadequate. Typical of these conditions was ITP management's lack of action toward nine engineers who missed three scheduled training sessions. This condition was corrected after the initial audit and the IDVP's follow-up audit verified that the condition had been remedied. This minor deficiency and other similar ones simply do not demonstrate the program was unacceptable. Considering the extent of the ITP verification activities, such discrepancies are to be expected and the very purpose of the auditing process is to ensure that they are caught and corrected. Thus, contrary to the charges of the Governor and the joint intervenors, the ITP quality assurance program, under which the vast majority of the design verification program was performed, was adequate.

N. In issue 9, the joint intervenors[248] maintain that the applicant has failed to provide assurance of component cooling water system (CCWS) heat removal capacity and that a technical specification limiting plant operation does not provide a level of safety equivalent to compliance with GDC 44.[249]

During the course of a review of the applicant's analysis of the CCWS, the NRC staff discovered that the most limiting single failure from the standpoint of CCWS performance, concurrent with the worst design basis accident heat load, had not been considered by the applicant as required by GDC 44.[250] Rather, the assumptions incorporated in the

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[247] Cooper *et al.* Tr. fol. D-1459 at 8-1 to -8; App. Exh. 90, IDVP Final Report, Vol. III, at 5.6.4; App. Exh. 133, ITR 41, at 1-2, 11.

[248] JI PF at 45-46.

[249] 10 C.F.R. Part 50, Appendix A, GDC 44.

[250] Wermiel Tr. fol. D-2864 at 1-2 (Contention 9); Staff Exh. 55, SSER 16, at 9-5 to -7.

applicant's original analysis (including the use of a single heat exchanger) led the applicant to conclude that adequate cooling for the CCWS would be available as long as the water temperature of the ocean, the ultimate heat sink for the Diablo Canyon reactors, did not go above 70°F. With the more stringent conditions assumed by the staff, however, the maximum temperature of the ocean under which the CCWS could meet the limiting conditions would be 64°F.[251]

To overcome this problem, the applicant proposed a technical specification requiring monitoring of the ocean water temperature. When the temperature approaches the maximum allowable limit of 64°F, the normally isolated second CCWS heat exchanger will be put on line to provide the additional heat removal capability needed to maintain an acceptable CCWS temperature in the event of the design basis loss of coolant accident.[252] In the event that the second heat exchanger, a passive unit with low failure probability, is unavailable or fails, the technical specification requires that the plant be shut down.[253]

We find the applicant's proposed technical specification is sufficient to meet the requirements of GDC 44.[254] Because the applicant's CCWS technical specification was presented to us as "proposed," the Director of Nuclear Reactor Regulation must ensure that the essential operating conditions set forth in the applicant's proposal are incorporated into the plant technical specifications before permitting operation.[255]

## III. CONCLUSION

For the reasons we have discussed in Parts I and II, we find that the scope and the execution of the applicant's verification programs have

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[251] Wermiel Tr. fol. D-2864 at 1-4 (Contention 9).

[252] Connell *et al.* Tr. fol. D-487 at 37.

[253] Connell Tr. D-546, D-551.

[254] Connell *et al.* Tr. fol. D-487 at 37; Wermiel Tr. fol. D-2864 at 3-4 (Contention 9).

[255] The joint intervenors assert that the applicant's proposed technical specification is insufficient. They argue that if the recently experienced, above-normal ocean temperatures continue for long periods then, under the technical specification, the plant will have to shut down more frequently than originally contemplated. The joint intervenors then claim that each such unnecessary shutdown unacceptably challenges plant systems, thereby eroding the original safety margins of the facility. Thus, they argue the proposed limitation does not provide a level of safety equivalent to compliance with the requirements of GDC 44. *See* JI PF at 45-46. The sequence of events that must occur before shutdown is necessary is an unlikely one. The ocean temperatures must reach above-normal levels and the second heat exchanger (a passive component) must be unavailable for a period of at least six hours. Connell Tr. D-551. In these circumstances, the likelihood of any significant increase in the number of plant shutdowns because of ocean temperatures is exceedingly remote and the effect on the number of thermal cycles is inconsequential. Finally, we note that the applicant's technical specification could be amended and an additional heat exchanger added to the CCWS sometime in the future if the recent transient rise in ocean temperatures should become permanent or the facility should experience unexpected and repeated failures in the existing heat exchangers. Connell Tr. D-546.

been sufficient to establish that Diablo Canyon Unit 1 design adequately meets its licensing criteria. The applicant's verification efforts provide adequate confidence that the Unit 1 safety-related structures, systems and components are designed to perform satisfactorily in service and that any significant design deficiencies in that facility resulting from defects in the applicant's design quality assurance program have been remedied. Accordingly, we conclude that there is reasonable assurance that the facility can be operated without endangering the health and safety of the public. As a result, the license authorization previously granted to the Director of Nuclear Reactor Regulation in the Licensing Board's August 31, 1982 initial decision, LBP-82-70, *supra*, 16 NRC at 854, remains in effect with respect to Unit 1. Before exercising that authority, the Director must ensure that the applicant has adopted an appropriate technical specification for the component cooling water system.[256] In addition, before allowing commercial operation, the Director must ensure that the applicant has performed the appropriate jet impingement analyses for certain lines inside the containment.[257] Until we make our findings with respect to Unit 2, the license authorization previously granted for that unit is not effective.[258]

Our findings have been made on the basis of the record evidence in the reopened operating license proceeding. We note, however, that recent events may affect our findings. On February 14, 1984, the joint intervenors filed a second motion to reopen the record[259] citing, *inter alia*, a number of recently discovered, purported design deficiencies that they assert undermine the validity and integrity of the applicant's verification efforts and directly bear upon the issues in the proceeding. In support of their motion, the joint intervenors proffer the affidavits of several engineers who formerly worked at the Diablo Canyon site. The applicant and the staff oppose the joint intervenors' motion and have filed numerous affidavits of asserted experts rebutting joint intervenors' claims.[260] Although we have initially reviewed the motions and the responses, our assessment of the parties' filings has not been completed. In addition, Supplement 21 of the staff's Safety Evaluation Report for Diablo Canyon indicates that the staff is currently investigating a large number of recent allegations concerning the Diablo Canyon facility including

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[256] *See* p. 618, *supra*.
[257] *See* p. 603, *supra*.
[258] *See* p. 582, *supra*.
[259] Joint Intervenors' Motion to Augment or, in the Alternative, to Reopen the Record.
[260] *See* Pacific Gas and Electric Company's Answer in Opposition to Joint Intervenors' Motion to Augment or, in the Alternative, to Reopen (Mar. 5, 1984); NRC Staff's Answer to Joint Intervenors' Motion to Augment or, in the Alternative, to Reopen the Record (Mar. 15, 1984).

several that appear to relate to the adequacy of facility design.[261] In this regard, the staff informed us by a letter dated February 7, 1984, and again in its opposition to the joint intervenors' motion, that it is currently investigating matters relating to small bore piping at the facility that directly bear upon the issues in this proceeding. Therefore, some of these matters may require that we again reopen the record in the proceeding and hear further evidence.[262] Hence, it is possible that these findings may have to be amended or withdrawn in their entirety depending upon the nature of the new evidence.

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the
Appeal Board

**Concurring opinion of Mr. Moore:**

I write separately on an additional point in order to call it to the Commission's attention. In the reopened proceeding, the joint intervenors and the Governor sought to litigate several issues involving the adequacy of the applicant's verification efforts in light of the asserted failure of the applicant's quality assurance program to comply with 10 C.F.R. Part 50, Appendix A, GDC 1. Specifically, the joint intervenors and the Governor claimed, based on the applicant's FSAR, that the applicant had no quality assurance program to assure the design of structures, systems and components that were "important to safety" within the meaning of Appendix A. Rather, they asserted the applicant only had a quality assurance program to assure the design of structures, systems and components that were "safety-related" within the meaning of 10 C.F.R. Part 50, Appendix B.

At the prehearing conference, we excluded these issues from the reopened proceeding. We ruled that the history of the Diablo Canyon

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[261] NUREG-0675, Supplement No. 21, "Safety Evaluation Report Related to the Operation of Diablo Canyon Nuclear Power Plant, Units 1 and 2" (Dec. 1983).

[262] Because the joint intervenors' appeal from the Licensing Board's initial decision, LBP-82-70, *supra*, 16 NRC 756, is still pending before us and, in addition, the joint intervenors' latest motion was filed while the reopened phase of the proceeding was before us, we necessarily retain jurisdiction over the proceeding.

operating license application showed that the two terms, "important to safety" and "safety-related," had been used synonymously by the applicant and the staff, and to the extent the quality assurance criteria are currently interpreted to distinguish between the terms, such distinction would not be retroactively applied to Diablo Canyon.*

I highlight this matter because on January 18, 1984 the staff issued Board Notification 84-011 regarding the meaning of the terms "safety-related" and "important to safety." That notification contains a January 5, 1984 letter from the Director, Division of Licensing, to all operating licensees and applicants. The letter states that applicants are responsible for developing and implementing quality assurance programs that meet the requirement of Appendix A, GDC 1, for plant equipment "important to safety" as well as a program for "safety-related" equipment in accordance with Appendix B. The letter then suggests this interpretation of the regulations is not new but one that the staff has always followed. If the Director's position on this matter is now that of the Commission (including the asserted long-standing nature of the interpretation), then it would appear that the Governor and the joint intervenors must be given an opportunity to litigate the issues regarding the applicant's compliance with Appendix A.

## APPENDIX A

### Issues at Hearing in Accordance with Orders of August 26 and October 7, 1983 (unpublished)

1. The scope of the IDVP review of both the seismic and nonseismic aspects of the designs of safety-related systems, structures and components (SS&Cs) was too narrow in the following respects:

(a) The IDVP did not verify samples from each design activity (seismic and nonseismic).

(b) In the design activities the IDVP did review, it did not verify samples from each of the design groups in the design chain performing the design activity.

(c) The IDVP did not have statistically valid samples from which to draw conclusions.

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*Transcript of August 23, 1983 prehearing conference at D-6 [illegible]8.

(d) The IDVP failed to verify independently the analyses but merely checked data of inputs to models used by PG&E.

(e) The IDVP failed to verify the design of Unit 2.

2. The scope of the ITP review of both the seismic and nonseismic aspects of the designs of the safety-related systems, structures and components (SS&Cs) was too narrow in the following respects:

(a) The ITP did not verify samples from each design activity (seismic and nonseismic).

(b) In the design activities the ITP did review, it did not verify samples from each of the design groups in the design chain performing the design activity.

(c) The ITP did not have statistically valid samples from which to draw conclusions.

(d) The ITP has failed systematically to verify the adequacy of the design of Unit 2.

3. In various situations listed below the ITP used improper engineering standards to determine whether design activities met license criteria. In some of these situations, the IDVP either used or approved the use of such improper standards or did not verify them at all.

(f) The ITP's modeling of the soil properties for the containment and auxiliary buildings was improper in that:

(i) in the soil structure interaction analysis of containment for the DE [Design Earthquake] and the DDE [Double Design Earthquake], use of boundary motion inputs to the model were improperly used;

(ii) the soil structure interaction analysis for containment for the DE and the DDE uses a seven percent damping value for rock, which is unconservative, especially for the DE;

(iii) the dynamic analyses of the containment for all earthquakes omit any analysis of uplifting of the foundation mat;

(iv) the modeling of the soil springs for the auxiliary building does not specify soil properties;

(v) in the modeling of the soil springs for the auxiliary building, the motion inputs to the lower ends of the springs does not account for all soil structure interaction phenomena that could be expected.

(o) The ITP has not demonstrated, and the IDVP has not verified, that the DCP modeling of the seismic response of the fuel handling building is proper, in that the DCP has not adequately justified the use of the translational and torsional response of the auxiliary building as input to the fuel handling building nor

has it demonstrated the validity of the dynamic degrees of freedom selected.

(p) The ITP has not demonstrated, and the IDVP has not verified, that the DCP seismic model of the slabs in the auxiliary building is proper, in relation to the use of vertical and rotational springs to model the columns, and the motions used as input at the ends of the springs not connected to the slabs. In addition, in the study of the diaphragms, the ITP has not adequately accounted for the inplane flexibility of these slabs, and has not adequately demonstrated that stresses are within allowable limits at all elevations.

(q) The ITP has not demonstrated and the IDVP has not verified, that the soils analysis for the buried diesel fuel oil tanks is proper in that the values of the exponent shown in figure 14 of ITR 68 have not been demonstrated to be appropriate and the variation of shear velocity with depth is not properly justified.

(r) The ITP has not demonstrated and the IDVP has not verified that the soils analysis for the auxiliary saltwater piping and circulating water intake conduits is proper in that the selection of the modulus versus strain curve utilized is not justified.

(s) The ITP has not demonstrated and the IDVP has not verified that the seismic analysis of the turbine building is proper in that bolt bearing capacities were taken from an inappropriate source.

(t) The ITP has not demonstrated and the IDVP has not verified that the seismic analysis of the turbine building is proper in that the use of four different models for the vertical analysis has not been justified.

4. The IDVP accepted deviations from the licensing criteria without providing adequate engineering justification in the following respects:

(a) Contrary to the requirements of FSAR Section 17.1 regarding compliance of the as-built installation with the design documents, the IDVP review of the AFWS disclosed that the as-built installation failed to meet the design drawings in that (i) a steam trap on the turbine-driven AFW pump steam supply line is not provided and (ii) there are discrepancies in the arrangement of the long-term cooling water supply line.

(b) Contrary to FSAR Section 8.3.3, the electrical design does not fully comply with the commitments regarding separation and color coding.

(h) Contrary to PG&E's September 14 and December 28, 1978 licensing commitments, CRVPS equipment identified in the

FSAR as necessary to maintain control room habitability during safe shutdown has not been evaluated regarding the effects of a moderate energy pipe break.

(i) The fire protection for the motor driven AFW pump room is not consistent with the PG&E licensing commitment for fire zone separation as stated in its November 13, 1978 Supplemental Information for Fire Protection Review ("SIFPR") in that:
  (1) there is a large grated ventilation opening in the ceiling of the room;
  (2) a fire damper has gaps when it is closed.

(j) The fire protection for the AFW pump room is not consistent with the PG&E licensing commitment for cable separation as stated in its SIFPR of November 13, 1978 in that:
  (1) the pumps for the motor driven AFW pumps and the control circuitry for a flow control valve necessary for operation of the turbine driven AFW pump are located in a single fire zone;
  (2) cables for some AFW circuits are not routed in accord with descriptions in the SIFPR and four AFW circuits PG&E committed to identify and review in the SIFPR were not included in that document.

(k) Contrary to the licensing commitment set forth in its SIFPR of November 13, 1978, each of the three 4160 volt cable spreading rooms has a ventilation opening leading up to the 4160 volt switchgear rooms.

(l) Contrary to FSAR Section 3.6, possible jet impingement loads have not been considered in the design and qualification of safety-related piping and equipment inside containment.

(q) Contrary to PG&E's December 28, 1979 licensing commitment letter to the NRC, modifications to protect two Auxiliary Feedwater valves from the effects of moderate energy line breaks were not implemented.

(r) Contrary to the licensing commitment to maintain minimum system redundancy as stated in FSAR Section 3.6A (NSC evaluation of pipe break outside containment), four components were identified for which high energy line cracks could cause temperatures in excess of the specification temperatures of the components.

(s) Contrary to the licensing commitment to maintain minimum system redundancy as stated in FSAR, Section 3.6A (NSC evaluation of pipe break outside containment), a conduit was

identified whose failure due to a high energy line crack could eliminate redundant Auxiliary Feedwater system flow.

(t) Contrary to the FSAR Section 8.3 commitment to provide switchgear buses with adequate short circuit interrupting capability, the calculated duties for circuit breakers on 4160 V buses F, G, and H were above the nameplate ratings for those buses.

(u) Contrary to single failure criteria stated in FSAR Section 3.1.1, reviews of the Auxiliary Feedwater and Control Room Ventilation and Pressurization systems identified circuit separation and single failure deficiencies. Similar deficiencies were identified in additional verification reviews, which included other safety-related systems.

5. The verification program has not verified that Diablo Canyon Units 1 and 2 "as built" conform to the design drawings and analyses.

6. The verification program failed to verify that the design of safety-related equipment supplied to PG&E by Westinghouse met licensing criteria.

7. The verification program failed to identify the root causes for the failures in the PG&E design quality assurance program and failed to determine if such failures raise generic concerns.

8. The ITP failed to develop and implement in a timely manner a design quality assurance program in accordance with 10 C.F.R. Part 50, Appendix B to assure the quality of the recent design modifications to the Diablo Canyon facility and the IDVP failed to ensure that the corrective and preventative action programs implemented by the ITP are sufficient to assure that the Diablo Canyon facilities will meet licensing criteria.

9. Contrary to General Design Criterion 44 (GDC 44) of Appendix A to 10 C.F.R. Part 50, PG&E has failed to provide adequate assurance of component cooling water system (CCWS) heat removal safety function capacity in that the maximum ocean water temperature of 64°F. is not conservative because it has already been exceeded in 1983. Furthermore a technical specification limitation which permits plant operation at reduced power levels in lieu of enlarging the capacity of the CCWS does not provide an equivalent level of safety as compliance with the requirements of GDC 44 (SSER, 16 (Aug. 1983) and September 1983 ocean water temperature readings).

## APPENDIX B – LIST OF WITNESSES

**Applicant's Witnesses**

Anderson, Richard C.
Education: B.S. Mechanical Engineering
University of California at Berkeley
Present Occupation: An Engineering Manager for Bechtel Power Corporation now assigned as the Engineering Manager for the Diablo Canyon Project

Connell, Edward C., III
Education: M.S. Nuclear Engineering, 1974
Purdue University
Present Occupation: Mechanical Group Supervisor (Bechtel) Diablo Canyon Project

Cranston, Gregory V.
Education: B.S. Nuclear Science
United States Naval Academy, Annapolis, MD
Present Occupation: Project Engineer (Bechtel) for Unit 2 of the Diablo Canyon Project

Dick, Charles W.
Education: M.S. Electrical Engineering, 1948
Stanford University
Present Occupation: Project Manager (Bechtel) and member of project management team of the Diablo Canyon Project

Gouveia, Leigh A.
Education: B.S. Mechanical Engineering, 1968
California State Polytechnic College, San Luis Obispo
Present Occupation: Project Engineer for Project Assistance Corporation

Hoch, John B.
Education: B.S. Mechanical Engineering, 1959
University of Idaho
Present Occupation: PG&E Project Manager of Diablo Canyon Project

Jacobson, Michael J.
Education: B.S. Civil Engineering, 1970
Sacramento State College

| | |
|---|---|
| Present Occupation: | Project Quality Assurance Engineer (Bechtel) for Diablo Canyon Project |
| Kaplan, Stanley | |
| Education: | Ph.D Mechanical Engineering and Applied Mathematics, 1960<br>University of Pittsburgh |
| Present Occupation: | President, Kaplan & Associates, Inc. — a consulting firm specializing in risk analysis and applied decision theory |
| Kreh, Edward J., Jr. | |
| Education: | B.S. Mechanical Engineering<br>Carnegie Institute of Technology (now Carnegie Mellon University) of Pittsburgh, PA |
| Present Occupation: | Senior Consulting Engineer with SMC O'Connell and Associates of Pittsburgh, PA |
| Moore, Gary H. | |
| Education: | M.S. Mechanical Engineering, 1969<br>San Jose State University |
| Present Occupation: | PG&E Unit 1 Project Engineer of the Diablo Canyon Project |
| Seed, H. Bolton | |
| Education: | Ph.D Civil Engineering, 1948<br>Kings College, London University |
| Present Occupation: | Professor, University of California at Berkeley |
| Shipley, Larry E. | |
| Education: | B.S. Mechanical Engineering<br>United States Merchant Marine Academy, Kings Point, NY |
| Present Occupation: | Assistant Chief Engineer (Plant Design) in Bechtel's San Francisco Power Division and Technical Consultant to Diablo Canyon Project |
| Skidmore, Steven M. | |
| Education: | M.S. Nuclear Engineering, 1969<br>Stanford University |
| Present Occupation: | PG&E Manager of Quality Assurance in the Nuclear Power Generation Department |

Stokes, William J.
Education: B.S. Mechanical Engineering, 1974
Drexel University
Present Occupation: Partner, Shalako Energy Services (formerly with EDS Nuclear)

de Uriarte, Thomas G.
Education: B.S. Civil Engineering, 1967
University of California at Berkeley
Present Occupation: Senior Engineer, Quality Assurance Department, Pacific Gas and Electric Company

Vahlstrom, Wallace
Education: Electrical Engineer (degree not specified)
Present Occupation: Senior Electrical Engineer at Pacific Gas and Electric Company

White, William H.
Education: Ph.D Civil Engineering
University of Colorado
Present Occupation: Engineering Specialist with Bechtel's San Francisco Power Division — Seismic Analysis and Assistant Project Engineer in the Diablo Canyon Project

Wiesemann, Robert A.
Education: B.S. Mechanical Engineering, 1949
Case Institute of Technology
Present Occupation: Manager of Regulatory and Legislative Affairs in the Nuclear Technology Division of the Westinghouse Electric Corporation

**IDVP Witnesses**

Biggs, John M.
Education: M.S. Civil Engineering, 1947
Massachusetts Institute of Technology
Present Occupation: Professor Emeritus of Civil Engineering, Massachusetts Institute of Technology and Partner in the Consulting Firm of Hansen, Holley and Biggs, Inc.

Cloud, Robert L.
Education: Ph.D Mechanical Engineering, 1964
University of Pittsburgh

Present Occupation: President, Robert L. Cloud Associates, Inc., Berkeley, CA

Cooper, William E.
Education: Ph.D Engineering Mechanics, 1951
Purdue University
Present Occupation: Senior Vice President and Technical Director of Teledyne Engineering Services until 1976, now Consulting Engineer for Teledyne

Holley, Myle J., Jr.
Education: M.S. Civil Engineering, 1947
Massachusetts Institute of Technology
Present Occupation: Professor Emeritus, Massachusetts Institute of Technology and Partner in the Consulting Firm of Hansen, Holley and Biggs, Inc.

Krechting, John E.
Education: B.S. Naval Science, 1965
United States Naval Academy
Present Occupation: Employed by Stone & Webster Engineering Corporation — assigned as Project Engineer for the IDVP

Reedy, Roger F.
Education: B.S. Civil Engineering, 1956
Illinois Institute of Technology
Present Occupation: President, R.F. Reedy, Inc., Consulting Engineers, Los Gatos, CA

Wray, Ronald
Education: M.S. Engineering Science, 1962
Rensselaer Polytechnic Institute
Present Occupation: Theoretical Stress Analyst, Teledyne Engineering Services

**Governor's Witnesses**

Apostolakis, George
Education: Ph.D Engineering Science and Applied Mathematics
California Institute of Technology
Present Occupation: Professor, Engineering and Applied Science, University of California at Los Angeles

Hubbard, Richard B.

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|---|---|
| Education: | B.S. Electrical Engineering, 1960<br>University of Arizona |
| Present Occupation: | Vice President – MHB Technical Associates, San Jose, CA |

Roesset, Jose M.

| | |
|---|---|
| Education: | D.S. Structures and Soil Mechanics, 1964<br>Massachusetts Institute of Technology |
| Present Occupation: | Professor, University of Texas, Austin, TX |

**Joint Intervenors' Witness**

Samaniego, Francisco J.

| | |
|---|---|
| Education: | Ph.D Mathematics-Statistics, 1971<br>University of California at Los Angeles |
| Present Occupation: | Professor, Division of Statistics, University of California at Davis |

**Staff's Witnesses**

Altman, Willard D.

| | |
|---|---|
| Education: | Ph.D Mathematics, 1975<br>University of Virginia |
| Present Occupation: | Section Chief, Quality Assurance Branch, Division of Quality Assurance, Safeguards and Inspection Programs, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission |

Costantino, Carl J.

| | |
|---|---|
| Education: | Ph.D Civil Engineering, 1966<br>Illinois Institute of Technology |
| Present Occupation: | Professor, Civil Engineering, City College of the City University of New York |

Haass, Walter P.

| | |
|---|---|
| Education: | B.S. Mechanical Engineering, 1952<br>Stevens Institute of Technology |
| Present Occupation: | Assistant to the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission |

Knight, James P.

| | |
|---|---|
| Education: | B.S. Mechanical Engineering, 1957<br>Northeastern University |

Present Occupation: Assistant Director for Components and Structures Engineering, Division of Engineering, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission

Knox, John L.
Education: B.S. Electronic Systems Engineering, 1971
University of Maryland
Present Occupation: Senior Reactor Systems Engineer (Electrical), Power Systems Branch, Division of Systems Integration, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission

Kubicki, Dennis J.
Education: B.S. Fire Protection and Safety Engineering, 1974
Illinois Institute of Technology
Present Occupation: Fire Protection Engineer, Chemical Engineering Branch, Division of Engineering, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission

Kuo, Pao-Tsin
Education: Ph.D Civil Engineering, 1974
Rice University
Present Occupation: Section Leader, Structural and Geotechnical Engineering Branch, Division of Engineering, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission

Miller, Charles A.
Education: Ph.D Civil Engineering, 1966
Illinois Institute of Technology
Present Occupation: Professor, Department of Civil Engineering, City College of the City University of New York

Morrill, Philip J.

| | |
|---|---|
| Education: | B.S. Nuclear Engineering, 1966<br>United States Naval Academy |
| Present Occupation: | Reactor Inspector, Division of Resident, Reactor Projects and Engineering Programs, Region V, U.S. Nuclear Regulatory Commission |

Philippacopoulos, A.J.

| | |
|---|---|
| Education: | Ph.D Civil Engineering, 1980<br>Polytechnic Institute of New York |
| Present Occupation: | Associate Scientist, Structural Analysis Division, Department of Nuclear Energy, Brookhaven National Laboratory |

Polk, Harold E.

| | |
|---|---|
| Education: | B.S. Civil Engineering, 1958<br>North Carolina State College |
| Present Occupation: | Senior Structural Engineer, Structural and Geotechnical Branch, Division of Engineering, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission |

Schierling, Hartmut, E.H.

| | |
|---|---|
| Education: | M.S. Nuclear Engineering, 1963<br>Catholic University of America |
| Present Occupation: | Senior Project Manager, Division of Licensing, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission |

Wang, Ping-Chun

| | |
|---|---|
| Education: | Ph.D Civil Engineering, 1951<br>University of Illinois |
| Present Occupation: | Professor, Civil Engineering<br>Polytechnic Institute of New York |

Wermiel, Jared S.

| | |
|---|---|
| Education: | B.S. Chemical Engineering, 1972<br>Drexel University |
| Present Occupation: | Section Leader, Auxiliary Systems Branch, Division of Systems Integration, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission |

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING APPEAL BOARD**

**Administrative Judges:**

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

**In the Matter of** **Docket Nos. 50-329-OM&OL**
**50-330-OM&OL**

**CONSUMERS POWER COMPANY**
**(Midland Plant, Units 1 and 2)** **March 30, 1984**

The Appeal Board affirms the Licensing Board's refusal to quash subpoenas aimed at employees of a nonparty to this operating license proceeding.

## RULES OF PRACTICE: INTERLOCUTORY APPEALS (NONPARTY)

A nonparty to an operating license proceeding may appeal immediately an otherwise interlocutory discovery order. *Pacific Gas and Electric Co.* (Stanislaus Nuclear Project, Unit 1), ALAB-550, 9 NRC 683, 686 n.1 (1979).

## RULES OF PRACTICE: SUBPOENAS

A board may issue a subpoena upon a showing of only "general relevance" and "shall not attempt to determine the admissibility of evidence." *See* 10 C.F.R. § 2.720; *see also* 10 C.F.R. § 2.740(b)(1).

**PRIVILEGES: FIRST AMENDMENT (THE PRESS)**

That the press enjoys a qualified privilege not to reveal its sources in certain circumstances is beyond doubt. *Branzburg v. Hayes*, 408 U.S. 665, 709-10 (1972) (Powell, J., concurring); *United States v. Cuthbertson*, 630 F.2d 139, 147 (3d Cir. 1980), *cert. denied*, 449 U.S. 1126 (1981); *Silkwood v. Kerr-McGee Corp.*, 563 F.2d 433, 436-37 (10th Cir. 1977); *Carey v. Hume*, 492 F.2d 631, 636 (D.C. Cir.), *cert. dismissed*, 417 U.S. 938 (1974); *Baker v. F&F Investment*, 470 F.2d 778, 783 (2d Cir. 1972), *cert. denied*, 411 U.S. 966 (1973).

**PRIVILEGES: GENERALLY**

Courts traditionally have been loath to create a new testimonial privilege or to extend an existing one, "since such privileges obstruct the search for truth." *Branzburg v. Hayes, supra*, 408 U.S. at 690 n.29. *See Herbert v. Lando*, 441 U.S. 153, 175 (1979).

**EVIDENCE: DUTY TO PROVIDE**

All citizens have a "general duty . . . to provide evidence when necessary to further the system of justice." *Wright v. Jeep Corp.*, 547 F. Supp. 871, 875 (E.D. Mich. 1982). *See Branzburg v. Hayes, supra*, 408 U.S. at 688.

**PRIVILEGES: FIRST AMENDMENT (THE PRESS)**

The qualified First Amendment privilege of the press has been consistently and strictly limited to those reasonably characterized as part of the media. *Compare, e.g.*, the following cases where the privilege has been recognized: *United States v. Cuthbertson, supra; Silkwood v. Kerr-McGee Corp., supra; Baker v. F&F Investment, supra; Solargen Electric Motor Car Corp. v. American Motor Corp.*, 506 F. Supp. 546 (N.D.N.Y. 1981); *In re Consumers Union of the United States, Inc. (Starks v. Chrysler Corp.)*, 32 Fed. R. Serv. 2d 1373 (S.D.N.Y. 1981); *Apicella v. McNeil Laboratories, Inc.*, 66 F.R.D. 78 (E.D.N.Y. 1975); with *Wright v. Patrolmen's Benevolent Ass'n*, 72 F.R.D. 161 (S.D.N.Y. 1976).

**PRIVILEGES: FIRST AMENDMENT (SCHOLAR'S)**

The "scholar's privilege" — an alleged outgrowth of the journalist's First Amendment privilege — is of doubtful validity under modern case law, at least as applied to non-scholars. *See Wright v. Jeep Corp., supra,*

547 F. Supp. at 875-76. *See also In re Dinnan*, 661 F.2d 426, 427-31 (5th Cir. 1981), *cert. denied*, 457 U.S. 1106 (1982).

**PRIVILEGES: FIRST AMENDMENT (THE PRESS)**

Where the courts have recognized a journalist's privilege, they have balanced "the potential harm to the free flow of information that might result against the asserted need for the requested information." *Bruno & Stillman, Inc. v. Globe Newspaper Co.*, 633 F.2d 583, 596 (1st Cir. 1980) (footnote omitted). *See Branzburg v. Hayes, supra*, 408 U.S. at 710; *United States v. Cuthbertson, supra*, 630 F.2d at 148; *Carey v. Hume, supra*, 492 F.2d at 636-39; *Solargen Electric Motor Car Corp. v. American Motor Corp., supra*, 506 F. Supp. at 550.

**PRIVILEGES: FIRST AMENDMENT (THE PRESS)**

The principal factors to consider in determining to give recognition to the journalist's privilege are whether the requested information is relevant and goes to the heart of the matter at hand, and whether the party seeking the information has tried to obtain it from other possible sources. *Silkwood v. Kerr-McGee Corp., supra*, 563 F.2d at 438; *Baker v. F&F Investment, supra*, 470 F.2d at 783.

**RULES OF PRACTICE: PROTECTIVE ORDERS**

Boards assume protective orders will be obeyed unless a concrete showing to the contrary is made. One who violates a protective order risks serious sanction. *See Commonwealth Edison Co.* (Byron Nuclear Power Station, Units 1 and 2), ALAB-735, 18 NRC 19, 25 (1983).

**RULES OF PRACTICE: PROTECTIVE ORDERS**

Imposition of a protective order can be a pragmatic accommodation of the need for discovery and the protection of the asserted interests of the persons against whom discovery is directed.

## APPEARANCES

**John W. Karr**, Washington, D.C., for the appellants, Government Accountability Project employees Louis Clark, Thomas Devine, Billie Pirner Garde, and Lucy Hallberg.

**David M. Stahl, Susan D. Proctor,** and **Sarah H. Steindel,** Chicago, Illinois, for the applicant, Consumers Power Company.

**Donald F. Hassell** and **Nathene A. Wright** for the Nuclear Regulatory Commission staff.

## MEMORANDUM AND ORDER

Four employees of the Government Accountability Project (GAP) have appealed the Licensing Board's refusal to quash subpoenas directed to them in this operating license proceeding. *See* LBP-83-53, 18 NRC 282, *reconsideration denied,* LBP-83-64, 18 NRC 766 (1983).[1] For the reasons stated below, we affirm the Licensing Board's decision.

### I.

In July 1982, applicant Consumers Power Company (CPC) requested the Licensing Board to issue the four subpoenas here challenged. According to applicant, GAP submitted affidavits to the NRC alleging poor quality work at the Midland facility and gave similar information to the press. Applicant further asserted the relevance of this information to its pending licensing proceeding before the Licensing Board. CPC Application for Deposition Subpoenas (July 8, 1982) at 1, 2. The Board agreed as to the general relevance of GAP's allegations to certain matters already at issue in the proceeding and accordingly issued the subpoenas. Licensing Board Memorandum of July 8, 1982 (unpublished).[2]

Applicant, however, acceded to the NRC staff's request to defer serving the subpoenas while the staff conducted its own investigation of GAP's allegations. In March 1983, applicant informed the staff of its intention to proceed with discovery, and the staff did not object. Letter from M.I. Miller to J.G. Keppler (March 22, 1983). Applicant subsequently served its subpoenas, and GAP moved to quash on essentially three grounds: (1) First Amendment privilege, deriving from GAP's

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[1] For ease of reference, we will refer to the four appellants collectively as GAP. GAP is not a party to the operating license proceeding and thus may appeal now an otherwise interlocutory discovery order. *Pacific Gas and Electric Co.* (Stanislaus Nuclear Project, Unit 1), ALAB-550, 9 NRC 683, 686 n.1 (1979).

[2] *See* 10 C.F.R. § 2.720, which provides that a board may issue a subpoena upon a showing of only "general relevance" and "shall not attempt to determine the admissibility of evidence." *See also* 10 C.F.R. § 2.740(b)(1).

information gathering and disseminating functions; (2) common law privilege; and (3) estoppel, resulting from the NRC's asserted promise of confidentiality. GAP Motion to Quash Subpoenas (June 27, 1983). As GAP explained, it "offers assistance to public and private employees, private citizens and community-oriented groups who pursue illegal, wasteful, improper or negligent actions by government or corporate bodies." *Id.* at 1. Citizens groups in Midland, Michigan, thus approached GAP, seeking assistance for "whistleblowers" at the Midland nuclear plant. GAP agreed to help and, serving as a conduit, submitted to the NRC staff six affidavits (five from persons who sought to remain anonymous) alleging poor quality work and safety problems at the plant. *Id.* at 2-3. Applicant's subpoenas, in GAP's view, are designed to determine the identities of the Midland whistleblowers and thereby deter others from coming forward in the future. *Id.* at 3.

The Licensing Board denied the motion. It concluded, in agreement with both applicant and the staff, that GAP's motion was "premised on the false notion that the Applicant is seeking to expose the identity of the confidential informants." LBP-83-53, *supra*, 18 NRC at 286. *See* CPC Application for Deposition Subpoenas at 2-3, Schedule of Documents Requested at 2. It thus found it unnecessary to reach the question of privilege.[3] As for GAP's claim of estoppel, the Board noted that the Commission's "assurance . . . of nondisclosure" went only to the informants' identities. 18 NRC at 286. The Board did, however, take steps — at the staff's urging and without objection by applicant — to assure that the release of the *contents* of the affidavits will not inevitably or inadvertently lead to the disclosure of the affiants' *identities*, and so undermine GAP's credibility. Specifically, the Board entered a protective order providing that (1) the informants' identities, and any information that might reasonably lead to their disclosure, need not be provided on deposition or in the subpoenaed documents; (2) if such information is inadvertently disclosed, it shall be deleted from the transcript and not revealed by those present; (3) all information elicited is to be restricted to applicant's *counsel*, the NRC staff, intervenors, and, to the extent necessary, the Board itself; and (4) applicant, the staff, and deponents may present to the Licensing Board for resolution any dispute over what constitutes protected information. *Id.* at 289-90. *See* 10 C.F.R. §§ 2.720(f), 2.740(c). The Board also repeated the direction of its

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[3] The Board did note, however, that the privileges asserted are not absolute and would require a balancing of the need for the information against the harm in revealing it. Under such a test, the Board "would not in any event quash the instant subpoenas on the basis of privilege." LBP-83-53, *supra*, 18 NRC at 288-89.

Memorandum of July 8, 1982, that the scope of the depositions and documents sought under these subpoenas be

> *limited* to "[that information] relevant to the matters already at issue in the OL/OM (including admitted contentions) proceedings." In that connection, the manner in which GAP generally obtains information would not be relevant; the manner in which it obtained particular information relevant to particular contentions or issues might be relevant.

18 NRC at 287.[4] *See* LBP-82-118, 16 NRC 2034, 2047-50, 2057-61 (1982), for a description of the pertinent "matters already at issue" in this proceeding.

Still dissatisfied, GAP asked the Licensing Board to reconsider its denial of the motion to quash. The Board denied the motion for reconsideration but elaborated somewhat on its earlier decision. It pointed out that, although it found it unnecessary to decide if either asserted privilege applied, it did in fact undertake the balancing test employed where such a privilege is found to exist. LBP-83-64, *supra*, 18 NRC at 768-69. *See* note 3, *supra*. The Board emphasized the value of the protective order imposed and found GAP's expressed apprehension of a breach of that order baseless. 18 NRC at 769-70. The Board also stressed the limits on the scope of discovery permitted under the subpoenas and provided further guidance in that regard. *Id.* at 771-72.

GAP now appeals the Licensing Board's two orders denying its motion to quash the subpoenas.[5] Both applicant and the staff urge that we affirm the Board's decision.[6]

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[4] In the same order, the Board granted a separate motion to quash the subpoenas to the extent they requested testimony and documents concerning communications between GAP and two intervenors in this proceeding. The Board based its decision on attorney-client privilege. *See id.* at 284-86. That matter is not before us in this appeal.

[5] GAP sought a stay of the Board's decision from both the Licensing Board and us. In each instance, the stay request was denied. *See* LBP-83-64, *supra*, 18 NRC at 768, 772, 773; Appeal Board Memorandum of October 6, 1983 (unpublished); Appeal Board Order of October 27, 1983 (unpublished). No party, however, has requested an expedited appeal.

When GAP failed on October 27, 1983, to produce the subpoenaed documents, applicant moved to compel and sought court enforcement of the subpoenas. CPC Motion to Compel and Application for Enforcement of Subpoenas (November 2, 1983). The GAP deponents responded that they "will not appear for depositions unless and until ordered to do so by a court of the United States." GAP Deponents' Response (November 4, 1983) at 2 n.*. *See Solargen Electric Motor Car Corp. v. American Motor Corp.*, 506 F. Supp. 546, 552 (N.D.N.Y. 1981), where the court was "greatly bothered by the unreasonable refusal of the [subpoenaed persons] to even appear at their designated depositions. . . ." The Licensing Board granted applicant's motion and asked the NRC's General Counsel to seek court enforcement of the subpoenas. Memorandum and Order of November 8, 1983 (unpublished). *See* 10 C.F.R. § 2.720(g). Apparently further action in that regard has been deferred pending resolution of the instant appeal.

[6] Applicant has moved for leave to file corrected copies of its brief. The purpose of the motion is to provide the table of contents and table of authorities omitted from its original filing more than six weeks

*(Continued)*

## II.

On appeal, GAP renews two of the three arguments it made to the Licensing Board, specifically those concerning the "privileged" nature of the information solicited by the subpoenas.[7] Its principal argument is that the subpoenas impair "its First Amendment right freely to collect information from confidential sources about the safety problems at the Midland nuclear plants." GAP Memorandum in Support of Appeal (October 20, 1983) at 4. Because it gathers information from confidential sources and passes it on to the NRC for investigation, GAP claims that, like journalists and scholars, it is entitled to the qualified privilege — footed in the First Amendment guaranty of a free press — not to disclose its sources.[8] GAP's second and independent argument is that the subpoenas violate the common law principle of confidential communications. *Id.* at 9-10. *See* 8 Wigmore, *Evidence* § 2285 (J. McNaughton rev. 1961). We find no merit to either argument.

A. As noted, GAP draws an analogy between itself and the press, contending that "[t]he growing line of cases which protects journalists and news editors in their news-gathering and editorial functions clearly protects GAP's information-gathering which serves the public interest." GAP Memorandum in Support of Appeal at 5. That the press enjoys a qualified privilege not to reveal its sources in certain circumstances is beyond doubt. *Branzburg v. Hayes*, 408 U.S. 665, 709-10 (1972) (Powell, J., concurring); *United States v. Cuthbertson*, 630 F.2d 139, 147 (3d Cir. 1980), *cert. denied*, 449 U.S. 1126 (1981); *Silkwood v. Kerr-McGee Corp.*, 563 F.2d 433, 436-37 (10th Cir. 1977); *Carey v. Hume*, 492 F.2d 631, 636 (D.C. Cir.), *cert. dismissed*, 417 U.S. 938 (1974); *Baker v. F&F Investment*, 470 F.2d 778, 783 (2d Cir. 1972), *cert. denied*, 411 U.S. 966 (1973). We can find no basis, however, for expanding the press' qualified privilege to encompass GAP's activities.

First, courts traditionally have been loath to create a new testimonial privilege or to extend an existing one, "since such privileges obstruct the search for truth." *Branzburg*, *supra*, 408 U.S. at 690 n.29 (plurality opinion). *See Herbert v. Lando*, 441 U.S. 153, 175 (1979). Further, all citizens have a "general duty . . . to provide evidence when necessary to further the system of justice." *Wright v. Jeep Corp.*, 547 F. Supp. 871,

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earlier. *See* 10 C.F.R. § 2.762(c). We *grant* the motion, although the proffered material came too late to be of any real value. In the future, we expect applicant's counsel, as well as the other parties, to conform their pleadings to the Commission's Rules of Practice. *See* 10 C.F.R. § 2.762(f).

[7] GAP no longer presses its "estoppel" claim. *See* p. 637, *supra*.

[8] GAP here abandons one of the First Amendment arguments it pressed before the Licensing Board — *i.e.*, that it serves as a conduit through which citizens can "petition the Government for a redress of grievances." U.S. Const. amend. I. *See* GAP Motion to Quash at 4-6.

875 (E.D. Mich. 1982). *See Branzburg, supra,* 408 U.S. at 688 (plurality opinion).

Second, despite GAP's suggestion to the contrary, the qualified privilege of the press has been consistently and strictly limited to those reasonably characterized as part of the media. *Compare, e.g.,* the following cases where the privilege has been recognized: *Cuthbertson, supra* (Columbia Broadcasting System); *Silkwood, supra* (free-lance documentary filmmaker); *Baker, supra* (journalist); *Solargen,* note 5, *supra* (television cameraman); *In re Consumers Union of the United States, Inc. (Starks v. Chrysler Corp.),* 32 Fed. R. Serv. 2d 1373 (S.D.N.Y. 1981) (publisher of *Consumer Reports*); *Apicella v. McNeil Laboratories, Inc.,* 66 F.R.D. 78 (E.D.N.Y. 1975) (publisher of *The Medical Letter on Drugs and Therapeutics*); with *Wright v. Patrolmen's Benevolent Ass'n,* 72 F.R.D. 161 (S.D.N.Y. 1976) (journalist's privilege *not* extended to bar association that conducted investigation of transfer of judge from criminal to civil bench).[9] GAP does not purport to be part of the fourth estate, nor could it, given the description of its work provided by its Executive Director. *See* GAP Motion to Quash, Affidavit of Louis Clark (June 24, 1983) at 2-3. Moreover, although it does perform some information gathering and disseminating functions on a confidential basis, that alone is not enough to convert GAP into a branch of the media. By its own account, GAP is a public interest group that offers assistance to corporate and governmental whistleblowers. It does not place information directly into the public "marketplace of ideas." *Apicella, supra,* 66 F.R.D. at 84. By no reasonable measure can it be deemed "the press" for the purpose of invoking the qualified privilege of a journalist not to reveal confidential communications.[10]

Even if GAP were within the ambit of this qualified privilege, the outcome here would be no different. Where the courts have recognized a

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[9] Indeed, the plurality opinion in *Branzburg* speculated on the "practical and conceptual difficulties" of creating a broad and absolute privilege bottomed on the function of disseminating information. 408 U.S. at 703-05.

[10] GAP's reliance on a "scholar's privilege" — an alleged outgrowth of the journalist's privilege — is similarly without basis. GAP can no more be fairly characterized as part of the academic community than part of the media. More important, support for a recognized scholar's privilege cannot be found in the cases on which GAP relies.

In *Richards of Rockford, Inc. v. Pacific Gas & Electric Co.,* 71 F.R.D. 388, 389 & n.2, 390 (N.D. Cal. 1976), the court explicitly declined to decide if such a privilege exists, deciding the case on other grounds. Neither the majority nor concurring opinion in *United States v. Doe (In re Popkin),* 460 F.2d 328 (1st Cir. 1972), *cert. denied,* 411 U.S. 909 (1973), expressly recognizes a scholar's privilege. Finally, while *United States v. Doe (In re Falk),* 332 F. Supp. 938, 941 (D. Mass. 1971), might be read as according First Amendment rights to a professor, that case relied on a lower court opinion overturned in *Branzburg* and its rationale is thus suspect. On the other hand, more recent authority has clearly rejected the notion of a scholar's privilege. *See Wright v. Jeep Corp., supra,* 547 F. Supp. at 875-76. *See also In re Dinnan,* 661 F.2d 426, 427-31 (5th Cir. 1981), *cert. denied,* 457 U.S. 1106 (1982) (rejection of "academic privilege" against testifying).

journalist's privilege, they have balanced "the potential harm to the free flow of information that might result against the asserted need for the requested information." *Bruno & Stillman, Inc. v. Globe Newspaper Co.*, 633 F.2d 583, 596 (1st Cir. 1980) (footnote omitted). *See Branzburg, supra*, 408 U.S. at 710 (Powell, J., concurring); *Cuthbertson, supra*, 630 F.2d at 148; *Carey, supra*, 492 F.2d at 636-39; *Solargen, supra*, 506 F. Supp. at 550. The principal factors considered are whether the requested information is relevant and goes to the heart of the matter at hand, and whether the party seeking the information has tried to obtain it from other possible sources. *Silkwood, supra*, 563 F.2d at 438; *Baker, supra*, 470 F.2d at 783. Although the Licensing Board found it unnecessary to decide whether GAP was entitled to assert a First Amendment privilege, the Board in fact balanced these facts as if the privilege did apply.

In particular, the Board determined that the requested information is relevant to certain issues in this licensing proceeding[11] and noted applicant's inability to obtain the information elsewhere. LBP-83-53, *supra*, 18 NRC at 287, 288; LBP-83-64, *supra*, 18 NRC at 771-72. *See* LBP-82-118, *supra*, 16 NRC at 2047-50, 2057-61; CPC Application for Deposition Subpoenas at 2. *See also* Memorandum of CPC in Opposition to Appeal (December 9, 1983) at 13-14. The Board also concluded that the protective order it was imposing would eliminate the harm GAP perceived to its interest. LBP-83-53, *supra*, 18 NRC at 288; LBP-83-64, *supra*, 18 NRC at 768-69. *See* pp. 643-44, *infra*. It then weighed this factor against the others and — quite reasonably, in our view — denied the motion to quash. LBP-83-53, *supra*, 18 NRC at 288-89. *See also* LBP-83-64, *supra*, 18 NRC at 769, 771.

B. GAP also contends that the subpoenas should be quashed as a matter of the "common law of privilege." It refers us to no case authority, but relies on Wigmore's statement of the "four fundamental conditions . . . recognized as necessary to the establishment of a privilege against the disclosure of communications:"

> (1) The communications must originate in a *confidence* that they will not be disclosed.
>
> (2) This element of *confidentiality must be essential* to the full and satisfactory maintenance of the relation between the parties.
>
> (3) The *relation* must be one which in the opinion of the community ought to be sedulously *fostered*.

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[11] GAP conceded as much in its Motion to Stay Depositions (October 26, 1983) at 3.

(4) The *injury* that would inure to the relation by the disclosure of the communications must be *greater than the benefit* thereby gained for the correct disposal of litigation.

8 Wigmore, *Evidence* § 2285 (J. McNaughton rev. 1961) (footnote omitted). GAP contends that it has satisfied all four factors, and thus the subpoenas for its testimony and documents should be quashed.

We note at the outset that Wigmore used these four conditions simply as a convenient framework for discussing already recognized privileges (*e.g.*, attorney-client, spousal, government informer). *Ibid.*[12] In no respect did he suggest that new privileges should be lightly created, even by statute. Indeed, Wigmore characterizes as "[t]he sounder attitude" several reports strongly disapproving the creation of so-called "novel privileges." *Id.*, § 2286.

Be that as it may, GAP fails to meet three of the four conditions — (1), (2), and (4) — specified by Wigmore. First, the communications did not originate in a confidence that they would not be disclosed. On the contrary, GAP was requested to "act as an intermediary for the presentation of [the utility and construction workers'] information to the NRC." GAP Motion to Quash, Affidavit of Louis Clark at 4. GAP also discussed with the press some of the workers' specific allegations. CPC Application for Deposition Subpoenas, Attachment No. 1 at 2. *See* GAP Deponents' Motion for Reconsideration (September 30, 1983), Affidavit of Billie Pirner Garde (September 30, 1983) at 2, 5. Moreover, GAP's brief on appeal refers to its role in facilitating "the full and free flow of information to the NRC *and to the public.*" GAP Memorandum in Support of Appeal at 9 (emphasis added). These statements and actions belie any notion that the communications were, or were intended to be, completely confidential. Only the informants' *identities* were intended to be kept anonymous. GAP Motion to Quash, Affidavit of Louis Clark at 4, 6.[13] And, as discussed below, the Board's protective order is designed to accomplish that purpose.

By the same token, preserving the confidentiality of the information supplied to GAP could not possibly have been contemplated by — and thus essential to the relationship between — GAP and its informers. As noted, the information was intended for dissemination to at least the

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[12] The way courts have used this section of Wigmore bears this out. *See, e.g., Somer v. Johnson*, 704 F.2d 1473, 1479 n.6 (11th Cir. 1983); *Reporters Committee for Freedom of the Press v. American Telephone & Telegraph Co.*, 593 F.2d 1030, 1050 n.67 (D.C. Cir. 1978), *cert. denied*, 440 U.S. 949 (1979).

[13] Even then, the NRC explained that, while it was its policy not to divulge allegers' identities, it could not guarantee preservation of anonymity in all circumstances. GAP Motion to Quash, Affidavit of Louis Clark, Attachment 1 (Letter of J.G. Keppler to B. Garde).

NRC, while only the informers' identities were meant to be protected. The last factor, injury to the relationship from disclosure greater than the benefit to the litigation, simply reflects the balancing test employed by the courts in the journalist's privilege cases discussed above. As we explained at pp. 640-41, *supra*, the Licensing Board correctly weighed the competing interests involved here in favor of disclosure. GAP has therefore failed to make a case for according it the "common law of privilege."

C. GAP's most significant shortcoming on appeal is its total failure to address the protective order imposed by the Licensing Board. We must presume, from the very prosecution of this appeal, that GAP regards that order as deficient in some respect. Yet GAP has provided us with no explanation whatsoever of how it is inadequate. Protection of the *identities* of GAP's sources is the predominant theme of its motion filed with the Licensing Board. *See* GAP Motion to Quash at 3, 7, 8, 10, and Affidavit of Louis Clark at 4, 6. Accordingly, the most important feature of the protective order is its inclusion of precautions against even inadvertent breaches of anonymity. Disclosures are also to be limited both in scope and to only applicant's *counsel*, the NRC staff (which already has the information), intervenors (who are being counseled by GAP and are not likely to harass the informers), and the Licensing Board. Disputes over what constitutes protected material are to be presented to the Board for resolution. LBP-83-53, *supra*, 18 NRC at 289-91. GAP leaves us to ponder why these measures are not responsive to its fear of irreparable damage to its institutional integrity.[14]

The imposition of a protective order in the circumstances of this case is a sound and pragmatic action designed to facilitate essential discovery while protecting GAP's asserted interests — interests that we have found not privileged. Moreover, the Licensing Board's order is fully consistent with the approach taken by the courts, even where a qualified privilege is found to exist. *See, e.g., Bruno & Stillman, supra*, 633 F.2d at 598, where the court describes various options available, including one of the measures employed here by the Licensing Board — limiting attendance at and distribution of the depositions.[15]

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[14] The Licensing Board correctly pointed out that we assume protective orders will be obeyed unless a concrete showing to the contrary is made. *See* LBP-83-53, *supra*, 18 NRC at 287-88 and cases cited. In seeking reconsideration, GAP attempted but failed to do just that. *See* LBP-83-64, *supra*, 18 NRC at 769-70. The Licensing Board nonetheless pointed out that one who violates such orders risks " 'serious sanction.' " *Id.* at 769. *See* 10 C.F.R. § 2.713. GAP does not pursue this on appeal, and we see no basis for contradicting the Board's conclusion that its protective order is unlikely to be violated.

[15] GAP relies on *Machin v. Zuckert*, 316 F.2d 336 (D.C. Cir.), *cert. denied*, 375 U.S. 896 (1963), which involved the *government's* assertion of privilege with respect to a U.S. Air Force crash report. Although

(*Continued*)

In affirming the Licensing Board's denial of GAP's motion to quash, we do not denigrate the important role that GAP and similar organizations may play in uncovering possible wrongdoing and waste. Nor are we insensitive to informants' fears — warranted or not — of harassment and reprisal, should their identities become known. On the other hand, significant questions about quality assurance at applicant's facility have been raised in this litigation. GAP has information bearing on those issues, and applicant is entitled to learn the nature of it through reasonable discovery methods. *See Herbert v. Lando, supra,* 441 U.S. at 177; 10 C.F.R. § 2.740(b)(1).[16] We believe the Licensing Board's protective order successfully and fairly accommodates all of these competing interests.

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The Licensing Board's denial of GAP's motion to quash is *affirmed.*
It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the
Appeal Board

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that case is not only inapposite but also probably superseded by the subsequent enactment of the Freedom of Information Act, we note that the court there found a protective order to be a useful tool in dealing with the controversy at hand. *Id.* at 340, 341.

[16] We agree with the Licensing Board's observation that it is particularly unfair to applicant and the adjudicatory system itself for GAP to reveal to the press the information "confided" to it (*see* p. 642, *supra*), while refusing to subject it to scrutiny in related litigation. *See* LBP-83-64, *supra,* 18 NRC at 770-71.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING APPEAL BOARD**

**Administrative Judges:**

**Christine N. Kohl**, Chairman
**Gary J. Edles**
**Dr. Reginald L. Gotchy**

**In the Matter of**

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

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

**March 30, 1984**

The Appeal Board affirms (1) the Licensing Board's assertion of jurisdiction over an intervenor's contentions concerning the applicant's 10 C.F.R. Part 70 application for a license to receive and store new, unirradiated fuel outdoors at the Limerick site, and (2) dismissal of the contentions for lack of basis and specificity.

## MATERIALS LICENSE UNDER PART 70: NEED

A Special Nuclear Materials License is required for a person to "receive title to, own, acquire, deliver, receive, possess, use, or transfer special nuclear material." 10 C.F.R. § 70.3. Such authorization is essentially subsumed within a license to operate a commercial power reactor, issued pursuant to 10 C.F.R. Part 50.

## MATERIALS LICENSE UNDER PART 70: NEED

If a utility wants (or needs) to receive and store new fuel before an operating license is issued, the utility must obtain a Part 70 license.

**RULES OF PRACTICE: JURISDICTION OF LICENSING BOARDS**

Under the Commission's Rules of Practice, licensing boards may "preside in such proceedings for granting, suspending, revoking, or amending licenses or authorizations as the Commission may designate, and to perform such other adjudicatory functions as the Commission deems appropriate." 10 C.F.R. § 2.721(a).

**RULES OF PRACTICE: JURISDICTION OF APPEAL BOARDS**

Appeal boards are delegated authority to perform the Commission's review functions in Part 50 and other licensing proceedings specified by the Commission. 10 C.F.R. § 2.785(a).

**RULES OF PRACTICE: SCOPE AND TYPE OF PROCEEDING**

Under 10 C.F.R. § 2.721(a), only the Commission can define the scope of a proceeding before a licensing board, or decide that a formal adjudicatory-type proceeding should be instituted.

**ATOMIC ENERGY ACT: HEARING REQUIREMENTS FOR MATERIALS**

Section 189a of the Atomic Energy Act, 42 U.S.C. § 2239a, mandates a hearing for *any* licensing action where requested by a person "whose interest may be affected." But a formal, "on the record" adjudicatory-type hearing under Section 554 of the Administrative Procedure Act (APA), 5 U.S.C. § 554 — like those conducted by licensing boards — is not required for so-called materials licenses. *See Kerr-McGee Corp.* (West Chicago Rare Earths Facility), CLI-82-2, 15 NRC 232, 244-62 (1982), *aff'd sub nom. City of West Chicago v. NRC*, 701 F.2d 632 (7th Cir. 1983). The Commission can delegate authority to adjudicate such matters informally to an agency official, such as the Director of the Office of Nuclear Material Safety and Safeguards. *See, e.g., Kerr-McGee Corp.* (West Chicago Rare Earths Facility), CLI-82-21, 16 NRC 401 (1982).

**RULES OF PRACTICE: JURISDICTION OF LICENSING BOARDS**

Licensing boards may assert jurisdiction over Part 70 issues raised in conjunction with an ongoing Part 50 licensing proceeding. *See Pacific*

*Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units Nos. 1 and 2), CLI-76-1, 3 NRC 73, 74 (1976). *See also, e.g., Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 & 2), LBP-83-38, 18 NRC 61, 63 (1983); *Cincinnati Gas and Electric Co.* (William H. Zimmer Nuclear Station), LBP-79-24, 10 NRC 226, 228-30 (1979).

**ATOMIC ENERGY ACT: NOTICE REQUIREMENT FOR MATERIALS LICENSES**

It is not clear what, if any, notice requirements pertain to materials license cases. *See Armed Forces Radiobiology Research Institute* (Cobalt-60 Storage Facility), ALAB-682, 16 NRC 150, 157-59 (1982).

**RULES OF PRACTICE: ADMISSIBLE CONTENTIONS**

Section 2.714(b) of 10 C.F.R. requires an intervenor in a proceeding to set forth the bases for its contention(s) with reasonable specificity. Where the laws of physics deprive a proposed contention of any credible basis, the contention will not be admitted. *Compare Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542 (1980).

**RULES OF PRACTICE: RESPONSIBILITIES OF PARTIES**

Parties in Commission proceedings have a duty to alert the Boards and all other parties of any significant new information related to the proceeding. *See Tennessee Valley Authority* (Browns Ferry Nuclear Plant, Units 1, 2 and 3), ALAB-677, 15 NRC 1387, 1394 (1982).

**RULES OF PRACTICE: NONTIMELY SUBMISSION OF CONTENTIONS**

Under *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041 (1983), all five factors enumerated in 10 C.F.R. § 2.714(a)(1) must be considered and balanced before an untimely intervention petition may be granted or a late-filed contention admitted. This is so even where a party has succeeded in making a strong showing on the first of those factors (good cause).

## TECHNICAL ISSUES DISCUSSED

Criticality Potential of New Fuel;
Handling and Storage of New Fuel at the Reactor Site;
Radiation Hazard from New Fuel.

## APPEARANCES

**Robert L. Anthony,** Moylan, Pennsylvania, for intervenor Friends of the Earth.

**Troy B. Conner, Jr., Mark J. Wetterhahn,** and **Robert M. Rader,** Washington, D.C., for applicant Philadelphia Electric Company.

**Benjamin H. Vogler, Joseph Rutberg, Ann P. Hodgdon, Nathene A. Wright,** and **Michael N. Wilcove** for the Nuclear Regulatory Commission staff.

## MEMORANDUM AND ORDER

Friends of the Earth (FOE), an intervenor in this operating license proceeding, appeals the Licensing Board's March 16, 1984, memorandum and order (and related oral rulings). *See* LBP-84-16, 19 NRC 857. In that order, the Board dismissed several new contentions by FOE concerning Philadelphia Electric Company's (PECo's) application, pursuant to 10 C.F.R. Part 70, to receive and store new, unirradiated fuel outdoors at the Limerick site for several weeks.[1] Before reaching that ultimate decision, the Board determined that, despite its specific authorization to conduct hearings on PECo's *operating* license application, it had jurisdiction over related Part 70 issues. The Board also concluded that FOE's contentions were not late-filed.

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[1] The Licensing Board's dismissal of FOE's contentions (and those of LEA, another intervenor, not at issue here) opened the way to the issuance of the Part 70 license. The Board's ruling is therefore an immediately appealable order. Delivery of the fuel was scheduled for this month; hence, FOE also seeks a stay of the Board's order. After learning of the imminent issuance of the license and subsequent likely movement of the fuel, we temporarily stayed the Board's order (and thereby fuel delivery) to permit receipt of FOE's brief and to prevent FOE's appeal from becoming effectively moot. Order of March 27, 1984 (unpublished).

As explained below, we ratify the Board's assertion of jurisdiction over this matter and affirm its dismissal of FOE's contentions for lack of basis and specificity.

## I. BACKGROUND

The Licensing Board's written ruling thoroughly sets out the background of this appeal. *See id.* at 860-62. We summarize the salient points chronologically here.

In June 1983, PECo filed with the Commission a Part 70 application for a Special Nuclear Materials License.[2] The following January and February, it amended the application to reflect a proposed March 1984 delivery date for 764 fuel bundles. The fuel bundles are to remain in their shipping containers but will be stored outdoors at the Limerick site for several weeks.[3] Staff counsel served copies of the amended application on the Licensing Board and parties on February 21, 1984. In a pleading dated February 23 and filed with the Licensing Board, FOE sought to introduce what are essentially several new contentions based on the Part 70 application.[4] Because of the proposed March delivery date for the fuel, the Board requested expeditious responses to FOE's pleading from PECo and the staff. At about the same time as those responses were submitted, FOE filed what it termed an "Addition" to its earlier paper.

The Board heard oral argument from the parties and on March 6 ruled from the bench that it was not admitting FOE's contentions. *See* Tr. 7909-23. It did, however, request certain affidavits from the staff and applicant to bolster one aspect of its oral rulings.[5] After receiving them, the Board issued LBP-84-16, confirming its earlier ruling and subject only to receipt of FOE's reply affidavit. With that in hand, the Board reconfirmed its earlier oral and written rulings. Tr. 8846-48; Licensing Board Memorandum and Order of March 26, 1984 (unpublished).

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[2] This license is required for a person to "receive title to, own, acquire, deliver, receive, possess, use, or transfer special nuclear material" (*e.g.*, the fuel used in a reactor like Limerick). 10 C.F.R. § 70.3. Such authorization is essentially subsumed within a license to operate a commercial power reactor, issued pursuant to 10 C.F.R. Part 50. If the utility wants (or needs) to receive and store new fuel before that operating license is issued, the utility must obtain a Part 70 license.

[3] Though "outdoors," the stacks of containerized fuel assemblies will be sheltered by a five-sided corrugated metal box. PECo's Amended Application for Special Nuclear Material License, § 1.2.1.1 (rev. February 17, 1984).

[4] FOE is already an intervenor, involved in the litigation of several contentions concerning PECo's operating license application.

[5] In so doing, the Board emphasized that the affidavits were to address the *bases* of the contentions; it was "not talking about summary disposition." Tr. 7920. The affidavits may be properly viewed as supplemental responses to FOE's initial request to admit the contentions and its "Addition" thereto.

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Apparently not certain of when it should appeal, FOE sought our intercession after the Board's initial bench ruling but before the issuance of LBP-84-16. Once all doubt as to the "finality" of the Board's opinion was removed, FOE renewed its intent to appeal, and we abbreviated the prescribed briefing schedule in light of the likely imminence of fuel movement.

## II. JURISDICTION

Under the Commission's Rules of Practice, licensing boards may "preside in such proceedings for granting, suspending, revoking, or amending licenses or authorizations as *the Commission* may designate, and to perform such other adjudicatory functions as *the Commission* deems appropriate." 10 C.F.R. § 2.721(a) (emphasis added).[6] The Commission's order directing the Licensing Board to preside in this proceeding is limited on its face to issues relating to PECo's operating license. *See* 46 Fed. Reg. 42,557 (1981).[7] Relying on Commission precedent and a common sense reading of the Rules of Practice, however, the Licensing Board concluded that it was appropriate for it to *assert* jurisdiction over FOE's Part 70 filings as well. LBP-84-16, *supra*, 19 NRC at 862-64. We agree with the Board's reasoning.

In *Diablo Canyon, supra* note 6, the Commission expressly approved the Licensing Board's assertion of jurisdiction over Part 70 issues raised in conjunction with an ongoing Part 50 licensing proceeding. The Commission noted that, under 10 C.F.R. § 2.721, it could delegate such authority to the Licensing Board. More important, it stressed that the Part 70 materials license involved there was "integral to the Diablo Canyon project." The Commission also commented that "[g]iven that Board's familiarity with the Diablo Canyon project, it made good practical sense

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[6] Similarly, appeal boards are delegated authority to perform the Commission's review functions in Part 50 and other licensing proceedings specified by the Commission. 10 C.F.R. § 2.785(a). The Commission has expressly delegated us authority to exercise the review functions over the Part 70 issues raised here that it would ordinarily perform. Commission Order of March 22, 1984 (unpublished). *See Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units Nos. 1 and 2), CLI-76-1, 3 NRC 73, 74 (1976). At the same time, the Commission noted that it was not deciding whether the Licensing Board, in fact, had jurisdiction over these Part 70 issues, or whether there should be formal adjudication in this type of case. Commission Order of March 22, 1984, *supra*, at 2 n.1.

[7] In a notice dated March 16, 1984, and served ten days later, the Chairman of the Atomic Safety and Licensing Board Panel "established" the Licensing Board below "to rule on the admissibility of Part 70 issues raised in this proceeding." That notice, of course, cannot be construed as an actual delegation of subject matter jurisdiction to the Board. As noted above, under 10 C.F.R. § 2.721(a), only the Commission can define the scope of a proceeding before a licensing board, or decide that a formal adjudicatory-type proceeding should even be instituted. *See* Commission Order of March 22, 1984, *supra*, at 2 n.1. *See also* p. 651, *infra*.

for it to hear and decide the related issues raised by the Part 70 materials license application." 3 NRC at 74 n.1.

PECo's materials license is no less "integral" to Limerick.[8] As in *Diablo Canyon,* it is necessary for PECo to receive and store new fuel assemblies in advance of the issuance of its requested operating license. It also "made good practical sense" for the Licensing Board, so familiar with the Limerick facility and engaged in hearings at the time, to rule on the admissibility of FOE's proffered contentions. The need for expeditious attention to this matter, prompted by the proposed March fuel delivery date, further validates the Board's quick and responsible action.

This is not to say that a licensing board is *required* to consider Part 70 issues, or even that it should do so in all circumstances. To be sure, Section 189a of the Atomic Energy Act, 42 U.S.C. § 2239a, mandates a hearing for *any* licensing action where requested by a person "whose interest may be affected." It is now clear, however, that a formal, "on the record" adjudicatory-type hearing under Section 554 of the Administrative Procedure Act (APA), 5 U.S.C. § 554 — like those conducted by licensing boards — is not required for so-called materials licenses. *See Kerr-McGee Corp.* (West Chicago Rare Earths Facility), CLI-82-2, 15 NRC 232, 244-62 (1982), *aff'd sub nom. City of West Chicago v. NRC,* 701 F.2d 632 (7th Cir. 1983).[9] The Commission is free to delegate authority to adjudicate such cases informally to an agency official, such as the Director of the Office of Nuclear Material Safety and Safeguards (NMSS). *See, e.g., Kerr-McGee Corp.* (West Chicago Rare Earths Facility), CLI-82-21, 16 NRC 401 (1982).[10]

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[8] Applicant argued to the Licensing Board that the Part 70 issues must concern the same matters that are being litigated in the operating license proceeding. *Diablo Canyon,* however, suggests no such requirement. In any event, FOE's contentions assertedly relate to at least two matters under litigation in the proceeding — the ability of safety-related buildings to withstand overpressures and impacts from offsite accidents, and emergency planning.

[9] *Kerr-McGee* involved a 10 C.F.R. Part 40 license for the possession, use, etc., of "source material" (*e.g.,* uranium ore). The informal hearing requirement of Section 189a, however, applies to all types of materials licenses, whether arising under 10 C.F.R. Part 30, 40, or 70. Thus, the holding of *Kerr-McGee* fully pertains to Part 70 matters.

[10] On appeal, FOE contends that Section 182b (*sic* — Section 182c) of the Atomic Energy Act, 42 U.S.C. § 2232c, requires notice of PECo's application for the Part 70 license. FOE also cites 10 C.F.R. §§ 72.34, 2.104, and 2.105 as further evidence of the Commission's obligation to provide notice of an application for a Part 70 license.

FOE is in error on all counts. Section 182c of the Act requires notice of the application for the license to operate the power plant itself — "a utilization or production facility for the generation of commercial power." 42 U.S.C. § 2232c. *See* 42 U.S.C. §§ 2014v, cc (definitions of "production facility" and "utilization facility"). It does not refer to a Part 70 materials license to receive and store special nuclear material. *See* note 2, *supra.* Nor do the Commission's Rules of Practice, 10 C.F.R. §§ 2.104, 2.105, require such notice. Section 2.104 requires notice of an application where a hearing is "required" or the Commission has found a hearing to be in the public interest. Under a court-approved Commission interpretation, Section 2.104 does not apply to materials license cases. *See City of West Chicago, supra,*

*(Continued)*

The consistent agency practice, however, is for licensing boards, already presiding at operating license hearings, to act on requests to raise Part 70 issues involving the same facility. *See, e.g., Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 & 2), LBP-83-38, 18 NRC 61, 63 (1983); *Cincinnati Gas and Electric Co.* (William H. Zimmer Nuclear Station), LBP-79-24, 10 NRC 226, 228-30 (1979).[11] In neither of these cases did the Commission intercede to terminate the Boards' action. *See also Armed Forces Radiobiology Research Institute* (Cobalt-60 Storage Facility), Docket No. 30-6931, Commission Order (October 8, 1981) (unpublished) (Commission notes ongoing proceeding for renewal of research reactor operating license and refers request for hearing on Part 30 license for same facility to a licensing board). The *Limerick* Licensing Board's assertion of jurisdiction is consistent with this practice and fully justified.

## III. THE CONTENTIONS

### A. Basis and Specificity

The precise nature of FOE's proposed contentions was not entirely clear to the Licensing Board. It identified, however, a number of areas of concern vis-a-vis the Part 70 license, reflected in FOE's original filing and subsequent "Addition": (1) the ability of safety-related buildings to withstand overpressures and impacts from offsite accidents; (2) the not yet final Independent Design Verification Program for the facility; (3) the qualification of the overhead cranes for handling fuel; (4) the incompleteness of the emergency plan; (5) natural hazards such as tornadoes and electrical storms; (6) theft and sabotage; (7) the hazard posed

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701 F.2d at 639. Although Section 2.105 lists other types of proposed action where the Commission is committed to providing notice, it does not include Part 70 materials licenses. *See id.* at 639-40. 10 C.F.R. § 72.34 is inapposite: it requires notice of a Part 72 application to license an *independent spent* fuel storage installation (ISFSI). *See* 10 C.F.R. § 72.3(m) (definition of "ISFSI"). That, of course, is not what PECo seeks here through its Part 70 application.

It is not clear whether any other statutory or regulatory provision requires notice of materials license action. *See Armed Forces Radiobiology Research Institute* (Cobalt-60 Storage Facility), ALAB-682, 16 NRC 150, 157-59 (1982) (Eilperin, concurring). As in *AFFRI*, however, it is not necessary that we resolve the issue because FOE had actual notice of the Part 70 application after February 21, 1984, when staff counsel served the Licensing Board and all parties with PECo's amended application. From this very appeal, it is evident that FOE had the opportunity to seek to litigate issues arising from the Part 70 application. It therefore has not been prejudiced, in fact, by the lack of any formal notice. *But see* p. 657 & n.20, *infra*.

[11] In *Pennsylvania Power & Light Co.* (Susquehanna Steam Electric Station, Units 1 and 2), Docket Nos. 50-387, 50-388, Licensing Board Memorandum and Order (May 20, 1981) at 28-29 (unpublished), the Licensing Board declined to assert jurisdiction over Part 70 issues *at that time* because it obviously believed it would reach an expedited decision on the operating license first, obviating the Part 70 license itself. *See* note 2, *supra*.

by a design-basis railway car explosion; and (8) possible "activation" (*i.e.*, criticality) of the fuel by an accident involving underground and overhead electrical lines. LBP-84-16, *supra*, 19 NRC at 869. The Board addressed these items collectively from two perspectives — whether the new fuel is likely to go critical, and whether the public health and safety can be threatened by the release of radioactive materials through some means not involving criticality.

As to the former, the Board emphasized that, based on its own collective knowledge, there is no credible explanation of how unirradiated fuel, as stored at Limerick, can go critical in any of the situations mentioned by FOE. It referred FOE to our general discussion of this matter in *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units Nos. 1 and 2), ALAB-334, 3 NRC 809, 817-20 (1976), and indicated that this proceeding was not intended as a forum in which to litigate the laws of physics. LBP-84-16, *supra*, 19 NRC at 869-70. On a similar basis, the Board also found no credible mechanism, not involving criticality, that would subject the public to harmful radioactive releases from the low-enriched, unirradiated fuel to be stored at Limerick. *Id.* at 870. To verify this finding, the Board obtained affidavits from the staff and applicant, as well as from FOE. These statements led the Board to confirm its earlier written ruling. Tr. 8846-48; Licensing Board Memorandum and Order of March 26, 1984, *supra*.

Further, the Board specifically addressed FOE's concern about the overhead crane.[12] It noted the staff's finding that certain lifting devices attached to the crane are "non-conforming" as to heavy weights (100,000 pounds or more). But the Board stressed that the staff does not question the crane's ability to lift together even several of the lighter new fuel containers, and PECo has explained why the crane will not be used to lift heavier loads over the new fuel storage area. LBP-84-16, *supra*, 19 NRC at 871. With respect to FOE's concern about theft and sabotage, the Board found that FOE failed to allege any specific inadequacy in the security plan and noted that it (the Board) could discern no general cause to doubt the plan's sufficiency. *Id.* at 874. The Board therefore dismissed all of FOE's contentions for failure to satisfy the basis and specificity requirements of 10 C.F.R. § 2.714(b).

FOE's purported contentions are unfocused and contain no attempt to identify with reasonable specificity the basis of the perceived risks from the temporary outdoor storage of unirradiated fuel assemblies packed in

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[12] In doing so, the Board emphasized that its decision did not depend on "whether the non-conforming crane could somehow crush new fuel." LBP-84-16, *supra*, 19 NRC at 871. The Board simply sought to aid FOE's understanding of the matter.

special shipping containers. The Licensing Board quite properly dismissed them on that ground. But even though FOE's filings were thus deficient, the Board was sensitive to what it believed to be FOE's fundamental misapprehension about the delivery and temporary outdoor storage of the fuel — *i.e.*, that the fuel could somehow go critical with a corresponding risk to the public, or that through some noncriticality mechanism the fuel could release harmful radiation. The Board correctly pointed out that there is simply no conceivable, credible explanation for either to occur.[13]

Perhaps some additional elaboration will assuage FOE's concerns. As we explained in *Diablo Canyon*, ALAB-334, *supra*, for criticality — *i.e.*, a stable chain reaction — to occur, four factors must be present: (1) a sufficient supply of uranium fuel; (2) a "moderator" (usually a significant amount of water); (3) a proper geometric pattern of fuel rods within each fuel assembly, and of the fuel assemblies themselves, with the fuel/moderator ratio within certain limits; and (4) careful control of the heat produced by fission. 3 NRC at 818-19. We went on to explain how each of these factors must be controlled to maintain criticality or else the chain reaction will terminate. *Id.* at 819. Even construing FOE's contentions in a manner most favorable to FOE, we can see no way that these conditions can be achieved in the situations that FOE postulates. For example, it is simply not credible that dropping of the fuel, a tornado, electrical cables, or a nearby explosion could cause the removal of the protective packaging around enough of the fuel *and* stack it in some source of water in the required configuration, so as to achieve criticality.

FOE's fears of radiation hazard from unirradiated, noncritical fuel also are generalized and thus without basis. Moreover, even assuming the complete *absence* of the protective containers for the fuel assemblies (through unexplained means), the ceramic uranium dioxide fuel pellets, at the enrichment level involved here, would emit radiation at levels well below the dose limits set by the Commission in 10 C.F.R. Part 20. *See* Affidavit of Norman Ketzlach (March 13, 1984); Affidavit of Lubomir B. Pyrih (March 13, 1984) at 1-6; Affidavit of Paul S. Stansbury

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[13] This case is thus distinguishable from *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-590, 11 NRC 542 (1980). There we found a *pro se* petitioner's inartfully drafted contention, asserting that a marine biomass farm would be environmentally preferable to the Allens Creek nuclear power plant, specific enough to be admitted for litigation, even though there was "appreciable room for doubt" as to its merit. *Id.* at 546-49. In this case, it is the laws of physics and the physical properties of the unirradiated fuel that deprive FOE's purported contentions of any credible or arguable basis.

(March 12, 1984).[14] The *presence* of the shipping containers, designed and licensed under 10 C.F.R. Part 71,[15] adds yet another level of protection against any perceived hazard. *See* Pyrih Affidavit at 6-12.[16]

There are other reasons as well why FOE's contentions should not or need not be admitted for litigation. (1) The ability of safety-related buildings to withstand overpressures and impacts from offsite accidents is already being litigated as contentions V-3a and V-3b in the operating license proceeding. (2) FOE has articulated no connection between the apparently ongoing Independent Design Verification Program and its concern about the temporary *outdoor* storage of unirradiated fuel pursuant to the requested Part 70 license. (3) As fully explained by the Licensing Board, the non-conformance of the overhead crane, identified by the staff, is not related to the storage of new fuel. *See* LBP-84-16, *supra*, 19 NRC at 871. (4) The Commission's regulations do not require an emergency plan to be in place for the particular activity sought to be licensed here under Part 70. *See* 10 C.F.R. §§ 70.22(i), 70.23(a)(11). (5) FOE fails to provide any specifics whatsoever concerning the alleged "risk of theft and sabotage." PECo's Part 70 application, § 1.2.1.1, as amended, states that the outdoor New Fuel Storage Area will be enclosed by an eight-foot fence, subject to 24-hour surveillance by a watchman, and illuminated at night. Further, LEA (*see* note 1, *supra*), which raised concerns about the adequacy of the security plan for this new fuel storage, has entered a stipulation with PECo whereby LEA is permitted to review that plan subject to a protective order. FOE was

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[14] FOE is apparently concerned with the release of uranium oxide "dust." *See* Tr. 7908. As noted, the fuel is in ceramic pellet form. Only if removed from the fuel rod cladding and deliberately ground or cut could the pellets be transformed into "dust." *See* Ketzlach Affidavit, *supra*, at 2. FOE does not provide a credible scenario as to how this could occur. *See* Response of Anthony/FOE to Affidavits (March 19, 1984).

[15] FOE argues that the shipping containers do not conform to current NRC regulations. *Ibid.* According to applicant, the containers meet the standards in effect at the time the application to *transport* the fuel was filed (March 1982). Pyrih Affidavit at 7. Since that time, the Commission has amended 10 C.F.R. Part 71 "to make [these regulations] compatible with those of the International Atomic Energy Agency." 48 Fed. Reg. 35,600 (1983). Some substantive changes were made, but "the Commission's basic standards for radioactive material packaging remain unchanged." *Ibid.* In fact, the 1982 and current standards relevant to our inquiry here – *i.e.*, the ability of the containers to withstand certain hypothetical accident conditions – are virtually identical in all material respects. *Compare* 10 C.F.R. Part 71, App. B (1983), with 48 Fed. Reg. 35,616-17 (1983) (to be codified at 10 C.F.R. § 71.73).

To the extent FOE argues on appeal that a packaging standard other than that reflected in the pertinent Commission regulations should apply, 10 C.F.R. § 2.758(a) precludes litigation of such an issue.

[16] FOE contends that the "stringent handling" requirements for the fuel show that it is "highly dangerous." Addition to Anthony/FOE Application for Contention on New Matter (February 28, 1984). But these requirements reflect the Commission's "defense-in-depth" philosophy/policy rather than an acknowledgment that this unirradiated fuel is "highly dangerous" in the way FOE perceives it. Further, we suspect that the stringent packaging and shipping requirements for the fuel assemblies would be undertaken in large measure even in the absence of government regulation in order to protect the economic value of the cargo – in much the way delicate electronic equipment is shipped.

aware of this arrangement but apparently has chosen not to avail itself of it.

In sum, the Licensing Board's decision dismissing FOE's contentions for lack of the required basis and specificity is amply justified.[17]

## B. Timeliness

Having affirmed the Board's dismissal of FOE's Part 70 contentions for lack of basis and specificity, it is not necessary that we consider whether the contentions were late-filed. Nonetheless, we believe some comments on this matter are in order.

The Board concluded that the criteria applied to late-filed contentions — found in 10 C.F.R. § 2.714(a)(1) and discussed in *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041 (1983) — "do not apply" in the circumstances of this case. LBP-84-16, *supra*, 19 NRC at 868. It emphasized that PECo is under the Board's standing order (since 1981) to serve the Board and all parties with any material related to the operating license proceeding. In the Board's view, *Diablo Canyon*, CLI-76-1, *supra* note 6, determined that a Part 70 license is so related. Thus, PECo's failure to serve its June 1983 Part 70 application and subsequent amendments on the parties excuses FOE from having to satisfy the five late contention criteria of 10 C.F.R. § 2.714(a)(1).[18] The Board also explained why FOE had no reason to foresee that applicant would request this particular Part 70 license. LBP-84-16, *supra*, 19 NRC at 865-68.

We certainly agree with the Board's rebuke of PECo for not at least notifying the Board and parties of the filing of its Part 70 application. Even in the absence of the standing order, PECo should have done so. *See Tennessee Valley Authority* (Browns Ferry Nuclear Plant, Units 1, 2 and 3), ALAB-677, 15 NRC 1387, 1394 (1982). PECo may not agree that its Part 70 application is "related" to the operating license proceeding; but given the Commission's 1976 *Diablo Canyon* decision and *Zimmer* (in which both PECo's counsel and the Licensing Board

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[17] In its brief on appeal, FOE discusses several matters related to testimony given just last week in the ongoing operating license proceeding for Limerick. It is not apparent how any of this relates to the Part 70 contentions FOE sought to raise, particularly insofar as FOE's principal focus was the temporary outdoor storage of fuel at the site. Moreover, assuming *arguendo* that it would be proper for us to rely here on appeal on such new information, FOE makes no attempt to explain how this testimony and other cited documents would alter the Licensing Board's dismissal of its contentions. That is, FOE fails to explain a *credible* basis for any of its scenarios by which either criticality could be achieved or a radiation hazard could occur through some noncritical means.

[18] FOE first learned of the Part 70 application when staff counsel served it with copies on February 21, 1984. *See* p. 649, *supra*.

Chairman participated), PECo has no excuse for not assuming that the *Licensing Board* would find the matters related. If in doubt, of course, the more responsible course would have been to supply the information. *Cf. Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-691, 16 NRC 897, 914 (1982), *review declined*, CLI-83-2, 17 NRC 69 (1983).[19]

The Board's criticism of the staff on this score is warranted as well. *See* LBP-84-16, *supra*, 19 NRC at 867. There are a relatively small number of plants now involved in the licensing process. Each plant has an NRC project manager, who should be aware of all licensing activity concerning the plant. Further, staff counsel are supposed to be informed of the filing of all such applications. The agency has sophisticated data processing capability. There is simply no acceptable explanation for the staff's failure to apprise the Licensing Board and parties, in a more timely fashion, of PECo's Part 70 application.[20]

We disagree with the Licensing Board, however, insofar as it concludes that the 10 C.F.R. § 2.714(a)(1) criteria and *Catawba*, *supra*, "do not apply" in this situation. Rather, the facts discussed above strongly establish FOE's showing of "[g]ood cause . . . for failure to file on time" – the first of the five criteria in 10 C.F.R. § 2.714(a)(1). But we believe *Catawba* requires consideration and balancing of all five factors enumerated in that provision, even where a party has succeeded in making a strong showing on the good cause factor. *See* 17 NRC at 1045-46.[21] In view of our decision affirming the Licensing Board's ultimate conclusion, however, a remand to balance the five factors would serve no useful purpose.

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[19] PECo's argument that the parties are obliged to keep abreast of the public record by reviewing the files of the Public Document Room (here in Washington, D.C.) is without merit. The Commission maintains a *Local* Public Document Room (LPDR) in the vicinity of a plant site so that parties residing nearby have *reasonable access* to all filings. We have been advised by the NRC's Division of Rules and Records that PECo's Part 70 application was never filed in the LPDR for Limerick; thus, the parties did not have reasonable access to this information. PECo's further suggestion that the parties could have obtained, pursuant to the Freedom of Information Act, a document they had no reason to expect existed is similarly specious. *See* Applicant's Answer to New Contentions (March 1, 1984) at 5 n.9.

[20] The failure of FOE to have earlier notice of PECo's Part 70 application was surely responsible for the somewhat unusual procedural course of this case, in which the time for filing pleadings before both the Licensing Board and us was shortened and a temporary stay had to be entered. Questions concerning the jurisdiction of both Boards made the handling of this matter all the more complicated and time-consuming. Fortunately, the basis of the Licensing Board's decision was such that more time and neater procedures would not have altered the outcome that we affirm here. The next such Part 70 application, however, may be different. The Commission may thus find it worthwhile to establish general procedures for handling this category of cases.

[21] The other four factors are:

(ii) The availability of other means whereby the petitioner's interest will be protected.

(iii) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.

(iv) The extent to which the petitioner's interest will be represented by existing parties.

(v) The extent to which the petitioner's participation will broaden the issues or delay the proceeding.

The Licensing Board's decision asserting jurisdiction over and dismissing FOE's Part 70 contentions is *affirmed.*[22]

It is so ORDERED.

FOR THE APPEAL BOARD

C. Jean Shoemaker
Secretary to the
Appeal Board

[22] In light of our decision on the merits, we lift our temporary stay (*see* note 1, *supra*) and deny FOE's request to stay the Licensing Board's decision and issuance of the Part 70 license.

# Atomic Safety and Licensing Boards Issuances

LICENSING BOARDS

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Cite as 19 NRC 659 (1984) LBP-84-13

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**Charles Bechhoefer**, Chairman
**Dr. James C. Lamb**
**Ernest E. Hill**

**In the Matter of**

**Docket Nos. STN 50-498-OL**
**STN 50-499-OL**
**(ASLBP No. 79-421-07-OL)**

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

**March 14, 1984**

The Licensing Board issues a Partial Initial Decision which resolves various quality assurance/quality control issues raised by the Commission in CLI-80-32, 12 NRC 281 (1980), together with Intervenors' contentions related to those QA/QC issues. The Board also denies a motion to reopen the record. The Board rules that, subject to possible modification in later phases of the proceeding, there is currently no basis for concluding (1) that the reasonable assurance findings contemplated by 10 C.F.R. § 50.57 cannot be made, or (2) that HL&P currently lacks managerial competence or character sufficient to preclude an eventual award of operating licenses for the facility. The Board is requiring a report in Phase II of the proceeding concerning QA/QC activities performed following the assumption of duties by a new architect-engineer/construction manager and a new construction contractor.

## ATOMIC ENERGY ACT: OPERATING LICENSES

Character and competence are fundamental requirements for an operating license applicant. They are implicit in, and hence stem from the Atomic Energy Act, specifically Sections 103 and 182a, 42 U.S.C. §§ 2133(b)(2) and 2232(a).

## OPERATING LICENSE(S): MANAGERIAL CHARACTER AND COMPETENCE

There is a marked distinction between the competence and character requirements for an operating license applicant. Although the factors which comprise character or competence may overlap, they nevertheless constitute separate and distinct (and cumulative) requirements.

## OPERATING LICENSE(S): MANAGERIAL CHARACTER AND COMPETENCE

Issues which may bear upon management competence include: (1) whether an applicant's staff and management have sufficient technical and managerial expertise and experience (*i.e.*, demonstrated knowledge, judgment, and skill) to construct the plant properly and operate it safely, (2) whether an applicant's staff and management are organizationally structured so as to permit and encourage the unhindered application of their expertise and experience, and (3) whether an applicant's programs and procedures require the application of that expertise and experience and are consistent with goals of the Commission's regulations and the Atomic Energy Act. That third issue may also be characterized as the adequacy of an applicant's written quality assurance/quality control program(s).

## OPERATING LICENSE(S): MANAGERIAL CHARACTER AND COMPETENCE

Character is, among other things, a measure of the likelihood that an applicant will apply its technical competence to effect the Commission's health and safety (or environmental) standards.

## OPERATING LICENSE(S): MANAGERIAL CHARACTER AND COMPETENCE

The character of an operating license applicant is comprised of many traits relevant to the construction or operation of a nuclear plant.

Among those traits are truthfulness and candor, the manner in which the applicant has reacted to construction noncompliances or nonconformances, its assumption of responsibility for the facility under construction, and the degree to which it attempts to stay informed about the facility.

## OPERATING LICENSE(S): MANAGERIAL CHARACTER AND COMPETENCE

In evaluating an applicant's character and competence, all relevant circumstances must be considered, including reformation of character and improvement in competence.

## OPERATING LICENSE(S): MANAGERIAL CHARACTER AND COMPETENCE

Failure of one or more individuals to demonstrate adequate competence or character does not *per se* indicate a lack of organizational competence or character (and *vice versa*). In evaluating the competence or character of an organization, such factors as the role of particular individuals in the organization, the responsibilities they exercise, the seriousness and frequency of any deficiencies attributable to them, and the steps taken by the organization when deficiencies are discovered must be balanced.

## ATOMIC ENERGY ACT: MATERIAL FALSE STATEMENT

The presence or absence of intent, or of knowledge of falsity of a statement, is irrelevant to the technical question of whether or not a material false statement has been made. *Virginia Electric and Power Co.* (North Anna Power Station, Units 1 and 2), CLI-76-22, 4 NRC 480, 483, 486-87 (1976), *aff'd*, 571 F.2d 1289 (4th Cir. 1978). On the other hand, such intent and knowledge are pertinent to the effect of false statements on an applicant's character.

## QUALITY ASSURANCE: REQUIREMENTS (RELATIONSHIP TO REPORTS UNDER 10 C.F.R. § 50.55(e))

The circumstance that a deficiency was properly reported under 10 C.F.R. § 50.55(e) is not relevant to whether the deficiency represented a violation of the quality assurance requirements of 10 C.F.R. Part 50, Appendix B.

**QUALITY ASSURANCE: REQUIREMENTS (SURVEYING)**

The quality assurance criteria of 10 C.F.R. Part 50, Appendix B, particularly Criteria II and V, apply to construction activities such as surveying.

**QUALITY ASSURANCE: REQUIREMENTS**

The quality assurance criteria of 10 C.F.R. Part 50, Appendix B, control implementation as well as the establishment of a QA program. A failure in implementation may constitute a violation of Appendix B.

**QUALITY ASSURANCE: REQUIREMENTS (SURVEYING)**

To the extent that surveying represents a construction activity rather than a test, it is not governed by 10 C.F.R. Part 50, Appendix B, Criterion XI ("Test Control").

**RULES OF PRACTICE: REOPENING OF PROCEEDINGS**

A motion to reopen a record must be timely and must address significant safety (or environmental) issues. Where the record of a proceeding (or at least of a major phase thereof) is closed, the information sought to be included in the record must be material and significant — *i.e.*, to have at least the potential for altering a result which might otherwise be reached. To meet this standard, the proponent must offer new and significant factual information. The "timeliness" test is subsidiary to that of materiality or significance.

APPEARANCES

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# PARTIAL INITIAL DECISION
**(Operating License, Phase I)**

## Opinion

### I. INTRODUCTION

#### A. Nature of the Proceeding (Findings 1-4)

This Partial Initial Decision is the first involving the application for licenses to operate the South Texas Project, Units 1 and 2 (STP). Information respecting the public health and safety and environmental aspects of the license application was filed in May 1978 by Houston Lighting and Power Company (HL&P), the City of San Antonio, Central Power and Light Company, and the City of Austin, Texas (hereinafter referred to collectively as the Applicants). HL&P is the lead applicant with responsibility for construction and operation of the facility. A Notice of Opportunity for Hearing was published in August 1978.

The STP is located approximately 15 miles southwest of Bay City, on the west side of the Colorado River, in Matagorda County, Texas. The plant will consist of two pressurized water reactors, each with a rated output of 1,250 megawatts of electrical power.

#### B. Identification of the Parties (Finding 5)

Five petitioners originally sought intervention, and two were admitted as parties: Citizens for Equitable Utilities, Inc. (CEU), and Citizens Concerned About Nuclear Power, Inc. (CCANP). In addition, the State of Texas was admitted as an interested State pursuant to 10 C.F.R. § 2.715(c). CEU subsequently withdrew from this proceeding on June 15, 1982, subject to certain conditions. *See* our Memorandum dated June 24, 1982 (unpublished). *See also* Part III.A of this Opinion, *infra*.

#### C. Procedural Posture of the Case (Findings 6-12)

Eight contentions (some with multiple subparts) were admitted. Of these, CEU and CCANP jointly sponsored Contentions 1 and 2, CCANP was the sole sponsor of Contention 3, and CEU was the sole sponsor of Contentions 4 through 8. After CEU's withdrawal, CCANP sought to adopt all of CEU's contentions. By our Memorandum and Order dated October 15, 1982, LBP-82-91, 16 NRC 1364, we permitted

CCANP to adopt Contention 4 but dismissed the remainder of the contentions sponsored solely by CEU (Contentions 5, 6, 7 and 8).

On April 30, 1980, the NRC Office of Inspection and Enforcement issued I&E Report 79-19 (Staff Exh. 46, Appendix D), which identified twenty-two noncompliances in HL&P's STP construction activities. The investigation report indicated substantial deficiencies in HL&P's construction quality assurance/quality control (QA/QC) program and cast serious doubt on HL&P's ability to manage construction of the STP. Accompanying I&E Report 79-19 was a Notice of Violation and an Order to Show Cause, requiring HL&P to set forth its reasons why safety-related construction activities should not be halted. In addition, a civil penalty of $100,000 was proposed as a result of the items of noncompliance found in 79-19. By letters dated May 23, 1980, HL&P confirmed, with minor exceptions, the findings of 79-19 and paid the civil penalty of $100,000. Beginning with its filing of July 28, 1980, HL&P responded to the tasks required by the Show-Cause Order.

On May 28, 1980, CCANP and CEU filed with the Commission requests for a hearing on the Order to Show Cause. On September 22, 1980, the Commission denied those requests but agreed with our previously expressed intent to hold an early hearing on QA/QC issues. The Commission also directed us to consider the "broader ramifications" of charges relating to HL&P's "basic competence and character." CLI-80-32, 12 NRC 281, 291-92 (1980). Therefore, on December 2, 1980, we articulated six issues (A through F) addressing the Commission's concerns. We denominated the hearing on CLI-80-32 Issues A through E (and on Contentions 1 and 2, which address QA/QC deficiencies) as Phase I of the operating license proceeding. (At that time, only two phases were anticipated.) Evidentiary hearings on Phase I commenced on May 12, 1981 and extended intermittently until June 17, 1982. Reflecting the widespread interest in this proceeding, hearings were held in Bay City, Houston, and San Antonio, Texas; limited appearance statements were invited and heard in each city, as well as at a prehearing conference held in Austin, Texas.

On September 24, 1981, the Applicants informed us that they were dismissing Brown & Root (B&R), their architect-engineer and construction manager. Later we were advised that the Applicants would also replace B&R as constructor. Bechtel Power Corp. (Bechtel) assumed the duties of architect-engineer and construction manager, and Ebasco Services Inc. (Ebasco) replaced B&R as constructor. On September 28, 1981, the Applicants further informed us that a report on B&R engineering had been prepared for HL&P by Quadrex Corporation (the Quadrex Report).

At a prehearing conference on December 8, 1981, in order to accommodate these changes, we divided the hearing into three phases. *See* Fourth Prehearing Conference Order, dated December 16, 1981 (unpublished). The topics previously included in the first phase, plus certain issues arising out of the transition from B&R to Bechtel and Ebasco, continued as Phase I. The Board also admitted for Phase I adjudication four new subparts of Contention 1 (1.8(a) through (d)). Phase II will address the Quadrex Report (including its effect, if any, on determinations reached in Phase I) and Contention 4 (hurricanes).[1] It will also include the report we are directing under CLI-80-32 Issue B, *infra*, p. 697. Phase III will address CLI-80-32 Issue F (QA for operation), Contention 3 (overpressurization), and any remaining issues.[2]

Phase I is now complete.[3] Accordingly, this Partial Initial Decision addresses and resolves CLI-80-32 Issues A through E, and Intervenors' Contentions 1 and 2.[4] For reasons hereafter spelled out, and based on the entire record, we find no basis at this time for concluding (1) that the reasonable assurance findings contemplated by 10 C.F.R. § 50.57 cannot be made, or (2) that HL&P currently lacks managerial competence or character sufficient to preclude an eventual award of operating licenses for STP. These conclusions will be subject to modification, if appropriate, as a result of our consideration of Quadrex Report issues in Phase II. In addition, we are requiring that the NRC Staff (and the Applicants and other parties if they wish) report to us during the Phase II evidentiary hearings concerning safety-related construction activities (including implementation of the QA/QC program) following the assumption of duties by Bechtel and Ebasco. We also expect that, during the consideration of Issue F (QA for operation) in Phase III, the Applicants and Staff will update (as appropriate) the testimony presented with respect to Issue C dealing with HL&P's organization for operation.

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[1] On July 14, 1983, we denied CCANP's motion seeking to add a financial qualifications contention to Phase II. LBP-83-37, 18 NRC 52, *reconsideration denied*, LBP-83-49, 18 NRC 239 (1983).

[2] On October 20, 1983, CCANP filed a motion to admit a new contention concerning soil stability. Since CCANP wishes to litigate this contention in Phase III, we have deferred ruling on it until after the issuance of this Decision.

[3] On January 10, 1983, we denied a motion by CCANP to reopen the Phase I record. We deal with and deny another such motion by CCANP during the course of this Decision. *See* Opinion, Part IV, *infra*.

[4] All of the issues and contentions dealt with by this Decision are set forth in Appendix A (unpublished), as well as in our Findings with respect to the various issues or contentions.

## II. LEGAL STANDARDS FOR DETERMINING CHARACTER AND COMPETENCE

The central focus of our inquiry in this first phase of the proceeding has been the "character and competence" of HL&P to build and operate the facility.[5] In CLI-80-32, the Commission found that many of the nonconformances and related items which gave rise to the Show-Cause Order are relevant to the "basic competence and character" of HL&P, and it directed that we "look at the broader ramifications of these charges in order to determine whether, if proved, they should result in denial of the operating license application." 12 NRC at 291-92. Reflecting this direction, questions concerning HL&P's character and competence permeate Issues A, B, C and D derived from CLI-80-32. Before addressing those questions, however, we must first delineate our understanding of character and competence and the legal standards which we will employ in determining whether HL&P possesses the requisite character and competence to be authorized to operate the STP.

Because of the importance of these standards to our Decision, we asked the parties to file pre-trial briefs on those standards. All of them did so.[6] In addition, each of the parties filing proposed findings and conclusions again addressed these legal issues.[7] We have considered all of those filings, as well as other legal authority, in formulating our views as to the legal standards for determining character and competence.

All parties appear to agree that character and competence are fundamental requirements for a license applicant. The character and competence requirements are implicit in, and hence stem from, the Atomic Energy Act.[8] All parties also concede that the Commission has not pre-

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[5] Since HL&P is the lead applicant with responsibility for construction and operation of the facility, our discussion of the character or competence of the Applicants will represent findings only with respect to the character or competence of HL&P.

[6] Applicants' Memorandum of Law on Issues Concerning Competence and Character, dated May 2, 1981; CCANP Brief on "Character," dated May 5, 1981; Citizens for Equitable Utilities Prehearing Brief, dated May 6, 1981; and NRC Staff Memorandum on Standards for Evaluating Managerial Competence and Corporate Character, dated May 6, 1981.

[7] In particular, *see* Applicants' Proposed Findings of Fact and Conclusions of Law (App. FOF), dated August 6, 1982, at 291-99; CCANP Proposed Findings of Fact and Conclusions of Law (CCANP FOF), dated September 20, 1982, at 1-19; NRC Staff's Proposed Opinion (etc.) (Staff FOF), dated October 4, 1982, at 12-28; Applicants' Reply to Proposed Findings of Fact and Conclusions of Law submitted by the Other Parties (App. Reply FOF), dated October 18, 1982, at 11-12.

[8] Section 103 states that a commercial license shall be issued to applicants "who are equipped to observe and who agree to observe such safety standards to protect health and to minimize danger to life or property as the Commission may by rule establish." 42 U.S.C. § 2133(b)(2). Section 182a adds that "[e]ach application for a license hereunder shall • • • specifically state such information as the Commission, by rule or regulation, may determine to be necessary to decide such of the technical and financial qualifications of the applicant, the character of the applicant, • • • or any other qualifications of the applicant as the Commission may deem appropriate for the license." 42 U.S.C. § 2232(a).

cisely defined, through either rule or adjudicatory decision, the exact contours of those terms. In CLI-80-32, *supra*, it provided some guidance:

> The history of the South Texas Project — at least 12 separate NRC investigations over a 2½ year period, resulting in conferences with the licensee, several prior items of non-compliance, a deviation, five immediate action letters, and [n]ow substantiated allegations of harassment, intimidation and threats directed to QA/QC personnel and apparent false statements in the FSAR — is relevant to the issue of the basic competence and character of Houston.

12 NRC at 291. Given the lack of more detailed guidance, we have found it necessary, in applying the Commission's directive, to determine: (1) whether our evaluation of HP&L's character should be divorced from our evaluation of its competence; (2) what factors are relevant to character and to competence, and what weight should such factors be accorded; (3) what consideration should be given to reformation of character or improvement in competence; and (4) the relationship of individual and organizational character or competence.

### A. The Dichotomy

The NRC Staff and the Applicants each assert that character and competence are inextricably intertwined and cannot be evaluated separately.[9] CCANP, although it does not explicitly state how it believes character and competence should be analyzed, treats the two concepts as separate and distinct.[10] As described below, that basic approach is consistent with applicable precedent, which generally has analyzed character and competence in terms of attributes that, although overlapping in some respects, are fundamentally of a different nature. We view the differences between character and competence to be more significant than their similarities and have thus treated character and competence separately in our analysis of the instant record.

The Staff itself acknowledges that instructive case law both within and outside the NRC has addressed character and competence separately.[11] Similarly, the Commission, in CLI-80-32, *supra*, read the Atomic Energy Act as drawing a marked distinction between "competence (*i.e.*, technical)" and "character qualification" of a licensee or license applicant. 12 NRC at 291. The relationship between competence

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[9] NRC Staff Memorandum (May 6, 1981) at 6; Staff FOF at 12-15; Applicants' Memorandum (May 2, 1981) at 9-10. CEU took a basic approach similar to that taken by the Staff and Applicants.

[10] CCANP Brief (May 5, 1981) at 4; CCANP FOF at 12-13.

[11] Staff FOF at 15.

(adequacy of technical qualifications) and character was well explained by the Appeal Board in *Consumers Power Co.* (Midland Plant, Units 1 and 2, ALAB-106, 6 AEC 182 (1973). In addressing the adequacy of an applicant's QA/QC program, the Appeal Board stated:

> The inquiry which the board must make is not necessarily resolved by a determination of whether, in a broad sense, the applicant and its architect-engineer are "technically qualified." A demonstration that technical qualifications do exist does not necessarily provide reasonable assurance that the QA program described in the PSAR will be faithfully fulfilled. To the contrary, as important as qualifications may be, of no less significance is the matter of managerial attitude. Unless there is a willingness — indeed, desire — on the part of the responsible officials to carry it out to the letter, no program is likely to be successful.

*Id.* at 184. Thus, under that formulation, character and competence are quite different: character is, among other things, a measure of the likelihood that an applicant will apply its technical competence to effect the Commission's health and safety standards.

We recognize that the factors which comprise character or competence may overlap. For instance, whether an applicant has developed technical ability may be relevant to and indicative of both its character and its competence. But, in our opinion, even the most technically qualified applicant should be denied a license if its character is deficient — *i.e.*, if it is shown that the applicant is unlikely to apply that technical ability adequately. Similarly, no degree of character can compensate for technical incompetence. We read the *Midland* decision as providing that an applicant must demonstrate both that it is competent (*i.e.*, technically qualified) and that it has the requisite character. Moreover, we do not believe that character can be inferred from competence, or *vice versa*. Finally, to the extent that otherwise deficient character or competence can be remedied (*see* Part II.C of this Opinion, *infra*), the remedies themselves are often quite different. We therefore view character and competence as separate and distinct (and cumulative) requirements and treat them accordingly.

### B. The Relevant Factors

The Commission's regulations do not amplify the competence requirement and make no explicit mention of character.[12] Therefore, we (as well as all of the parties) have looked to the Commission's guidance in

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[12] 10 C.F.R. §§ 50.40(b) and 50.57(a)(4) merely repeat the competence requirement, that "the applicant is technically . . . qualified" to engage in the activities for which a license is sought.

CLI-80-32 and to precedent, in order to determine what factors are relevant to character and competence. Although other decisions have addressed character and competence, the decisions have not been consistent in their terminology.[13] Accordingly, we include in our discussion of the relevant factors a definition of each term as we apply it.

### *1. Competence*

In the absence of a regulatory definition of "competence," we use the plain meaning of the term. Competence is "the quality or state of being functionally adequate or of having sufficient knowledge, judgment, skill or strength (as for a particular duty or in a particular respect)."[14] We apply this definition in accordance with the statutory mandate of Section 103 of the Atomic Energy Act, 42 U.S.C. § 2133, that applicants be "equipped to observe * * * [the Commission's] safety standards."[15]

In interpreting this statutory mandate, the Commission has pointed to a number of issues which may bear upon "management competence." In particular, it has referred to the sufficiency of staffing and resources, the quality of management, and the adequacy of organization of a utility. It has indicated that prior performance by a utility (including a comparison of its performance with industry-wide statistics) may also raise competence questions. *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit No. 1), CLI-80-5, 11 NRC 408 (1980). The Commission emphasized, however, that it has not established definitive standards by which to judge managerial competence but only has identified questions it deems pertinent to such an inquiry. *Id.* at 410.[16]

A similar scope of inquiry as to competence seems to have been envisaged by the Commission in CLI-80-32, *supra*. In particular, the Commission stressed the relevance to HL&P's competence of the history of past violations; specifically, whether those violations suggested an

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[13] In *Midland*, ALAB-106, *supra*, 6 AEC at 184, the Appeal Board used "technical qualifications" in the same sense as we use "competence," and it used "managerial attitude" as we use "character"; in *Virginia Electric and Power Co.* (North Anna Nuclear Power Station, Units 1 and 2), LBP-77-68, 6 NRC 1127, 1151 (1977), the Licensing Board used "commitment" in the same sense as we have used "character"; and in *Carolina Power and Light Co.* (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), LBP-79-19, 10 NRC 37 (1979), the Licensing Board addressed both concepts under the label "capability."

[14] Webster's Third New International Dictionary 463 (unabridged ed. 1976).

[15] Competence would also extend to an applicant's ability to satisfy environmental requirements. But since CLI-80-32 (as well as Intervenors' Contentions 1 and 2) concern only safety issues, we are here considering competence only with respect to safety requirements.

[16] *See also Shearon Harris*, LBP-79-19, note 13, *supra*, 10 NRC at 56-94; *Mississippi Power & Light Co.* (Grand Gulf Nuclear Station, Units 1 and 2), LBP-74-64, 8 AEC 339, *aff'd*, ALAB-232, 8 AEC 635 (1974).

"abdication of responsibility or abdication of knowledge" and hence an organizational, programmatic or personnel deficiency. 12 NRC at 291.

To a great extent, these considerations are amenable to objective assessment. NUREG-0731, "Guidelines for Utility Management Structure and Technical Resources" (1980), provides guidelines for an applicant's staff and management organization and experience.[17] As the Staff observes, NUREG-0731 incorporates the approach adopted by the Commission in *Three Mile Island*, CLI-80-5, *supra*.[18]

In sum, in the context of the issues before us, the appropriate inquiry is: (1) whether an applicant's staff and management have sufficient technical and managerial expertise and experience (*i.e.*, demonstrated knowledge, judgment, and skill) to construct the plant properly and operate it safely, (2) whether an applicant's staff and management are organizationally structured so as to permit and encourage the unhindered application of their expertise and experience, and (3) whether an applicant's programs and procedures require the application of that expertise and experience and are consistent with goals of the Commission's regulations and the Atomic Energy Act.

### 2. *Character*

The parties all appear to recognize that the concept of character is difficult to define. *See Hall v. Geiger-Jones Co.*, 242 U.S. 539, 553 (1917). CCANP asserts that, in the absence of a regulatory or statutory direction, the term should be given its commonly understood definition (*citing Mester v. United States*, 70 F. Supp. 118, 122 (E.D.N.Y. 1947)). We agree.

Character is defined as "a composite of good moral qualities typically of moral excellence and firmness blended with resolution, self-discipline, high ethics, force, and judgment."[19] Obviously, the term is less specific than is "competence" and calls for a more subjective determination. Character comprises many traits. No trait should be considered, however, unless it is relevant to the construction or operation of a nuclear plant.[20] Therefore, a trait should only be considered if it evinces a willingness and propensity, or lack thereof, on the part of an applicant to ob-

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[17] *See also* NUREG/CR-1280, "Power Plant Staffing" (1980); NUREG/CR-1656, "Utility Management and Technical Resources" (1980).

[18] Staff FOF at 27.

[19] Webster's Third New International Dictionary 376 (unabridged ed. 1976).

[20] *See Schware v. Board of Bar Examiners of New Mexico*, 353 U.S. 232, 239 (1957).

serve the Commission's health and safety standards.[21] Indeed, our ultimate finding of fact must determine, *inter alia,* whether there is reasonable assurance that the Applicants will (*i.e.*, have the character to) observe the Commission's health and safety standards.[22]

In CLI-80-32, the Commission indicated that responsibility was a necessary trait, the abdication of which could result in denial of a license application. An applicant must retain responsibility for construction or operation of a nuclear power plant and must keep itself fully informed. In CLI-80-32, the Commission also stressed that truthfulness is of particular concern.[23] And from earlier decisions, it is clear that truthfulness contemplates not only false or misleading statements but the completeness or comprehensiveness of information provided by an applicant to the Commission. *Virginia Electric and Power Co.* (North Anna Power Station, Units 1 and 2), CLI-76-22, 4 NRC 480 (1976), *aff'd,* 571 F.2d 1289 (4th Cir. 1978).

As the Staff indicates, the trait of truthfulness or candor is particularly important given the regulatory regime relied upon by NRC.[24] The Commission has forcefully stated that

> In order to fulfill its regulatory obligations, NRC is dependent upon all of its licensees for accurate and timely information. Since licensees are directly in control of plant design, construction, operation, and maintenance, they are the first line of defense to ensure the safety of the public. NRC's role is one primarily of review and audit of licensee activities, recognizing that limited resources preclude 100 percent inspection.
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> As the Commission has stated in the past:
>
> > Our inspection system is not designed to and cannot assume such tasks [to provide full inspection of construction activities]. Rather, we require that licensees themselves develop and implement reliable quality assurance programs which can assume the major bu..en of inspection. *Consumers Power Company* (Midland Plant, Units 1 and 2), CLI-74-3, 7 AEC 7, 11 (1974)
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> > We require instead a regime in which applicants and licensees have every incentive to scrutinize their internal procedures to be as sure as they possibly can that all submissions to this Commission are accurate.

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[21] As in the case of competence, character also is reflected by an applicant's willingness or propensity to observe environmental standards. No such issue has been raised in Phase I of this proceeding.

[22] 10 C.F.R. § 50.57(a)(3).

[23] The Commission stated (12 NRC at 291 n.4):

> [T]he Commission cannot ignore false statements in documents submitted to it. Congress has specifically provided that licenses may be revoked for "material false statements," *see* section 186a of the Atomic Energy Act [42 U.S.C. § 2236(a)], and we have no doubt that initial license applications or renewal applications may also be denied on this ground, certainly if the falsehoods were intentional, *FCC v. WOKO, Inc.*, 329 U.S. 223 (1946), and perhaps even if they were made only with disregard for the truth. *Lefiore Broadcasting Company v. FCC*, [636 F.2d 454 (D.C. Cir. 1980)]; *Virginia Electric and Power Co. v. NRC*, 571 F.2d 1289 (4th Cir. 1978).

[24] Staff FOF at 19.

*Petition for Emergency and Remedial Action,* CLI-78-6, 7 NRC 400, 418 (1978).

More recently, the Commission again stressed the importance to character of an applicant's truthfulness, particularly as that trait bears on information provided to Licensing Boards in adjudicatory proceedings such as this one. The Commission stated:

> A deliberate false statement or withholding of material information would warrant the imposition of a severe sanction. The time and resources committed to an adjudicatory probing of the facts of this case are evidence of our concern over allegations of this sort. Not only are material false statements and omissions punishable under Sections 234 and 186 of the Atomic Energy Act, but deliberate planning for such statements or concerns on the part of applicants or licensees would be evidence of bad character that could warrant adverse licensing action even where those plans are not carried to fruition. Moreover, we want to warn parties and their attorneys that when they engage in conduct which skirts close to the line of improper conduct, they are running a grave risk of serious sanction if they cross that line.

*Consumers Power Co.* (Midland Plant, Units 1 and 2), CLI-83-2, 17 NRC 69, 70 (1983).

There are, of course, many other traits that are pertinent, and CCANP has suggested six generalized ones against which HL&P's character should be evaluated: foresight, judgment, perception, resolve, integrity (including trustworthiness, reliability and honesty), and values (CCANP FOF at 3-5, 12). These traits are, of course, generally relevant to character. Indeed, they closely track the definition of character which we have found appropriate. But, in our view, they are so broad and ill-defined that analyzing them would give little assistance in providing answers to the questions raised by CLI-80-32.

In that connection, we note that, in applying the facts of record to determine whether HL&P possesses the requisite character, CCANP has utilized many of the same incidents or events as examples of several of the traits it enumerates. The abilities of one of HL&P's managerial personnel, for instance, are said to bear upon four of those traits: HL&P's foresight (CCANP FOF at 46), its judgment (CCANP FOF at 50-52), its perception (CCANP FOF at 66) and its values (CCANP FOF at 120-21). HL&P's utilization of this employee may be relevant to its character (as well as to its competence), but it contributes little to a meaningful analysis to find that such utilization is pertinent to one or several subsets of character. Moreover, we do not believe it is practical or necessary to attempt to enumerate all relevant traits. Were we to undertake such an exercise, we feel it would serve only to replace one label, "character," with many; it would leave unresolved the factors determinative of each trait. What is necessary is a nexus of a particular

trait to particular performance standards contemplated by the Atomic Energy Act or NEPA and NRC's implementing regulations and guides.

Therefore, we adjudge HL&P's character by consideration of its past and present performance, and consider those traits, both positive and negative, that are naturally inferred therefrom. We find this approach consistent with that taken by other Boards. In particular, we scrutinize, *inter alia*, HL&P's record of compliance with the NRC regulations;[25] its response to noncompliances;[26] and, most importantly, whether HL&P made material false statements or omissions and whether it addressed questions propounded by the Staff, the parties and us with candor. This approach is also consistent with that utilized by other agencies with regulatory schemes comparable to that used by NRC. *See, e.g., FCC v. WOKO, supra.* The traits we infer from this scrutiny are, in effect, our conclusions; and the composite of these traits constitutes HL&P's character and forms the basis for our ultimate finding of fact.

### C. Reformation of Character and Improvement in Competence

Early in this proceeding, the Intervenors asserted that we should limit the first phase of this proceeding to whether HL&P's past conduct and actions in themselves indicated a lack of character or competence sufficient, without more, to warrant denial of the operating license application (in effect, the matters encompassed by Issue A). They would have thus excluded all evidence of corrective measures taken by the Applicants (*i.e.*, matters relevant to Issues B, C, D and E). We rejected that position in our Second Prehearing Conference Order (unpublished), dated December 2, 1980 (at 4-5) and denied reconsideration in our Third Prehearing Conference Order (unpublished), dated April 1, 1981 (at 8-11).[27] We reasoned that, although CLI-80-32 contemplated a determination whether past practices, in themselves, should result in a

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[25] *See, e.g., Carolina Power and Light Co.* (Shearon Harris Nuclear Power Plant, Units 1, 2, 3, and 4), LBP-79-19, 10 NRC 37 (1979), *aff'd and modified*, ALAB-557, 11 NRC 18, CLI-80-12, 11 NRC 514 (1980). *See also Duke Power Co.* (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-128, 6 AEC 399, 407 (1973); *Midland*, ALAB-106, *supra*, 6 AEC at 184 (1973); *North Anna*, LBP-77-68, note 13, *supra*; *Duquesne Light Co.* (Beaver Valley Power Station, Unit 1), LBP-76-3, 3 NRC 44 (1976); *Commonwealth Edison Co.* (Zion Station, Units 1 and 2), LBP-73-35, 6 AEC 861 (1973), *modified on other grounds*, ALAB-226, 8 AEC 381 (1974).

[26] *See, e.g., Shearon Harris*, LBP-79-19, note 13, *supra*, 10 NRC at 51; *North Anna*, LBP-77-68, note 13, *supra*; *Consolidated Edison Co. of New York* (Indian Point Station, Unit 2), LBP-73-33, 6 AEC 751, 756 (1973), *aff'd*, ALAB-188, 7 AEC 323, 336 (1974); *Beaver Valley*, LBP-76-3, note 25, *supra*, 3 NRC at 50-51; *Zion*, LBP-73-35, note 25, *supra*, 6 AEC at 892-93, 898-99; *McGuire*, ALAB-128, note 25, *supra*, 6 AEC at 407.

[27] The Appeal Board declined requests by CCANP and CEU for interlocutory review of the April 1, 1981 Order. ALAB-637, 13 NRC 367 (1981).

denial of the operating license application, the Commission also contemplated that we explore the totality of the Applicants' performance, including matters which may mitigate the significance of adverse findings concerning prior practices.

In its proposed findings, CCANP has largely confined its factual findings to Issue A and, in essence, has ignored the Applicants' corrective actions. Although it concedes that competence can be acquired and improved by judicious hiring, it asserts that an applicant's character is far less mutable than its competence and is perhaps immutable.[28] It urges that past behavior is a true indication of present character, or at least may cast sufficient doubt on character to prevent a favorable predictive finding.

We here reaffirm our earlier rulings as to the potential importance of corrective actions or reformation to both competence and character. We will examine HL&P's competence in order to determine if there is reasonable assurance that it *can* observe the Commission's health and safety standards. Therefore, we examine its present ability. Past incompetence is relevant, of course, to the extent it may be indicative of present incompetence. Thus, if HL&P has improved its competence, it is that improved state that is determinative.

CCANP's position with respect to character is too rigid. As we previously held, both the Atomic Energy Act and CLI-80-32 contemplate that we take into account all relevant circumstances in determining character. A change in corporate management can change an applicant's character, as can education and experience. Moreover, our role in this proceeding is not to punish an applicant for past infractions.[29] Our findings (and our authority) are limited to those standards specified by the regulations, in particular 10 C.F.R. §§ 50.40, 50.57, and 51.53, and if an applicant, whose character may have been unsatisfactory in the past, demonstrates a reformed and adequate present character, then we may find that there is reasonable assurance that it will observe the Commission's health and safety standards.

We would agree with CCANP, however, that there may be *some* character defects that are so serious that they are in fact uncorrectable, at least in the absence of a "radical change in the control of [the]

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[28] CCANP Brief (May 5, 1981) at 4; CCANP FOF at 10-13.

[29] We make no judgment here as to the appropriateness of a licensing board's denying a license application because of material false statements made directly to that Board. In such a case, the denial might be necessary to preserve the integrity of the hearing process, and imposition of such a sanction might fall under the general grant of power to presiding officers, 10 C.F.R. § 2.718. We view this issue, however, as one totally separated from our character and competence determination, and as one not raised in this proceeding.

corporation."[30] One of these defects might be evidenced by an intentional lack of truthfulness or candor condoned by management. As we have observed, the Commission in CLI-80-32 emphasized the importance of truthfulness and candor, and it explicitly pointed out that a lack of truthfulness or candor could prove disqualifying. CLI-80-32, *supra*, 12 NRC at 291 nn.4, 5. Further, the Commission cited cases suggesting that willful misrepresentations to the Commission, or representations made with disregard for their truth, could be grounds, without more, for license denial.[31]

Whether such a character defect can be attributed to HL&P, and whether such a defect, if proved, has been, or can be, reformed, are questions of fact not of law. Accordingly, we conclude that evidence of reformation of character is relevant to and may be determinative of our ultimate finding of fact.

### D. Individual vs. Organizational Competence or Character

We might note, as a general observation, that in ascertaining whether the Applicants possess the requisite competence or character, we have had some difficulty in drawing a line between the competence or character of particular individuals and the competence or character of HL&P. As CCANP observes, all organizations must carry on their activities through individuals (CCANP FOF, ¶¶ 1.2, 4.1). It is clear to us, however, that the failure of one or more individuals to demonstrate adequate competence or character does not *per se* indicate a lack of organizational competence or character (and *vice versa*). *See, e.g.*, Tr. 9511 (Taylor). For example, if an individual employee were found to lack competence or to have demonstrated a character defect and were removed from a project, the organization would not *per se* be deemed to lack competence or character — indeed, it might then be viewed as possessing either or both of those qualities. Furthermore, particularly with respect to character, only a limited group of corporate employees may truly be regarded as exercising a sufficient degree of responsibility so as to be deemed to affect an organization's character.

In evaluating the competence or character of an organization, we must therefore evaluate such factors as the role of particular individuals in the organization, the responsibilities which they exercise, the seriousness and frequency of any deficiencies attributable to them, and the

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[30] CCANP Brief (May 5, 1981) at 4.

[31] FCC v. WOKO, note 23, *supra*; *Lefiore Broadcasting Co. v. FCC*, note 23, *supra*; *see also Hamlin Testing Laboratories, Inc.*, 2 AEC 423, 428-29 (1964).

steps taken by the organization when deficiencies are discovered. Our final judgment as to HL&P's organizational competence or character must balance all of these factors.

## III. OPINION ON INDIVIDUAL ISSUES

### A. Introduction

The record of this proceeding consists entirely of testimony (and documentary evidence) sponsored by the Applicants or NRC Staff, documentary evidence introduced by CEU or CCANP through the Applicants' or Staff's witnesses, cross-examination by all parties, and examination by the Board of all witnesses (with the exception of the testimony of one Staff panel, which was entered into the record by stipulation). The Intervenors presented no witnesses of their own.[32] Proposed findings and conclusions were submitted by the Applicants, the NRC Staff, and CCANP.[33]

Even though CEU and CCANP were joint sponsors of certain contentions, their positions on the ultimate issues considered in this proceeding were quite disparate. CEU consistently emphasized that it was not trying to stop construction or operation of the STP but only was seeking to assure the safe and expeditious completion of the project (Tr. 782). It stressed that, although license denial was a remedy which might be necessary, the more appropriate remedy might be the dismissal of Brown & Root (Tr. 786).[34] Consistent with that position, it withdrew from the proceeding (subject to certain conditions designed to keep it informed concerning the adequacy of HL&P's QA/QC program and practices) shortly after the replacement of B&R as design engineer, construction manager and constructor.

On the other hand, CCANP consistently has taken the position that the operating license applications should be denied. It asserted that at

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[32] Prior to the withdrawal of B&R, CEU had proposed to present an expert witness concerning project organization (his direct testimony had been prefiled), and both CEU and CCANP proposed to present factual witnesses concerning B&R activities. After the announcement of B&R's replacement, CEU and CCANP declined to present any such witnesses.

[33] App. FOF, dated August 6, 1982; CCANP FOF, dated September 20, 1982; Staff FOF, dated October 4, 1982; App. Reply FOF, dated October 18, 1982. CEU withdrew prior to the conclusion of the Phase I evidentiary hearings and hence did not offer proposed findings and conclusions.

On January 14, 1984, CCANP submitted a "supplement" to its proposed findings which directed our attention to a recent ruling of another Licensing Board. The Applicants responded on January 25, 1984. We appreciate parties' calling our attention to new legal rulings which, they believe, bear significantly on not-yet-decided issues before us. (The Staff similarly did so in conjunction with CCANP's motion to reopen the Phase I record (*see* p. 715, *infra*)).

[34] To the same effect, *see also* CEU Prehearing Brief (May 6, 1981) at 4-5.

least the character, if not the competence, of HL&P should be adjudged by past acts alone; and that, given those acts, HL&P could not be trusted to operate the plant safely (Tr. 791; CCANP FOF, ¶¶ 1.33, 2.1). Reflecting that point of view, CCANP's proposed findings are for the most part limited to CLI-80-32 Issue A and ignore discussing in any detail the corrective actions which HL&P put into effect to remedy certain of its past deficiencies.

As discussed in Part II.C of this Opinion, *supra*, we disagree as a matter of law with CCANP's position that certain character traits are immutable and cannot be improved or corrected. In our view, whether or not a character trait which is deficient can be or has been reformed is a factual question. Even more so, whether or not a deficiency in competence can be or has been corrected is also a factual question. CCANP's failure to include in its proposed findings any detailed discussion of corrective actions has therefore left a gap in the material by which we must evaluate CCANP's claims.

As we spell out in more detail below, we disagree as a factual matter with CCANP's position that, based on the entire record, the Applicants at the present time lack either competence or character to a degree which would warrant license denial. This view is not based solely on our resolution of Issue A. Indeed, in certain respects, we have found that, prior to the issuance of the Show-Cause Order, HL&P's managerial competence was questionable. In addition, however, our ultimate conclusion takes into account, to a substantial degree, the corrective actions instituted by the Applicants to ameliorate their earlier deficiencies — not the least of which is the replacement of B&R with Bechtel and Ebasco. CCANP's failure to file detailed proposed findings on the corrective actions made our task more difficult; from the overall conclusions reached by CCANP, we presume it finds the corrective actions to be ineffective or inadequate, but we are left in the dark as to its reasons.

Although they would not have us base any of our conclusions thereon, the Applicants suggest that we find CCANP in default with respect to its failure to file proposed findings on certain issues — particularly some of its own contentions (App. Reply FOF at 8). We decline to take this course. In the first place, with a view to the Intervenor's limited resources, we advised CCANP that it could focus in its findings on those issues it considered most significant (Tr. 10,656-57; Memorandum and Order dated August 19, 1982 (unpublished)). Its election to forego filing detailed findings on certain issues on which it had conducted cross-examination was not inconsistent with that advice. Moreover, we never explicitly directed

CCANP to file any proposed findings -- there never was any question of its desire to do so. Despite the difficulties which its filing presents, we do not wish to penalize CCANP for attempting to follow our advice.[35]

More important, however, we find it desirable for our Decision to reflect a coherent and comprehensive picture of HL&P's activities and to resolve on their merits the issues raised by CLI-80-32 (with respect to which the Intervenors' contentions are relevant). Furthermore, the Applicants' corrective actions bear on the Intervenors' contentions, as well as on the CLI-80-32 issues. For that reason, we have reviewed with great care the record on all issues, including those on which CCANP failed to submit detailed findings. We are confident that our judgments take into account all the diverse points of view bearing on matters of safety significance which the record reflects.

We turn now to the issues and contentions dealt with by this record.

## B. CLI-80-32 Issues

### *1. Issue A: HL&P's Managerial Character and Competence (Findings 13-187)*

Issue A questions whether HL&P's record of compliance with NRC requirements is so inadequate that we should determine that HL&P does not have the necessary managerial competence or character to be granted licenses to operate the STP. This is the Issue upon which CCANP has primarily focused its attention in its proposed findings. The Issue is derived from the Commission's instructions in CLI-80-32 and explicitly excludes from consideration the effectiveness of any remedial steps taken by HL&P. (Those steps are considered separately under Issue B.)

In Part II of this Opinion, *supra*, we reviewed the applicable standards for determining the competence and character of a license applicant. Under this Issue, we are applying these standards to HL&P's record of compliance, particularly in four specified areas: (1) the material false statements alleged in the Order to Show Cause; (2) the instances of non-compliance set forth in the Notice of Violation and Order to Show Cause; (3) HL&P's alleged abdication of responsibility to B&R; and (4) HL&P's alleged failure to keep knowledgeable about construction activities. The composite of our conclusions as to competence and character, respectively, in the various areas will comprise our general

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[35] *Cf. Detroit Edison Co.* (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-709, 17 NRC 17 (1983).

cribed in Part II (pp. 670-71, *supra*), we will treat HL&P's character separately from its competence. Given CCANP's emphasis on HL&P's character, we will turn first to that subject.

*a. HL&P's Character*

In our earlier discussion of the definition of character, we pointed out that it comprises many traits and that, in evaluating the character of an NRC license applicant, the relevant traits are those which evince a willingness and propensity, or lack thereof, to observe NRC regulatory standards. In the present proceeding, the most significant character traits for us to evaluate are HL&P's truthfulness and candor, the manner in which it reacted to the noncompliances or nonconformances which occurred, its responsibility, and the degree to which it attempted to stay informed about STP.

(i) We turn first to what in our view is the most important of these character traits in the context of this proceeding — *i.e.*, HL&P's truthfulness and candor. Investigation Report 79-19, and the ensuing Order to Show Cause, raised questions about HL&P's truthfulness and candor on the basis of alleged false statements in the FSAR. In CLI-80-32, the Commission indicated that statements in the FSAR, if false, would bear directly on HL&P's character (CLI-80-32, *supra*, 12 NRC at 291 n.4).

As our findings indicate, certain statements in the FSAR relating to construction techniques and tests for backfill did not in fact accurately reflect the construction and testing carried out by HL&P through its contractor, B&R. Those FSAR statements, however, were for the most part not inaccurate when written. As the Applicants and Staff have asserted, the lack of conformance with FSAR requirements should be viewed as nonconformances with specified procedures rather than as material false statements. In the limited circumstance where nonconforming performance had in fact occurred prior to the submission of the FSAR, HL&P had not become aware of the discrepancy until long after such submission (Finding 25).

In its proposed findings, the Staff asserts that there was "no intent" by HL&P to file false statements with the Commission (Staff FOF, ¶ 65). Although we agree (Finding 33), and although we are satisfied with the Applicants' explanation that HL&P had no knowledge of the deviating construction practices at the time the relevant portions of the FSAR were submitted (Finding 25), we wish to point out that the presence or absence of intent — or, indeed, of knowledge by HL&P of falsity — is irrelevant to the technical question of whether or not a material false statement has been made. *North Anna*, CLI-76-22, *supra*, 4 NRC at

483, 486-87. On the other hand, intent and knowledge are pertinent to the question of HL&P's character which is before us. Since we are not presiding over an enforcement proceeding in which HL&P is alleged to have made material false statements but, rather, are considering alleged material false statements only in the context of HL&P's character, we find it appropriate to consider intent to falsify and knowledge of falsity as ingredients in our character determination. Given the lack of intent to submit false FSAR statements, and HL&P's lack of knowledge that certain statements were in fact inaccurate, we find that the statements in question do not reflect adversely on HL&P's character.

In considering the honesty and candor of HL&P, we have not limited our inquiry to the alleged false statements in the FSAR but have also inquired into HL&P's record for being open and candid with the NRC Staff. We were most impressed by the testimony of various Staff witnesses who had interacted with HL&P and who regarded the company as exemplary in its practice of keeping the Staff fully informed on topics of interest. H. Shannon Phillips, the Staff's Resident Inspector at STP during a substantial portion of time covered by the Phase I record (from 1979 until 1982), expressed great confidence in HL&P's candor and truthfulness — *i.e.*,

> Management was not deceptive in any way, form or fashion during the [79-19] inspection or after the inspection [Tr. 9854].
>
> [HL&P's] record of identifying and reporting construction deficiencies . . . was open and honest, and probably was better than any other utility that I've been at. . . . They got us the information, even if it was going to be detrimental to them [Tr. 9855].
>
> They were cooperative, probably the most open licensee that I've ever dealt with [Tr. 9516].

Further, various Staff witnesses noted that HL&P was generally responsive to Staff inquiries and anxious to keep the Staff informed about the project (Findings 58, 61, 164, 168, 192).

Similarly, we were also impressed by the willingness and desire expressed by HL&P managerial witnesses to communicate with NRC about project developments. *See, e.g.*, Finding 162. In similar fashion, HL&P's willingness to have a CEU representative participate in an annual independent audit of the STP QA/QC program is also representative of HL&P's openness and candor. Not only did it lead to CEU's with-

drawal from the proceeding but, in addition, enhances our view of HL&P's character.[36]

CCANP has dealt with the truthfulness and candor aspects of character under the heading of "Integrity" (CCANP FOF, ¶ 7.0). It focuses almost entirely upon the study of alternative forms of QA/QC organization which HL&P undertook (through Bechtel, its consultant) in response to Item 1 of the Show-Cause Order. That Order required a review by an experienced, independent management consultant of the advantages and disadvantages of various alternative forms of QA/QC organizational structure including, as a minimum, five specified forms. With regard to that study, CCANP accuses HL&P of a "deliberate attempt to deceive the Commission" (CCANP FOF, ¶ 7.3.19, at 111). The gist of CCANP's accusation is that HL&P witnesses represented that no alternative offered significant advantages over the five which HL&P was directed to study in the Show-Cause Order whereas, in fact, a sixth alternative was preferable and certain others were not even reviewed (CCANP FOF, ¶¶ 7.3.2, 7.3.11, 7.3.12). Further, CCANP claims that HL&P's contract with Bechtel unreasonably restricted Bechtel's study, in effect precluded a recommendation in favor of certain options specified in the Show-Cause Order (as well as certain other options) and assured that the conclusion of the study would favor the form of organization already in place at STP (CCANP FOF, ¶¶ 7.3.3-7.3.16).

In our view, these claims are not well founded. They are based on statements taken out of context and, in fact, amount to a distortion of the record when viewed as a whole. We agree with the Applicants' analysis of these claims, appearing in ¶¶ 57-66 of their reply findings. We need stress only that the study in question analyzed the five forms suggested in the Show-Cause Order and, in addition, a sixth form which amounted to a variant of one of the five — and which, as CCANP concedes, HL&P adopted in part (CCANP FOF, ¶ 7.3.2). Mr. John M. Amaral, Manager of Quality Assurance of Bechtel Power Corporation, who headed the study, confirmed that Bechtel was not constrained in the manner in which it conducted its study. HL&P explicitly indicated that it gave Bechtel a "blank check" in performing that study. Finding 201. The Staff accepted the study as fulfilling the Show-Cause Order requirement. Moreover, we were most impressed with the knowledge

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[36] The terms upon which CEU withdrew from the proceeding are set forth in an exchange of correspondence between HL&P and CEU, which was provided the Board by the Applicants' letter of June 14, 1982. We approved CEU's withdrawal, subject to the agreed-upon conditions, on June 15, 1982. Tr. 10,384; Memorandum dated June 24, 1982. We commend both CEU and the Applicants for the responsible manner in which they settled their differences.

and forthrightness of Mr. Amaral. Nothing in his testimony, or in that of other HL&P witnesses who addressed the study, gives us any cause to believe that HL&P was not being honest and forthright in its testimony on the study.[37]

Apart from its claims concerning the Bechtel study, CCANP has advanced two other grounds for questioning HL&P's truthfulness and candor. CCANP first claims that HL&P failed to meet a commitment made in response to the Notice of Violation (CCANP FOF, ¶ 7.3.17). We were hampered in resolving this claim by CCANP's failure to have raised it during the evidentiary hearings. The evidence cited by CCANP (Staff Exh. 64 (I&E Report 80-18, at 4, Item A.19)) indicates that HL&P failed to meet a deadline for taking certain actions with respect to HL&P's and B&R's audit programs, but we fail to see how it even suggests that there was any intent by HL&P to deceive NRC. Certainly the inspector responsible for I&E Report 80-18 did not perceive any. The statement cited by CCANP as being untruthful is HL&P's representation in its response to the Show-Cause Order that HL&P and B&R had substantially revised and improved their audit programs (Staff Exh. 48 (Licensee's Response to Order to Show Cause) at 9-2). HL&P's representation is not inconsistent with the Staff's conclusion in I&E Report 80-18 that progress had been made (Staff Exh. 64 (I&E Report 80-18, at 5)), although certain details of that improvement set forth by the Applicants in the Show-Cause Order response may not have been completely accurate. Given CCANP's failure to raise the claim at a time when witnesses could have addressed it, we decline to consider it as affecting HL&P's character.

The other claim by CCANP regarding HL&P's truthfulness and candor consists of alleged inconsistencies in Mr. Don D. Jordan's testimony concerning reasons for assigning Mr. George W. Oprea full-time to the STP (CCANP FOF, ¶ 7.3.18). We do not regard the statements as necessarily inconsistent but only as elaborations of earlier statements.

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[37] We need not dwell long on the merits of the study or of any particular form of organization. The testimony of both the Applicants and Staff indicated that no one organizational form is *per se* superior or preferable to several of the other forms which were analyzed. A number of forms could be successful in particular circumstances. Tr. 1911-12, 1930-31 (Amaral); Tr. 9528-29 (Crossman); Tr. 9943-45 (Hayes, Shewmaker, Phillips). Furthermore, as a result of the shift from one contractor (B&R) to two (Bechtel and Ebasco), the form of organization currently in effect (*see* Issue D) is vastly different from the form recommended by the Bechtel study, which was a variant of the form in effect prior to the Show-Cause Order. The current form bears some resemblance to that recommended in the prepared testimony of a CEU expert witness (Prepared Testimony of Richard H. Hubbard). (CEU did not in fact present Mr. Hubbard as a witness. *See* note 32, *supra*.) Finally, CCANP has advanced no objection to the current form of organization. We regard the questions raised by CCANP to the form of organization to be moot for all practical purposes.

In sum, we find no basis for determining that HL&P was anything other than open and frank with the NRC Staff and this Board. We regard the evidence on this question as enhancing HL&P's character and not as detracting from it in any way. The only caveat is the matter concerning HL&P's promptness in forwarding the Quadrex Report to the Staff and this Board — a matter which is to be considered in Phase II. Our findings and conclusions concerning HL&P's truthfulness and candor are, of course, subject to modification (if necessary) as a result of the Phase II hearings.

(ii) The next indicator of character which we find pertinent is reflected by the manner in which HL&P responded to the many noncompliances or nonconformances (including infractions, deficiencies and deviations) which occurred prior to, and to some extent resulted in, the Order to Show Cause. In terms of a character trait, the manner in which HL&P responded to noncompliances or nonconformances may be depicted as the willingness or desire of corporate officials to carry out a QA program "to the letter." *Midland*, ALAB-106, *supra*, 6 AEC at 184.

The evidence on this question is not uniform. It is clear to us that HL&P, when considered as an entity, demonstrated a strong willingness and desire to carry out a successful QA program. But it is just as clear to us that, at least during the period of time prior to the Show-Cause Order, HL&P was not entirely successful in translating its desires to reality. There was never a complete breakdown of the QA program (Findings 86, 140, 155). But in many areas, noncompliances or nonconformances up to the severity level of infractions (*see* Finding 49, *infra*) kept recurring, despite the efforts of many HL&P and B&R officials to upgrade project performance. Reports of incidents of harassment of QC inspectors by construction personnel, and other indications of poor morale of QC inspectors, kept surfacing, despite extensive efforts by HL&P and B&R officials to deal with those incidents and to upgrade morale (Findings 66, 74-75, 223, 381-398). Moreover, the Staff's SALP report for the period July 1, 1980-June 30, 1981 reflected continuing difficulties by HL&P in responding to various nonconforming conditions (Finding 223).

We will recount just a few of HL&P's efforts which bear on its corporate character. As we have demonstrated, it has been open and aboveboard in its relationship with NRC. It has promptly and adequately reported nonconforming conditions, even conditions which have a potential for being nonconforming but have not as yet been so demonstrated. It has acted promptly in trying to correct nonconforming conditions. It has frequently discussed with NRC its proposals for correcting nonconforming conditions prior to its putting those proposals

into effect. During NRC's 79-19 Investigation, after early preliminary reports of numerous nonconformances in many areas, HL&P began corrective actions well before the NRC had completed its investigation and issued its report.

HL&P also initiated a number of procedural measures to counteract the incidents of harassment of QA/QC personnel. Although incidents of harassment were not unique to the STP, their seriousness caused HL&P to go beyond what most utilities have in place and to require B&R to adopt a written procedure for resolving disputes of this sort (Finding 393). Furthermore, HL&P never limited the resources available to the QA/QC program to less than what QA/QC officials claimed they needed. In fact, HL&P's and B&R's QA/QC program utilized considerably more personnel than the average program or — indeed — what a well-run program should have utilized (Findings 118, 141).

Finally, and most significantly, HL&P took the important step of replacing its less-experienced architect-engineer-constructor with two considerably more-experienced organizations. HL&P did not take this action for the express purpose of upgrading its QA/QC program. But, in our view, that action is likely to have that effect. In the words of the Staff, the action represents "the most extreme corrective action possible" (Staff Exh. 131 (I&E Rept. 81-36, at 7). One Staff witness regarded it as "a testimony to [HL&P's] character" (Finding 125).

As the Commission in CLI-80-32, and as the Appeal Board in ALAB-106 (*Midland*), have recognized, a history of nonconforming conditions may reflect a lack of character of a license applicant. CCANP takes this position particularly with respect to the incidents of harassment (CCANP FOF, ¶¶ 6.21-6.28). Here, however, the record shows that the history of nonconforming or noncomplying conditions (including the incidents of harassment) was caused not by a lack of corporate character but, instead, by inexperience on the part of both HL&P and its contractor, B&R.

HL&P had early notice of problems arising out of its utilization of B&R. For example, to consider only design engineering — the area which eventually led to B&R's dismissal as architect-engineer/construction manager — Mr. Jordan testified as to HL&P's expectation that around 50 percent of the design engineering work would have been completed at the time of NRC's award of the construction permit whereas, in fact, only about 8-9 percent of the engineering was actually complete at that time (Finding 60). Moreover, given this notice, HL&P should have taken steps earlier than it did to correct the problems which were apparent (Tr. 9524 (Crossman)). Although this delay is perceived by CCANP as a product of deficient character (CCANP FOF, ¶¶ 6.1,

6.31-6.33), we find that it more credibly may reflect a facet of HL&P's inexperience. In our view, in the days prior to the Show-Cause Order, HL&P was not sufficiently knowledgeable to realize that major corrective actions were needed or to ascertain what those corrective actions should be. Finally, to the extent that the failure of HL&P to react sooner may be attributed to a character deficiency, the strong steps taken by HL&P to correct its inexperience (the effectiveness of which we shall treat under Issue B, *infra*) in our view counterbalances any character deficiencies which HL&P may have demonstrated.

CCANP claims that merely trying (without succeeding) is not sufficient to support an award of operating licenses (*see, e.g.*, CCANP FOF, ¶¶ 2.17, 2.19, 2.27, 2.29, 2.42). We agree. But if by this claim CCANP means to assert — as we believe it does — that attempts to achieve quality should not be taken into account in evaluating character (irrespective of the degree of success of those attempts), then we must demur from that position. In our view, attempts to achieve quality are pertinent to character. Their degree of success must be taken into account, but not necessarily in terms of character, in determining whether operating licenses should be awarded (a subject we shall reach again in our consideration of Issues B and E).

In short, an applicant's sincere attempts to correct deficiencies may be viewed as favorable from a character standpoint irrespective of success. If licenses were to be denied because of the failure to take adequate corrective actions, the denial would not necessarily be premised upon the applicant's lack of character. In that context, we view the strong attempts made by HL&P to improve its own performance — particularly its extensive replacement of key managerial personnel with persons of greater nuclear experience and its eventual replacement of B&R with Bechtel and Ebasco — as strongly indicative of favorable character.

(iii) The next character trait which we find pertinent for evaluating HL&P's character is that of responsibility. In particular, did HL&P remain responsible for STP QA/QC activities or did it abdicate its responsibilities to B&R?

We begin by agreeing with the Staff (Finding 114) that, although HL&P may delegate the authority for conducting a QA/QC program to contractors and subcontractors, it remains responsible for the program. We also agree with the witnesses for both the Applicants and Staff that, at least at upper management levels, HL&P did not abdicate responsibility to B&R for the QA/QC program (Findings 114, 118-120).

On the other hand, at lower levels, HL&P did not exercise effective control prior to the Show-Cause Order in areas such as auditing (Finding 116). We attribute the lack of effective control to inexperience

and excessively long chains of command rather than to abdication of responsibility. HL&P's willingness to remedy those deficiencies, and the steps it took to effectuate those remedial steps, convince us that HL&P did not abdicate responsibility for STP to an extent which would reflect on its character or which would derogate from its eligibility for operating licenses.

In its view, CCANP believes that HL&P's manner of exercising responsibility for STP is reflected by the lack of familiarity of HL&P management officials (particularly Messrs. Jordan and Oprea) with certain details arising out of the STP; by HL&P's failure to remove certain personnel (especially Mr. Richard A. Frazar, the QA manager); by HL&P's over-reliance on B&R; and by HL&P's failure to recognize B&R's inadequacies at an earlier date (CCANP FOF, ¶¶ 5.24.[1]-5.24.8, 5.25.2, 5.29, 6.8). All of these deficiencies, in CCANP's view, reflect HL&P's lack of character.

We do not agree with CCANP's analysis, even though some of the facts it relies on are accurate. For example, the record citations which are said to demonstrate a lack of familiarity with details on the part of Messrs. Jordan and Oprea do in fact reflect that neither officer was aware of every single project detail. Nor would we expect them to be. In our view, both of them have been exposed to a level of detail commensurate with their corporate positions (*see* App. Reply FOF, ¶ 36). What we fault them for is not their lack of awareness of details but their lack of understanding of the facts which they had before them. This represents in our view a defect in competence rather than character. The circumstance that Messrs. Jordan and Oprea attempted to improve their competence in QA matters, as in attending the Crosby College seminar (Finding 215), reflects favorably upon their character (as well as that of HL&P).

HL&P also tolerated deficiencies in personnel for too long a period of time, and it over-relied to some extent on B&R, particularly during the early stages of the project (Findings 115, 132). But these deficiencies are also traceable to lack of experience. When Mr. Jerome H. Goldberg was finally hired to head HL&P's nuclear construction program, he brought his many years' experience to bear in acting quickly to upgrade the project. Within 3 months of his assuming his duties, HL&P had commissioned the Quadrex Report and, at Mr. Goldberg's initiative, had begun consideration of alternatives to B&R (Finding 224). Given the magnitude of the changes which proved to be necessary, it is understandable, if not entirely acceptable, for HL&P to have waited as long as it did to act. In short, we regard HL&P's responsibility as not reflecting adversely on its character, although raising questions as to its competence. Neither

with respect to character or competence, however, would HL&P's responsibility disqualify it from receiving operating licenses.

(iv) The other trait which bears on HL&P's character is the degree to which it attempted to stay informed about STP. The facts relevant to this question are to some extent the same as bear upon HL&P's exercise of responsibility: HL&P received a large quantity of information about the STP but was unable to assess the significance of much of it. Part of this problem stemmed from the lack of an adequate system of trending nonconforming conditions during the period prior to the 79-19 Investigation (Finding 128). The excessively long communications lines between personnel on site and upper management officials prior to Investigation 79-19 also resulted in HL&P management officials not being aware as rapidly as they should have been of various developments at the STP: management was informed of individual problems which were occurring but was not given either the causes or sufficient detail to ascertain the causes (Findings 96, 129, 132).

CCANP points to HL&P's alleged lack of knowledge as a deficiency in "perception" and hence as a character defect (CCANP FOF, ¶ 5.0 *et seq.; see also* CCANP FOF, ¶ 2.36.9). The gist of CCANP's claim is that HL&P never really perceived the difference between building a nuclear and a fossil-fired plant and, for that reason, was unable to deal successfully with the QA/QC requirements inherent in constructing a nuclear plant. We note in particular CCANP's claim that HL&P failed to perceive signals of developing trouble (CCANP FOF, ¶ 5.21).

In some respects, CCANP's observations are well founded. HL&P did not, prior to the 79-19 Investigation, recognize the quality differences between the construction of nuclear and fossil-fired plants. When it saw problems developing, it often failed to react effectively. Problems continued to recur. But every expert witness addressing this question attributed the recurring problems not to a lack of character but to a lack of experience on the part of both HL&P and B&R. We find no reason to disagree with that assessment.

(v) To sum up the facets of HL&P's character which we find pertinent, HL&P has been open and candid with the NRC. It demonstrated those same qualities in its relationship with CEU (which resulted in CEU's withdrawal from the proceeding). It has done its best — although not always with success — to deal with the many QA/QC problems it faced. It has assumed responsibility for all aspects of the STP. Although it perhaps at first left too much responsibility to B&R, it remedied that situation and became more involved with the project. It also exposed itself to great quantities of project information, although it was not always sufficiently knowledgeable to react properly to that

information. Its shortcomings in this area are attributable in large part to lack of experience. In conclusion, HL&P has not demonstrated character deficiencies which would preclude the Applicants from being granted operating licenses for the STP. Subject to the outcome of the Phase II hearings on the Quadrex Report, we have reasonable assurance that HL&P has sufficient character for the Applicants to be granted operating licenses.

*b. HL&P's Competence*

In our discussion of the meaning of competence (Part II.B.1, *supra*), we pointed to three lines of inquiry which are appropriate for evaluating an applicant's competence — *i.e.*, (1) whether the applicant's staff and management have sufficient technical and managerial expertise and experience; (2) whether that staff and management are organizationally structured so as to permit and encourage the unhindered application of their expertise and experience; and (3) whether the applicant's programs and procedures require the application of that expertise and experience and are consistent with regulatory goals. No party has raised any question with respect to the third line of inquiry — which constitutes in effect an inquiry into the adequacy of the written QA programs of HL&P and its contractors. All witnesses addressing the programs (as they existed both before the Show-Cause Order and as subsequently modified) considered them as in compliance with applicable regulatory requirements, and we see no reason to disagree. (*See*, in particular, Findings 112, 143, 264, 268.)

It is in the implementation of the HL&P and B&R QA programs where difficulties have arisen. We turn our attention, therefore, to the first two lines of inquiry.

(i) The first line of inquiry involves expertise and experience. Both of these characteristics are necessary contributors to an applicant's technical competence. HL&P and B&R each employed many talented individuals with adequate or more-than-adequate technical expertise (Finding 118). Some of those individuals testified before us. Where necessary, HL&P and B&R were also willing to hire consultants or subcontractors. However, to some extent, B&R did not have sufficient depth of expertise prior to the 79-19 Investigation (Findings 59, 103, 111, 142). Moreover, the rapid turnover of B&R managerial personnel accentuated B&R's lack of experience — *e.g.*, it took 3-6 months for a General Manager to become fully effective, and the occupants of that position averaged only 8 months' tenure between 1977 and 1981 (Findings 105-106, 111). But it was in the area of experience in nuclear design and

construction where both HL&P and B&R were lacking prior to the 79-19 Investigation.

The lack of experience of both HL&P and B&R in our opinion produced synergistic effects. As Mr. Goldberg observed, B&R's manner of carrying out its QA/QC responsibilities was typical of a first generation nuclear project (Finding 141). Or, put another way by the Staff, B&R's serving as construction manager, architect-engineer and constructor was a "very ambitious program, especially when you don't have much experience" (Tr. 10,707 (Gilray)). Thus, despite extensive efforts to correct nonconforming conditions, many of the conditions continued to recur. These continued recurrences led to enlargement of the QA/QC staff, to the point where it became excessive for the amount of construction and design work in progress (Findings 118, 141).

One of the most pointed reflections of HL&P's and B&R's lack of experience was the continuing reappearance of incidents of harassment of QC personnel by construction personnel. B&R and/or HL&P investigated each of the incidents which were reported. B&R took steps to punish the persons responsible for such harassment, and HL&P and B&R instituted enhanced procedures to settle disputes which might arise between QC and construction personnel (Finding 393). Nonetheless, reports of low morale of QC inspectors, resulting in part from their clashes with construction personnel, continued to surface (Findings 223, 397).

We view the existence of the incidents and of low QC inspector morale to be in part the result of lack of managerial experience with projects involving QA/QC requirements such as those attendant to nuclear construction. As various witnesses pointed out, clashes among construction workers (including QC personnel) are to some extent to be expected, given the nature of the work and the characteristics of persons engaged in it. But the continued reappearance of clashes and the persistence of low morale reflect management's inadequate experience in constructing facilities subject to nuclear QA/QC requirements.

In short, the record clearly demonstrates that HL&P (and B&R), prior to the 79-19 Investigation, lacked one of the important elements of technical competence: experience. Experience, by its very nature, however, is obtainable by several means, including the hiring of experienced personnel or even by the mere passage of time (*i.e.*, the more time one spends on a project, the more experience one acquires). HL&P hired more-experienced personnel, and its involvement in STP by itself provided a degree of experience. Although Issue A excludes consideration of corrective actions, we do not believe we can fairly evaluate HL&P's competence to complete and operate the STP without taking

into account the qualifications and experience of the personnel who actually will be engaged in those tasks. Therefore, we are evaluating under Issue A both HL&P's prior experience and the existence of newly acquired experience such as that possessed by Mr. Goldberg. When HL&P's own increased experience is coupled with the additional experience provided by Bechtel and Ebasco, we believe that HL&P has remedied the lack of experience which has plagued the STP. The effectiveness of the newly acquired experience, however, remains for consideration under Issue B (where, *inter alia,* we conclude that further supplementation of the record in this regard is necessary).

(ii) The other line of our inquiry respecting HL&P's competence is the adequacy of the STP organizational structure. As Mr. Amaral and other witnesses pointed out, the extended lines of communication were a prime source of project difficulties (Findings 96-98, 111-112). To that extent, HL&P also lacked technical competence. But, as in the case of experience, a fair evaluation of this aspect of competence can only be given if updated organizational communication lines are taken into account. HL&P greatly shortened the lines of communication — it transferred its QA Manager to the site and enabled him to report directly to the Executive Vice President, Mr. Oprea (Finding 129). In our view, HL&P has thus alleviated the line-of-communication problem which it faced. Under Issue B, we will consider the effectiveness of the changes.

(iii) Taking into account the three lines of inquiry which we regard as pertinent to HL&P's competence, we find no problems with either the present or past written QA programs. We find that HL&P had sufficient technical capability to support its QA program but that it lacked adequate experience prior to the 79-19 Investigation. We also find that, prior to the 79-19 Investigation, HL&P lines of communication were overly extended to a degree which compromised management's ability to deal with problems efficiently. Combining all these factors, we can only conclude that HL&P's competence prior to the 79-19 Investigation was questionable in certain respects (Findings 150, 182).

HL&P took extensive steps to upgrade its experience, and it greatly shortened the lines of communication between its management and persons on site. Without regard to the effectiveness of those measures, we conclude that HL&P's past questionable competence was not of such magnitude as to preclude the eventual award of operating licenses. Had changes not been instituted, there would have remained a serious deficiency in HL&P's competence, possibly sufficient to warrant the denial of operating licenses. Changes were, however, made. Whether operating licenses should be awarded will thus depend, at least insofar as managerial competence in construction is concerned, on the effectiveness of

those changes, as reflected in our conclusions with respect to Issues B and D.

### 2. *Issue B: Adequacy of HL&P's Remedial Actions (Findings 188-226)*

Issue B inquires whether HL&P has taken sufficient remedial steps to provide assurance that it now has the managerial competence and character to operate the STP safely. In effect, this issue requires an evaluation of the effectiveness of the numerous steps taken by HL&P to correct the deficiencies identified in Issue A.

We begin by disagreeing with the implication expressed by the Applicants that HL&P's competence was always adequate but that, taking into account remedial steps, it became even better (App. FOF, ¶¶ 336, 362, 363; App. Reply FOF, ¶ 101). Although we agree (for reasons set forth below) that HL&P's competence has greatly improved over what it was prior to the Show-Cause Order, we are not prepared to state that it was always adequate.

The most significant of the deficiencies was the lack of adequate nuclear experience on the part of both HL&P and B&R. HL&P took steps to remedy that deficiency by adding significantly to the experience available to the managerial personnel responsible for the STP.

Most noteworthy in our view was HL&P's hiring in October 1980 of Mr. Goldberg as a Vice President in charge of nuclear construction. Mr. Goldberg brought many years of nuclear experience to the project (Finding 209). He has employed that experience well: in early 1981, shortly after he joined HL&P, the company's executive management commissioned the Quadrex Report, and Mr. Goldberg himself alerted HL&P to the need to consider changes in its major contractor, B&R (Finding 224).

Another example of increased experience is represented by Mr. Joseph W. Briskin, Manager, Houston Operations, who was hired since the Show-Cause Order to direct the work of HL&P's project management team, including engineering, procurement, project control services, accounting and project administration. He has had over 20 years' experience in project control and project management, including 10 on nuclear projects (Oprea, *et al.*, ff. Tr. 1505, at 52).

HL&P has further increased its nuclear experience through its new Corporate QA Manager for STP and Project QA Manager, both of whom bring substantial experience to STP (Findings 211, 213). HL&P also substantially strengthened its QA/QC organizations, at first through the

utilization of personnel supplied by the Management Analysis Corporation (MAC) (Finding 212). Thereafter, HL&P hired permanent employees to replace MAC personnel retained on an interim basis (*id.*). In hiring QA/QC personnel generally, Mr. Goldberg indicated that HL&P had recently concentrated on employees who had had substantial prior experience (Tr. 10,480 (Goldberg)).

And, perhaps most important, HL&P replaced B&R with two organizations with far more experience in nuclear design and construction, Bechtel and Ebasco. In our view, these changes should correct the deficiencies in nuclear experience to which many witnesses (representing both the Applicants and Staff) alluded.

Beyond those personnel changes, HL&P's shortening of its organizational lines of communication *per se* alleviated one of the sources of problems which previously existed. On paper, at least, HL&P clearly solved or at least mitigated its pre-existing organizational deficiencies. We have little record evidence, however, by which to judge the effectiveness of the shortened communications lines.

HL&P's responses to all of the various Show-Cause Items have been deemed by the Staff to be satisfactory. HL&P has continued to be open and above-board in its relations with the Staff. Moreover, we repeat that HL&P's offer to permit CEU to participate in an independent evaluation of the QA/QC program (which resulted in CEU's withdrawal from this proceeding) is commendable in every respect and constitutes a confirmation of testimony attesting to HL&P's openness and candor.

We also were impressed by the increasing involvement of HL&P management officials in QA/QC activities, including the attempts by management to increase their visibility in such involvement. Although the testimony on this subject could not relate experiences under the new contractors, we accept HL&P's expressed statements of intent to continue to become actively involved in QA/QC activities.

We here observe that the record includes extensive evidence concerning modifications or revisions to B&R procedures as a result of the Show-Cause Order, many of which resulted from HL&P's direction. *See, e.g.*, testimony concerning improvements in the procedures for processing nonconformance reports and detecting significant trends, and for controlling field changes. Oprea, *et al.*, ff. Tr. 1505, at 64-66, 95-99, 103. Because the revised procedures are not likely to be followed by Bechtel or Ebasco, we are not reviewing the adequacy of these procedures (except to the extent necessary to resolve certain of the Intervenors' contentions). Their adoption, however, strengthens our confidence that HL&P has the necessary character and competence to complete construction of the STP in a satisfactory manner.

As we have also found, however, the record does not reflect that HL&P has been totally successful in eradicating all its difficulties. For example, the SALP report for the period ending June 30, 1981 reflects continuing problems in responding to deficiencies and continuing reports of harassment and intimidation (Finding 223). Moreover, CCANP has observed, with respect to whether HL&P has taken sufficient remedial steps to improve its competence since the Show-Cause Order, that the "functions of architect-engineer, construction, and QA/QC have changed so recently that there is no record from which to judge the adequacy of that competence." It concedes that Bechtel and Ebasco might have "the best possible" reputations but points out that "this proceeding is not a construction permit proceeding." CCANP concludes that, at best, the issue of remedial measures regarding technical competence must remain unanswered. CCANP FOF, ¶ 10.3.2; *see also* CCANP FOF, ¶ 1.43.

Those observations are to some extent accurate. The record does reflect the initial performance of some recently acquired HL&P personnel (such as Mr. Goldberg). But the information concerning Bechtel and Ebasco is indeed limited to their experience on other projects, both nuclear and non-nuclear. The QA/QC programs of these companies are basically standardized programs previously approved by the Staff but modified in certain details to take into account the facts of STP. The Staff review of the new organization and the applicable QA/QC programs was largely (and of necessity) a review of Bechtel's and Ebasco's experience on other projects plus a reliance on prior Staff generic approval of the basic QA/QC programs.

CCANP is correct in its suggestion that, in an operating license proceeding such as this one, there should be more than reputation by which to evaluate the competence of the architect-engineer and/or constructor. Any evaluation at the operating license stage should take into account more than the type of information by which competence is judged during the construction permit review. CCANP is also correct in its observation that, insofar as Bechtel and Ebasco are concerned, the record here thus far includes only the type of information as would be available during a construction permit review — indeed, the same type of information as was reviewed (with respect to HL&P and B&R) at the construction permit stage of this proceeding.

The answer to this seeming deficiency in the record is, however, not the one suggested by CCANP — *i.e.*, to evaluate HL&P's competence solely on the basis of past performance on this project (CCANP FOF, ¶¶ 1.33, 2.1). For that course would ignore what undoubtedly is one of the most significant developments bearing on the construction of the

STP — the replacement of B&R by Bechtel and Ebasco. Instead, we are reaching only a preliminary evaluation of the competence of HL&P, Bechtel and Ebasco based on HL&P's performance since the Show-Cause Order and Bechtel's and Ebasco's reputations. We are similarly reaching only a preliminary conclusion concerning the effectiveness of corrective actions.

In addition, to enhance the record concerning the on-the-job performance of Bechtel and Ebasco, as well as up-to-date performance by HL&P, we are hereby requiring a report to us by the Staff concerning the performance of HL&P, Bechtel and Ebasco at STP since the close of the Phase I record. This report is to be presented during the Phase II evidentiary hearings and is to encompass (although not necessarily be limited to) such matters as the effectiveness of Bechtel and Ebasco procedures in areas which have been the subject of Phase I litigation, violations (if any) of applicable requirements, nonconformances (particularly, although not limited to, the civil structural area), altercations (if any) between construction and QC personnel, and SALP evaluations. The foregoing report should include the Staff's evaluation of the adequacy of the Applicants' implementation of their QA/QC program for construction. Although this report requirement is directed at the Staff, other parties (including the Applicants) are invited to supplement or comment upon that report or provide their own reports, if they wish.

### *3. Issue C: Character and Competence to Operate the STP (Findings 227-249)*

Issue C questions whether, in light of HL&P's planned organization for operation and the alleged deficiencies in its management of construction (including its past actions or lack of action, revised programs for monitoring the activities of its architect-engineer-constructor and those matters set out in Issues A and B), there is reasonable assurance that HL&P will have the competence and commitment to operate the STP safely.

As background for this issue, we begin with our resolution of Issues A and B: namely, that HL&P was not lacking in character to any significant degree and that its construction competence, although to some extent questionable prior to the Show-Cause Order, appears to have improved sufficiently so as not to preclude our making the reasonable assurance findings of 10 C.F.R. § 50.57. This resolution is of course subject both to our future consideration of the Quadrex Report and to the implementation review which we have directed under Issue B.

In evaluating the Applicants' proposals for operation, the Staff expressed its opinion that management of facility construction presents a more challenging problem than management of plant operation. The Staff also notes that HL&P's prior experience in operating power plants is substantially greater than in constructing them. The Applicants rely on these opinions (App. FOF, ¶ 374), whereas CCANP disagrees (CCANP FOF, ¶ 2.5). We decline to determine, or to base any of our conclusions on, the degree of challenge to management presented by construction or operation. Both must be managed adequately, and both present difficult, but different, challenges. Moreover, HL&P's operating experience thus far relates solely to non-nuclear facilities. In effect, we regard these matters as not helpful to our determination under this Issue as to whether HL&P has the character and competence to operate the STP safely.

Considering the stage of construction completion of the STP at the close of the Phase I record, HL&P's plans for operation are well under way (Findings 229, 243). Since the issuance of I&E Report 79-19, HL&P's upper management has been intimately involved with construction activities at the STP. It appears to be aware of plant status with a mind toward transition from construction activities to plant operation, and it has made substantial progress in formulating organizational plans for such operation. Based upon the testimony and our observation of witnesses from HL&P's upper management who are to be responsible for plant operation, we have reasonable assurance that HL&P is dedicated to safe plant construction and operation. Further, HL&P apparently intends to ensure that this objective remains paramount in the minds of its employees. Key positions within the plant operations staff are already filled with individuals possessing appropriate qualifications. That staff has been engaged in writing procedures and participating in transition and start-up activities.

The NRC Staff in its review of HL&P's plans for operation has concluded that HL&P's planned management and operating organizations meet the requirements of the applicable NRC rules and regulations. Although this review of necessity was preliminary in nature, we find no reason at this time to disagree. We anticipate, however, that at a time closer to operation the Applicants will update information bearing upon the organization and personnel for operation, and the Staff will review the updated information. At the time we consider Issue F (QA for operation) during Phase III, we would expect that the Applicants and Staff will supplement the record with such updated information.

CCANP submitted no detailed proposed findings and conclusions on Issue C. Instead, it merely referenced its conclusions on Issues A and B

and asserted that, since Issue A must be answered in the affirmative and Issue B in the negative, Issue C must also be answered in the negative (CCANP FOF, ¶ 11.1). Since our conclusions on Issues A and B do not parallel those of CCANP, we could not, and do not, accept CCANP's conclusions as a basis for our holdings on this Issue.

For these reasons and those more fully set forth in our findings, we conclude that there is now reasonable assurance that HL&P will have the competence and character, as well as the requisite commitment to safety, to operate the STP safely. This conclusion is based solely on the preliminary information currently of record and will be subject to any updated information added to the record in Phase III.

### 4. *Issue D: Adequacy of Current Construction QA Programs (Findings 250-272)*

Issue D, as admitted in the Second Prehearing Conference Order (December 2, 1980), questions (1) whether HL&P's and B&R's construction QA/QC organizations and practices meet the requirements of 10 C.F.R. Part 50, Appendix B, and (2) whether there is reasonable assurance that the QA/QC program will be implemented so that construction of STP can be completed in conformance with the construction permits and other applicable requirements. Subsequent to the admission of that issue, B&R was replaced by Bechtel and Ebasco as architect-engineer/construction manager and construction contractor respectively. The Board advised the parties that it would consider the adequacy of the QA/QC program as modified by the change in contractors. Fourth Prehearing Conference Order (unpublished) at 3-4 (December 12, 1982). Issue D has therefore been modified by replacing references to "Brown and Root (B&R)" with references to "Bechtel/Ebasco." In addition, we also advised the parties that we would consider in Phase I the related question of the adequacy of the modified organizational framework for continued construction, including consideration of plans for design, a review of past problems, project construction, and HL&P management involvement (*id.* at 4).

HL&P's most current QA program is essentially the sum of three programs: the updated Staff-approved QA program for the HL&P quality assurance-related activities and the separate QA programs of the two current principal contractors, Bechtel and Ebasco. The HL&P portion of the QA program provides for an improved QA organization with increased authority and responsibilities for surveillance by HL&P personnel during the day-to-day design and construction activities. Bechtel for

its part has committed to apply its Staff-approved quality assurance topical report, as modified to meet its assigned architect-engineer and construction manager functions. Similarly, Ebasco has committed to apply its Staff-approved quality assurance topical report, as modified to meet its function as the constructor.

We agree with the opinions expressed by witnesses for both the Applicants and Staff to the effect that the new QA organization, representing an additional layer of QA review not present when B&R had both construction and construction-manager roles, is beneficial. Additionally, both Bechtel and Ebasco have extensive nuclear experience in the functions to which they have been assigned at the STP — more so than did B&R. Moreover, we are impressed with the results of the Staff's preliminary review of both organizations, which indicates that they are selecting individuals with considerable qualifications and experience to manage their responsibilities at the STP. Finally, HL&P itself appears to be seeking and attracting highly qualified individuals to run its construction program, including the QA/QC aspects of that program. In short, the program appears likely to be superior both to that utilized prior to the Show-Cause Order and to the program as it evolved after the Show-Cause Order but prior to the replacement of B&R by Bechtel and Ebasco.

Neither through cross-examination nor in its proposed findings did CCANP succeed in refuting the extensive direct evidence offered by the Staff and Applicants on Issue D. Indeed, CCANP's proposed findings on this issue did not discuss any of the testimony bearing on the adequacy of the construction organizations. As in the case of Issue C, they merely referenced CCANP's conclusions on Issues A and B and asserted that, since Issue A must be answered in the affirmative and Issue B in the negative, Issue D must also be answered "no" (CCANP FOF, ¶ 12.1). Since we do not agree with most of CCANP's conclusions on Issues A or B, we could not for those reasons accept CCANP's conclusions as a basis for our holdings on this Issue.

Accordingly, for the detailed reasons set forth in our findings, we find that the present QA/QC organizations and practices for the STP meet the requirements of 10 C.F.R. Part 50, Appendix B, and that there currently is reasonable assurance that they will be implemented so that construction of STP can be completed in conformance with the construction permits and applicable regulatory requirements. We note that, insofar as this finding deals with implementation of the QA/QC program for construction, it is a preliminary finding which will be subject to the Phase II report which we are requiring (described under Issue B, p. 697, *supra*).

### 5. *Issue E: Adequacy of Existing Structures (Findings 273-316)*

Issue E inquires as to whether there is reasonable assurance that the structures now in place at the STP (and referred to in Sections V.A(2) and (3) of the Order to Show Cause) conform to the construction permits and applicable regulatory requirements; and, if not, whether HL&P has taken steps to assure that such structures are repaired or replaced as necessary to meet such requirements.

The Show-Cause Order, and Investigation Report 79-19, pointed to numerous deficiencies in the areas of structural backfill, concrete placements and voids, and welding. As a result, HL&P conducted a comprehensive verification program in those areas. Through the verification program, additional deficiencies were identified in the Category I structural backfill. In addition, voiding was detected in some concrete structures and problems were identified in AWS and ASME welding.

No evidence was developed in the record to indicate that any structure or compacted backfill is now inadequate for its intended function. With respect to voids detected, they were properly grouted and retested for adequacy (*see* Contention 1.2, *infra*). Welds were reexamined and necessary corrective action has been performed. Extensive evidence was developed to indicate HL&P performed a comprehensive verification program relative to existing structures and took adequate corrective action where deficiencies were detected. Analyses were performed which established reasonable assurance that concrete or welds which were inaccessible and possibly def ent would not present a safety hazard.

In cross-examination, the Intervenors did not refute any of the extensive direct evidence entered by the Applicants and Staff on Issue E. In its proposed findings (CCANP FOF, ¶¶ 13.1-13.9), CCANP does not address the evidence of record on any of the three sub-issues comprehended by Issue E — namely, adequacy of structural backfill, concrete verification, and welding verification. Instead, CCANP reiterates its view of earlier "widespread noncompliance" in the implementation of the QA/QC program (particularly, instances of harassment of QC inspectors, high turnover of inspectors, and the Staff's inability to locate certain former inspectors for questioning) and concludes (CCANP FOF, ¶ 13.9):

> In light of the history of the project and the difficulty of answering all doubts, the in-place condition of the structures must be considered indeterminate. Tr. 5541.

For that conclusion, CCANP cites the opinion of HL&P's former QA manager, who expressed the view (in response to a hypothetical

question) that if a QC inspector had signed off an inspection without actually performing the inspection, the condition of the work would be "indeterminate" (Tr. 5541 (Frazar)). Although Mr. Frazar's conclusion is entirely appropriate, its premise is not generally established in this record, except in extremely limited circumstances. Indeed, the evidence of record is largely to the contrary.

By its terms, Issue E questions only the adequacy of specified in-place structures and components, and the Applicants' proposed findings and conclusions on Issue E are so-limited. The Staff, however, has asked us also to conclude that there is reasonable assurance that future backfill work, concrete work and welding activities will meet applicable requirements (Staff FOF, ¶¶ 163, 172 and 185). The Staff provided a basis only with respect to the concrete work — *i.e.*, the "numerous improvements in the procedures for placing concrete" (*id.* at ¶ 172). We decline to reach this conclusion, both because it is beyond the scope of Issue E and because the record is not sufficient to support it. The improved procedures discussed at great length by various witnesses were those adopted during B&R's tenure on the project. Indeed, HL&P confirmed that, although the quality goals would remain the same, B&R's procedures would not continue to be used and Bechtel or Ebasco procedures would be substituted (Finding 225). The record at this time does not reflect the procedures which are to govern backfill work, concrete work, or welding activities.

For the foregoing reasons, we have adopted findings on Issue E with respect to in-place structures (but not with respect to future work) submitted by the Staff or Applicants and are rejecting CCANP's proposals. We find that, as of the close of the Phase I record, there is reasonable assurance that the structures in place at the STP are in conformity with applicable regulatory requirements.

### C. Intervenor Contentions

Contentions 1 and 2 allege that there is no reasonable assurance that STP can be operated safely, because of deficiencies in construction and in the construction Quality Assurance/Quality Control (QA/QC) program. The contentions enumerate these deficiencies and assert that, as a result, the findings required pursuant to 10 C.F.R. § 50.57(a)(1) and (2) (that STP conforms with its construction permits, the Atomic Energy Act, and NRC regulations, and can be operated in conformity with the operating license application, the Atomic Energy Act, and NRC regulations) cannot be made. Further, the contentions assert that the

particular deficiencies violate specified criteria of 10 C.F.R. Part 50, Appendix B.

The contentions raise two separable issues: (1) whether each particular, enumerated deficiency by itself demonstrates a nonconformity with the construction permits or NRC regulations (including 10 C.F.R. Part 50, Appendix B) and prevents a finding of reasonable assurance that STP can be operated safely; and (2) whether the deficiencies, when aggregated, are indicative of an overall construction QA/QC program that is or was so defective that there can be no reasonable assurance that STP has been constructed adequately and can be operated safely. The latter and broader issue, however, is completely subsumed by the CLI-80-32 issues, particularly D and E.

Recognizing that the broader issue is incorporated into the CLI-80-32 issues, CCANP declined to submit proposed findings on all but subpart 7(e) of Contention 1 and on all of Contention 2; it explains:

> Given the relative unimportance of most of the intervenor contentions in light of the larger issues in this proceeding, no findings are offered for Contentions [1.]1, 2, 3, 4, 5, 6, 7a, 7b, 7c, or 7d.
>
> * * *
>
> Findings on Contentions [1.]8a through 8.d . . . would also not contribute materially to the record.

CCANP FOF at 134.

Therefore, we could treat those contentions as abandoned and not address them. For, in an operating license proceeding, we need address only matters in controversy among the parties. *See* 10 C.F.R. § 2.760a. Nevertheless, because the specific allegations contained in Contentions 1 and 2 are pertinent to the CLI-80-32 issues, we have, in our discretion, made findings and conclusions. *See Consumers Power Co.* (Midland Plant, Units 1 and 2), ALAB-123, 6 AEC 331, 332-33 (1973). However, to avoid redundancy, we are addressing Contentions 1 and 2 narrowly and making findings and conclusions only as to each alleged deficiency standing alone; we have treated the adequacy of the overall QA/QC program in our findings and opinion on the CLI-80-32 issues.

As we have previously pointed out, the Intervenors presented no witnesses in support of their contentions (*but see* note 32, *supra*). Each of the contentions was addressed by witnesses of the Applicants and Staff. The Intervenors introduced some documentary evidence.

### *1. Contention 1.1 (Findings 318-326)*

Contention 1.1 alleges that a surveying error resulted in the eastern edge of the Mechanical-Electrical Auxiliary Building (MEAB) being constructed 1 foot short, in violation of 10 C.F.R. Part 50, Appendix B, §§ X, XI. The Applicants admitted the error and acknowledged that it arose from poor surveying practices. In addition, the Applicants conceded that there was no procedure for or inspection of actual surveys at the time the error was made, although they denied that the absence of a survey inspection procedure violated 10 C.F.R. Part 50, Appendix B, Criteria X or XI.

The Applicants' and Staff's uncontroverted testimony, and answers to questions posed by the Board, however, clearly demonstrate that the particular surveying error did not create a safety hazard; the equipment layout inside the MEAB was redesigned, still complies with the applicable safety criteria, and creates no difficulty with operation, inspection, maintenance, or replacement of this equipment. The Applicants' uncontroverted testimony also clearly demonstrates that the poor surveying procedures that were the root cause of the error were corrected and (during B&R's remaining tenure on the project) were generally adequate. Finally, the error was properly reported to the Staff pursuant to 10 C.F.R. § 50.55(e).

The Staff takes the position that we need not reach the allegation that the surveying error violated Appendix B, Criteria X and XI, inasmuch as the error was "properly reported" pursuant to 10 C.F.R. § 50.55(e) and "resolved through the provisions of that regulation" (Staff FOF, ¶ 196). Notwithstanding our agreement as to the propriety of HL&P's reporting of the surveying error, we nevertheless do not view that factor as relevant to whether a violation of Criterion X or XI took place or to the desirability of our resolving that allegation of Contention 1.1. Obligations under 10 C.F.R. Part 50, Appendix B, are different from obligations under 10 C.F.R. § 50.55(e) — although a violation of the latter provision might well reflect a violation of 10 C.F.R. Part 50, Appendix B, particularly Criterion X, XVI or XVII. *Texas Utilities Generating Co.* (Comanche Peak Steam Electric Station, Units 1 and 2), LBP-83-81, 18 NRC 1410, 1414 (1983).

For their part, the Applicants assert that the surveying error did not violate either Criterion X or XI of Appendix B. With respect to Criterion X, they claim that it imposes no requirements on surveyors, that inspection of surveying activities is impracticable and that other verification methods are generally adequate. As for Criterion XI, they claim that surveying is a basic activity rather than a test and so is not governed by Cri-

terion XI, which establishes requirements for testing. For both Criteria, the Applicants also cite Staff inspection reports and testimony which concluded that there was no violation. App. FOF, ¶ 262.

As the Applicants acknowledge (*id.*), Appendix B governs various aspects of surveying. But they construe its applicability to surveying very narrowly, limiting it to review of surveying procedures, calibration of instruments and occasional audits (Peverley (Contention 1.1), ff. Tr. 7826, at 8; Tr. 7967 (Peverley)). We read Appendix B, insofar as it applies to surveying, as considerably more encompassing. It establishes, *inter alia*, QA standards for activities affecting the construction of structures important to safety (including, here, the MEAB). Specifically, the pertinent requirements "apply to all activities affecting the safety-related functions of those structures" (Appendix B, *Introduction*). Surveying is a construction activity. The Appendix B requirements have been aptly described as a "sensible, integrated regulatory system." *Comanche Peak*, LBP-83-81, *supra*, 18 NRC at 1413. *Per force*, those requirements are not to be narrowly construed (*id.* at 1413-15). In that regard, it is noteworthy that surveying activities are not excluded, either explicitly or by inference, from any of the Criteria which would otherwise cover various surveying activities. Moreover, the Appendix B regulations control the implementation as well as the establishment of a QA program. *Midland*, ALAB-106, *supra*, 6 AEC at 184. Insofar as an activity such as surveying is concerned, a QA plan must "provide control over activities affecting the quality of the identified structures * * *," and those activities are to be "accomplished under suitably controlled conditions." 10 C.F.R. Part 50, Appendix B, Criterion II. Further, there must be an inspection program for "activities affecting quality * * * to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity" (*id.*, Criterion X).

Inasmuch as surveying is a construction activity and not a test as contemplated by Criterion XI ("Test Control"), we agree with the Applicants that Criterion XI does not govern the surveying practices covered by this contention. But, contrary to the Applicants' position, it is our view that the surveying in question is an activity covered by Criterion X ("Inspection"), as well as by Criterion II ("Quality Assurance Program"). We see no basis for the Applicants' position that the inspection requirements of Criterion X are limited, insofar as surveying is concerned, to the review of procedures, the calibration of instruments and the annual auditing of records. Rather, we construe Criteria II and X as requiring a program either for the inspection of survey activities affecting safety structures or, alternatively, for assuring that mistakes are

not made or, when made, are promptly detected and corrected.[38] Furthermore, the program is required to be successfully implemented. HL&P conceded that the surveying procedures utilized for the MEAB constituted poor surveying practices and, as part of its corrective actions, adopted procedures (through B&R) which would generally qualify under the standards we view as applicable (Finding 325; also Tr. 7891 (Peverley)). Moreover, the Applicants admitted that a surveyor's work could be checked by redoing the survey (Peverley (Contention 1.1), ff. Tr. 7826, at 8; Tr. 7969 (Peverley)). Far from being "impractical," as claimed by the Applicants, we would judge such a practice to be a sound surveying practice which should be carried out by independent surveyors (*i.e.*, by surveyors other than those who perform the initial survey).

We note that the requirement of independence, as set forth in Criterion X, does not necessarily require that a resurvey be accomplished by members of a QA/QC organization. Moreover, we would find Criterion X to be satisfied by a program which required the resurvey of selected structures (perhaps on a spot-check basis), together with the other ameliorative measures adopted by HL&P and B&R. The program adopted by HL&P and B&R included such selected resurveys. There should also be a QC check of the records of all surveys, to assure that the appropriate procedures were in fact followed.

Accordingly, we conclude that the absence of a survey inspection procedure (or of a procedure for assuring that survey errors would not be made or, when made, would be promptly detected and corrected) constituted a violation of Appendix B, Criterion X (as well as Criterion II); however, the subsequently adopted procedures (which were in effect during B&R's tenure at STP) are generally adequate. Further, we conclude that there was no violation of Appendix B, Criterion XI. Finally, we conclude that the surveying error does not prevent our making the findings required by 10 C.F.R. § 50.57.

### *2. Contention 1.2 (Findings 327-337)*

Contention 1.2 alleges that, as a result of a field construction error, extensive voids exist in the reactor containment building (RCB) walls,[39] in violation of Appendix B, §§ IX and X.

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[38] Criterion X specifically permits an alternative to "inspection of processed material or products" in certain circumstances. We construe the Criterion as permitting alternatives to other inspection requirements contained therein, in appropriate circumstances. *See* Tr. 7967-69 (Peverley).

[39] The RCB walls are constructed in circumferential portions called "lifts." A lift is generally 10 feet high. The concrete forming a lift may be the result of more than one pouring. Each such pouring and

*(Continued)*

Again, Applicants admitted that a large number of voids had been discovered in the RCB walls of both units. However, the Applicants' and Staff's uncontroverted testimony clearly demonstrated that, once voids were discovered, the Applicants conducted an extensive investigation to locate all voids; and that the RCB walls were adequately repaired by filling voids with grout that is as strong as or stronger than the surrounding concrete. Further, the RCB walls will be tested prior to operation. In addition, the Applicants revised the construction procedures to eliminate the root causes of the voids. (The revised procedures were applicable throughout B&R's tenure on the job.)

Accordingly, the Board finds that there is no residual safety problem and that the voids, now repaired, do not prevent the findings required by 10 C.F.R. § 50.57. With respect to the alleged violations of Criteria IX and X of 10 C.F.R. Part 50, Appendix B, we disagree with the Staff (Staff FOF, ¶ 205) — for the same reasons as described under Contention 1.1, p. 704, *supra* — that we need not reach this question because of adequate reporting under 10 C.F.R. § 50.55(e). We also disagree with the Applicants (App. FOF, ¶¶ 273, 275) that permitting the concrete pouring under inappropriate circumstances does not demonstrate a violation of applicable procedures or of Appendix B. Inasmuch as implementation of a QA/QC program is clearly covered by Appendix B (*see* discussion, pp. 705-06, *supra*), a failure in implementation such as produced the concrete voids in our view constituted a violation of Criterion IX (and, in addition, Criterion II). The failure of QC personnel to have discovered certain voids also constituted a violation of Criterion X.

We must add that the presence of extensive voids in the RCB walls is in our opinion but another reflection of the lack of experience of B&R personnel in carrying out large nuclear construction projects, with the significant QA/QC requirements which must be followed on such projects. The Applicants' investigation revealed that the voids were localized in areas where the structural arrangements (*e.g.*, presence of reinforcing steel bar) were complex. Contributing to the voids in such areas were such factors as access and visibility limitations during concrete pours, insufficient vibrations of the poured concrete, and equipment malfunctions and the delays associated therewith. For example, repeated pump failures caused at least one pour to extend almost 20 hours, leading to marked worker fatigue; further, there was inadequate lighting to

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the portion of the lift it forms is called a "placement." On the interior of the RCB walls is a 3/8-inch carbon steel liner that provides a leak-tight membrane for the containment. Construction of the corresponding portion of the liner precedes each placement. *See* Tr. 6536-43.

perform that particular pour after dark. Significantly, the voids were initially discovered not by QC personnel (who had checked the pours in question) but by construction personnel cleaning up after the pour (Finding 332).

In our discussion of CLI-80-32 Issue A, *supra*, we have pointed to B&R's (and HL&P's as well) lack of experience as contributing to the problems which arose during the early years of the STP construction. The voids in the RCB walls are but a prime example. Two of the Applicants' witnesses (Messrs. Joseph F. Artuso and Charles M. Singleton) conceded as much (Finding 333). A constructor with adequate experience would never have allowed a concrete pour on a safety structure like the RCB to be carried out under the conditions reflected in this record. Moreover, an adequate QC operation would have detected the deficiencies which occurred.

### *3. Contention 1.3 (Findings 338-345)*

Contention 1.3 alleges that a field document relating to cadweld[40] inspections had been lost, in violation of Appendix B, §§ VI and XVII.

The Intervenors never identified which field document they claim was lost. However, the document in question apparently was a field sketch, FSQ-030, which should have specified the exact location in the reactor containment building of cadwelds 28H31 through 28H44. FSQ-030 was not lost but in fact was never prepared.

We are convinced by the Applicants' uncontroverted testimony and the Staff's exhibits that these cadwelds were properly inspected and that there is no need to know their exact locations. Knowing the exact location of a batch of cadwelds is only necessary if cadweld test splices show that the batch might be defective; with respect to cadwelds 28H31 through 28H44, there is no such concern. Moreover the approximate location of the cadwelds is known; and if it were necessary, the cadwelds could be found. Accordingly, we find that the lack of the field sketch does not prevent the findings required by 10 C.F.R. § 50.57.

As for the alleged violation of Criteria VI and XVII of Appendix B, the Staff states that we need not reach this question, given the corrective action taken by HL&P. But it concedes that the failure to issue and control document FSQ-030 "would appear to be a violation of Criterion VI." Staff FOF, ¶¶ 211, 213. The Applicants base their proposed finding

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[40] A cadweld is a connector used to join two pieces of reinforcing steel bar or to connect a piece of reinforcing steel bar to a structural member. For a further description of the process, *see* Murphy, *et al.* (Contentions), ff. Tr. 6522, at 24-26.

of "no violation" on a failure of proof that a document had been "lost" (App. FOF, ¶¶ 279-280). Although we agree that no document had been "lost," we find the failure to prepare document FSQ-030 violated Criterion VI, and that the failure to have a document like FSQ-030 among the project QA records violated Criterion XVII. For reasons stated earlier, however, there was no safety significance to the particular violations in question.

### *4. Contention 1.4 (Findings 346-354)*

Contention 1.4 alleges that membrane seals[41] in the containment structure are damaged, indicating a violation of Appendix B, §§ X, XV and XVI.

The record shows that an NRC investigation into allegations similar to Contention 1.4 failed to substantiate those allegations. Furthermore, though documentation indicates instances where the membrane seal was damaged during construction, that documentation also indicates that such damage was detected by inspection and repaired. Finally, the Applicants' uncontroverted and unimpeached testimony demonstrated that the membrane seal is a secondary and redundant method of protecting against groundwater seepage; even if there remains undetected damage to the membrane seal, the damage would not cause a safety hazard.

Therefore, we conclude that the damage to the seal, which has been repaired, does not prevent the findings required by 10 C.F.R. § 50.57. We also agree with the Applicants (App. FOF, ¶ 290) and Staff (Staff FOF, ¶ 218) that no violation of Appendix B, §§ X, XV and XVI, occurred with respect to membrane seals.

### *5. Contention 1.5 (Findings 355-359)*

Contention 1.5 alleges that steel reinforcement bars (rebar) are missing from parts of the containment structure, in violation of Appendix B, §§ X, XV and XVI.

The record shows that there have been two NRC investigations into these allegations, neither of which uncovered any irregularities. Moreover, the Applicants' uncontroverted and unimpeached testimony indicated that any instances where rebar had been omitted were the subject of documentation, either an NCR or a field request for engineering action (FREA), and a design change and engineering review.

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[41] A waterproofing seal, a laminated sheet material consisting of rubberized asphalt bonded to a polyethylene sheet, is placed around the STP containment building surfaces that are below grade.

Accordingly, we conclude that the allegation in this contention does not prevent the findings required by 10 C.F.R. § 50.57. We also agree with the Applicants (App. FOF, ¶ 295) and Staff (Staff FOF, ¶ 224) that no violation of Appendix B, Criteria X, XV or XVI occurred due to missing rebar in the containment structure.

### *6. Contention 1.6 (Findings 360-367)*

Contention 1.6 alleges that there are cadwelds in the STP facility that cannot be verified with regard to compliance with Appendix B, in violation of §§ IX and X of Appendix B.

Cadweld documentation has been the subject of several NRC investigations and reports. The investigations revealed documentation deficiencies — in particular, missing records — but did not substantiate any allegations of falsification of cadweld records. The investigations also revealed quality control deficiencies, which were rectified by reinspecting cadwelds, retraining inspectors and cadwelders, and revising procedures.

HL&P also identified cadweld record deficiencies, and it and B&R established a task force to review all cadweld records. The task force was able to verify inspection of all but 40 of over 36,000 cadwelds.

We do not find the absence of documentation for these forty cadwelds has a significant impact on the proper construction or safe operation of the facility. The Applicants' unimpeached testimony demonstrated that it is very unlikely that even one of the unverified cadwelds would not meet tensile strength requirements; and even if there were instances where cadwelds did not meet requirements, that failure would be offset by the STP design conservatism.

Accordingly, we conclude that the documentation deficiencies do not prevent the findings required by 10 C.F.R. § 50.57. With respect to the alleged violations of Appendix B, we decline to follow the Staff recommendation that we not reach that question (Staff FOF, ¶ 231). Contrary to the view of the Applicants (App. FOF, ¶ 285), we view the document deficiencies (even though insignificant from a safety standpoint) as at least technical violations of Appendix B, Criteria IX and X (and Criterion VI as well).

### *7. Contention 1.7 (Findings 368-399)*

In Contention 1.7, CCANP makes five allegations, (a) through (e), each of which is said to represent a QC deficiency and to violate 10 C.F.R. Part 50, Appendix B, §§ III and IX. In the first, 1.7(a), CCANP claims that QC inspectors were unable to verify that design changes

were executed in accordance with the purposes of the original design. The uncontroverted testimony, however, clearly demonstrated that QC inspectors were not required to verify that changes were executed in accordance with the purposes of the original design. That function belonged to Design Engineering, and was accomplished by the Applicants' design change procedures. The QC inspectors' function was to verify that construction was performed in conformity with the appropriate design documents (as amended) and in accordance with appropriate procedures.

In Contentions 1.7(b) and (c), CCANP alleges that design changes were being approved by persons with inadequate knowledge. CCANP's total failure to prosecute these portions of its contention left the Applicants in the difficult position of being required to prove a negative, *i.e.*, the absence of improper design change approvals. The Applicants assumed that the allegations in 1.7(b) and (c) stemmed from an onsite design change approval procedure implemented in 1978. The procedure allowed construction pursuant to a design change, in advance of formal review and authorization by Design Engineering. The Applicants' uncontroverted and unimpeached testimony, however, demonstrated that *all* design changes were subject to review and ultimate authorization by the responsible and qualified Design Engineer. In addition, an NRC investigation into a similar allegation found no evidence that unqualified persons were approving design changes.

In Contention 1.7(d), CCANP alleges that numerous pour-cards had been falsified. The Staff, however, introduced investigative reports, none of which substantiated the allegation. Moreover, the Applicants conducted a thorough audit of concrete field documents, and this effort also produced no indication of pour-card falsification.

Accordingly, we conclude that the Applicants have rebutted each of the allegations contained in Contentions 1.7(a)-(d). We also conclude, with respect to those contentions, that no violations of Appendix B, Criteria III or IX have been demonstrated. (*See* App. FOF, ¶¶ 299, 301 and 303, and Staff FOF, ¶¶ 238, 242, 245, and, insofar as it covers Contention 1.7(d), ¶ 252.)

Finally, in Contention 1.7(e), CCANP alleges that there has been (and continues to be) harassment of QC inspectors, in the form of assaults and threats of bodily harm from construction workers and the firing of QC inspectors; and that, as the result of friction between QC inspectors and construction personnel, QC inspectors decided to play cards rather than perform their inspections. As we previously observed, this is the only one of its contentions on which CCANP submitted proposed findings. Those findings cover only the allegation concerning past

and continuing harassment. In that regard CCANP claims that the contention "has been proven beyond any doubt" (CCANP FOF, ¶ 14.1). It cites the Staff's Show-Cause Order (Staff Exh. 46). Under the aegis of Issue A, however, CCANP also asserts that the instances of harassment and intimidation were chronic and reflect a deficiency in HL&P's character (CCANP FOF, ¶¶ 3.9, 6.22-6.28, 7.3.9).

The record as a whole does reveal that there was friction between QC inspectors and construction personnel, and that there were incidents of harassment of and threats against QC personnel. However, the record refutes the allegation that as a result QC inspectors elected to play cards and not perform their inspections. This allegation was made by a former B&R inspector after he was discharged for allegedly soliciting a bribe. A subsequent NRC investigation of the allegation revealed that there had been card games only during lunch or during periods of low construction activity, and that these card games did not interfere with the QC inspectors' pursuit of their duties. These investigative results were consistent with a B&R investigation of the allegation, and with the direct testimony before this Board of two of the QC inspectors who were alleged to have been among the card players (one of whom appeared at the Board's request).

As we have pointed out in discussing Issues A and B, incidents of harassment of QC inspectors are not unique to STP. Nevertheless, the incidents of harassment of QC inspectors at STP were frequent enough to represent a serious indictment of B&R's managerial competence. *See, e.g.*, Findings 62, 64, 74-75, 223, 381-397. As to whether the incidents of harassment represent violations of Appendix B, Criteria III and IX, the Applicants have submitted no findings on this question, and the Staff finds no violation (Staff FOF, ¶ 252). We conclude that the incidents do not represent violations of Criteria III and IX, as alleged, although they do represent violations, in our opinion, of the general implementation requirements of Criterion II. Although B&R (assisted by HL&P) took steps to eliminate the harassment, the record does not reflect whether, if it had remained on the project, B&R would likely have succeeded in doing so. The recurrence over the course of several years of incidents of harassment, notwithstanding attempts to eliminate them, create certain doubts in this regard.

With B&R no longer on the job, we trust that HL&P and its new contractors will take such steps as are necessary to prevent the recurrence of incidents of harassment of QC inspectors. The past records of Bechtel and Ebasco on other projects, to the extent addressed by witnesses before us, do not appear to reflect that they have encountered significant difficulties of this type. Nor would the record, as it stands, preclude our

making the "reasonable assurance" findings of 10 C.F.R. § 50.57, given the corrective actions taken by HL&P and the generally favorable track records of the new contractors. Because the Phase I hearings were concluded prior to the performance of significant safety-related work by the new contractors, however, we have no record of actual performance on which to found any prediction in this regard. For that reason, as previously discussed (p. 697, *supra*), we are requiring the Staff (and the Applicants and other parties if they wish) to provide a report to us during the Phase II hearings which covers, *inter alia*, any further incidents of harassment or intimidation which may have surfaced since Bechtel and Ebasco assumed their duties.

### *8. Contention 1.8 (Findings 400-413)*

In Contention 1.8, CCANP makes four allegations derived from the investigative results of I&E Report 81-28 (Staff Exh. 124). Each of the allegations asserts a violation of one or more criteria of 10 C.F.R. Part 50, Appendix B.

In Contentions 1.8(a) and 1.8(b), CCANP alleges that the investigative results of Allegation 1 of I&E Report 81-28 indicate that HL&P failed to assure prompt corrective action of an access engineering problem and that HL&P management does not have a consistent policy on the issuance of stop-work notices. However, in I&E Report 81-28, the NRC inspectors concluded that HL&P had violated no NRC requirement with regard to that allegation. Moreover, the Applicants' unimpeached and uncontroverted testimony demonstrates that HL&P acted decisively and promptly to correct the access engineering problem. The same testimony also indicates that HL&P's QA stop-work procedures are adequate.

In Contention 1.8(c), CCANP alleges that the results of Allegation 2 of I&E Report 81-28 evidenced a lack of managerial commitment to observing NRC regulations. However, the NRC inspectors concluded that HL&P had not failed to meet an NRC requirement; rather, an HL&P manager had made a confusing statement at a meeting in an attempt to address a QC problem, and had resolved the confusion in a subsequent letter of clarification. This conclusion was corroborated by the Applicants' uncontroverted and unimpeached testimony.

In Contention 1.8(d), CCANP alleges that the investigative results of Allegation 4 of I&E Report 81-28 evidence a failure on the part of HL&P management to implement effectively a QA program. Again, however, the investigation of the allegation revealed no instance where HL&P failed to meet an NRC requirement.

Accordingly, we conclude that the investigative results of I&E Report 81-28 do not support CCANP Contention 1.8 but, rather, rebut it. Therefore, the investigative results do not prevent a finding pursuant to 10 C.F.R. § 50.57. Nor do they support any violation of Appendix B.

### *9. Contention 2 (Findings 414-425)*

In Contention 2, CCANP alleges that NRC Inspection Reports 77-03 and 78-08 indicate that construction records have been falsified, in violation of Criteria VI and XVII of Appendix B.

I&E Report 77-03 does substantiate the falsification of construction records by an employee of a subcontractor. A Pittsburgh Testing Laboratory (PTL) employee falsified records to show tests on concrete that were not performed. However, the Applicants' uncontroverted and unimpeached testimony and the NRC inspection report demonstrate that HL&P discovered the falsification first and promptly notified the NRC, that the PTL employee was promptly discharged, and that other tests and a review by the subcontractor negated any safety consequences that might have resulted from the nonperformance of the tests.

I&E Report 78-08, the second report referred to in CCANP Contention 2, does not address any instance or allegation of falsified construction documents. That report addressed an instance where a QC inspector had marked a record print to indicate a completed inspection when in fact he had only completed a partial inspection. However, the inspection report and the Applicants' uncontroverted and unimpeached testimony clearly demonstrated that the incident was not an instance of deliberate falsification, but rather was a misinterpretation based on an ambiguity in the QC procedures.

It is also possible that CCANP meant to refer to I&E Report 78-09; this inspection, although it addressed alleged construction document falsifications, did not substantiate such allegations.

Accordingly, the Board finds that the inspection reports referred to in Contention 2 do not prevent findings pursuant to 10 C.F.R. § 50.57. Although the falsification of construction records by the PTL employee constitutes a violation of 10 C.F.R. Part 50, Appendix B, Criteria VI, there was no culpability in this regard by HL&P or B&R management. Indeed, that one instance was swiftly and effectively identified and rectified by HL&P and B&R.

## IV. MOTION TO REOPEN PHASE I RECORD

On August 8, 1983, CCANP filed a motion to reopen the Phase I record. In responses dated August 23 and 29, 1983, the Applicants and NRC Staff, respectively, each opposed the motion. (The Staff supplemented its response by letter dated September 12, 1983, which directed our attention to a pertinent Appeal Board opinion issued on August 31, 1983, subsequent to the Staff's filing of its response.) For reasons set forth in this portion of our Opinion, we agree with the Applicants and Staff that the information sought to be added to the record is essentially cumulative and, accordingly, that the Phase I record should not be reopened.[42]

A. CCANP seeks to reopen the record to include assertedly new information bearing on allegations of harassment and intimidation of B&R QC inspectors by B&R construction personnel, and alleged alteration or falsification of QC documents by B&R employees. We have dealt extensively with these general subjects in our rulings on Issues A and B and Contentions 1.7(d), 1.7(e) and 2. The material for which CCANP now seeks to reopen the record is that associated with an investigation conducted by the Commission's Office of Inspector and Auditor (OIA). Specifically, it seeks to include information in the record with respect to three areas:

(1) the concerns which led OIA to conduct its investigation;
(2) the interaction between OIA and the Department of Justice; and
(3) the OIA report, including attachments.

In the latter regard, CCANP points to at least one altercation mentioned by OIA which, it claims, was not encompassed by testimony in this proceeding, together with several of OIA's conclusions.

In opposing CCANP's motion, the Applicants stress that the material sought to be added to the record by CCANP is to a large degree cumulative of evidence already in the record and hence is not significant enough to warrant a reopening of the record. They also suggest that, at least with respect to document falsification, the motion may not have been submitted in a timely fashion (Applicants' response at 3 n.**). For its part, the Staff does not contest either CCANP's timeliness or the significance of the issues involved but opposes reopening the record on the ground that the material involved would not lead to a different result in the proceeding.

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[42] Given the conclusion we are reaching, we have deemed it appropriate to await issuance of this Partial Initial Decision to provide our ruling on CCANP's motion.

B. As all parties recognize, and as we earlier pointed out in our Memorandum and Order (Denying CCANP's Motion to Reopen Record), dated January 10, 1983 (unpublished), the proponent of a motion to reopen a record bears a heavy burden. It is well established that the motion must be timely and must address significant safety (or environmental) issues. *Id.* at 2-3, and cases cited therein. Furthermore, where the record of a proceeding (or at least of a major phase thereof) is closed, the information sought to be included in the record must be shown to be material and significant — *i.e.*, to have at least the potential for altering a result which might otherwise be reached. *Id.*[43] To meet this standard, the proponent must offer new and significant *factual* information relating to the issue in question. *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 & 2), ALAB-644, 13 NRC 903, 994-95 (1981).

The "timeliness" test is clearly subsidiary to that of materiality or significance. As the Appeal Board has observed:

> A board need not grant a motion to reopen which raises matters which, even though timely presented, are not of "major significance to plant safety" . . . By the same token, however, a matter may be of such gravity that the motion to reopen should be granted notwithstanding that it might have been presented earlier . . .

*Vermont Yankee Nuclear Power Corp.* (Vermont Yankee Nuclear Power Station), ALAB-138, 6 AEC 520, 523 (1973) (citations omitted); *see also Midland*, LBP-83-50, note 43, *supra*, 18 NRC at 249.

In conclusion, we are considering this motion in terms of the materiality and significance of both the issue and the information sought to be included in the record, and to a subsidiary degree, the timeliness of the motion.

C. 1. We need not dwell long on either the timeliness of CCANP's motion or the significance of the issue which the information in the reopened hearing would address.

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[43] If an initial decision on a particular question had been issued, a motion to reopen the record would be denied if the material sought to be added to the record were not susceptible of altering the result previously reached. *Louisiana Power & Light Co.* (Waterford Steam Electric Station, Unit 3), ALAB-753, 18 NRC 1321, 1324, 1328 (1983); *Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit No. 2), ALAB-486, 8 NRC 9, 21 (1978). On the other hand, if the record were closed on a particular issue but not on the portion of the proceeding in which the issue was included, the susceptibility of altering the result would not be pertinent, since no result would yet have been reached (or, indeed, even proposed by the parties). *Consumers Power Co.* (Midland Plant, Units 1 and 2), LBP-83-50, 18 NRC 242, 247-49 (1983). Here, with the record closed on the portion of the proceeding with respect to which information is being proffered, and with proposed findings on the question already submitted, it is appropriate to consider (in the context of the materiality or significance of the information in question) whether the additional information would alter the result we would reach in its absence.

As long ago as March 1981, prior to the commencement of evidentiary hearings, CCANP sought information through discovery concerning the OIA investigation, and we denied such discovery because of questions as to our authority to obtain information from an NRC office which reports directly to the Commission and is not technically involved in licensing (Tr. 707-13). Even though CCANP may have become aware of some of the information concerning which it seeks to reopen the record prior to June 1983 (when it states it first became aware that the OIA report had been released), we note that the significance of the information in question would likely be different if only isolated segments of that information were relied upon. We also note that, although the OIA report is dated October 10, 1980 and was apparently released to the public in March 1983, neither the Board nor the parties were apparently made aware of such release. Additionally, the approximately 6 weeks' elapsed time between CCANP's discovery of the OIA file and the filing of its motion to reopen the record is not excessive, considering the efforts required to locate and obtain certain documents referenced in the OIA file. We agree with the Staff that the motion to reopen should not be considered as untimely. We regard the timeliness criterion for reopening to have been satisfied.

Furthermore, no party contests the significance of the issues to which the OIA report relates. Indeed, the questions of alleged harassment and intimidation of QC inspectors and of alleged document falsification are central to many of the matters considered in this Decision. The criterion for reopening which requires that the issue be significant is thus also satisfied.

2. With respect to the significance and materiality of the OIA report and related documents to the questions before us, we must evaluate the information as to which CCANP seeks to reopen the record in light of the record as it currently stands. There is no question that, in the course of our taking evidence with regard to the allegations of harassment and intimidation of QC inspectors, and with respect to alleged document falsification, the information now proffered by CCANP would have been both relevant and, for the most part, material and not unduly repetitious. *See* 10 C.F.R. § 2.743(c). At this stage, however, there is much evidence in the record on these topics. What might have been material at one point in this proceeding may no longer be so.

The first of the three categories of information for which CCANP seeks to reopen the record is identified as the concerns which led OIA to conduct its investigation. CCANP characterizes these documents as "useful" (motion at 4, 6). If we were to admit the OIA report into the

evidentiary record, we agree with CCANP that the information concerning how and why the report was initiated would be relevant and perhaps useful as background to establish the context in which the information in the report is to be viewed. But the documents in question (included as a part of Exhibit 2 of CCANP's motion) do not appear in themselves to include factual information material to the issues or contentions before us. They therefore do not constitute significant and material factual information necessary for the record to be reopened. *Diablo Canyon*, ALAB-644, *supra*.

The second category of information for which CCANP seeks to reopen the record concerns the interaction between OIA and the Department of Justice. CCANP relies in particular on letters from the Department of Justice to HL&P and B&R (included in motion, Exh. 2) in which the Department assertedly concluded that "criminal violations were committed at STNP" and that these acts were "merely symptomatic of an overall pattern of neglect" on the part of HL&P and B&R; the Department also observed that HL&P and B&R were "on notice that any further such violations would be attributed to the two companies and their responsible officers" (motion at 4). CCANP claims that these letters establish a level of seriousness of the QA violations not previously documented and, as such, are relevant to the question of HL&P's character (Issue A) (motion at 6).

As pointed out by the Applicants, the Department of Justice opinions related to document falsification, and concerned the actions of lower level employees of B&R or its subcontractors. Although not a part of the basis for our ruling, we note that the very same documents recognize HL&P's efforts to rectify the Department's concerns with respect to safety, compliance and reporting problems (letter from Julian Greenspun, DOJ, to Earl J. Silbert, dated June 19, 1981, included in motion, Exh. 2).

We have dealt extensively with the allegations of document falsification and harassment or intimidation of QC inspectors elsewhere in this Opinion, and we have reached our own conclusions with respect to them. The conclusions of the Department of Justice (or of OIA) on these questions in any event could not be given much weight by us, at least in the absence of testimony by DOJ (or OIA) representatives as to the basis for their conclusions. *See Metropolitan Edison Co.* (Three Mile Island Nuclear Station, Unit No. 1), ALAB-738, 18 NRC 177, 195 (1983). Moreover, as spelled out in more detail below, the conclusions of the DOJ (and of OIA) apparently are derived from the OIA report which, in turn, is based in large part on factual events which are already

covered in the record of this proceeding, upon which our own conclusions are based. For those reasons, the opinions of the Department of Justice (or of OIA) would not constitute the type of factual information necessary to warrant a reopening of the record. *Diablo Canyon*, ALAB-644, *supra*.

The final and most important category of information which CCANP seeks to add to the record is the OIA report itself (motion, Exh. 2). That report, dated October 10, 1980, generally covers many of the same allegations as were dealt with in I&E Report 79-19 (Staff Exh. 46, Appendix D). OIA investigators interviewed various Region IV personnel — Messrs. Karl Seyfrit, William G. Hubacek, William Crossman, William Seidle, and Ramon Hall. All of these individuals with the exception of Mr. Seyfrit (Regional Director during the period covered by the OIA investigation) appeared as witnesses in this proceeding. OIA investigators also interviewed a number of B&R QC inspectors (including former B&R QC personnel), and seven executives, managers and supervisors of HL&P and B&R. The version of the OIA report which we received from CCANP does not identify these persons, but it appears that at least some of them have testified during the Phase I hearings.[44]

The OIA report reflects that, in addition to I&E Report 79-19, OIA reviewed I&E reports containing allegations received by NRC from May 1978 through March 1979 depicting program deficiencies, as well as selected earlier reports which included similar allegations. All of the I&E reports upon which the OIA report relied (which are attached to the OIA report) are also included in the record of this proceeding.[45] Indeed, for that reason, CCANP does not include them in its motion to reopen the record (motion at 2).

In addition, the OIA report reviewed the FBI report of investigation, the transcript of an October 1979 CBS television report on the STP, as well as an audio tape in which an unidentified former B&R employee made certain allegations concerning alleged deficiencies at the STP to a representative of one of the Intervenors in this proceeding. It is our

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[44] The OIA report has excised from it the names of all individuals interviewed other than NRC personnel, together with information which might tend to identify the anonymous individuals.

[45] I&E Reports (Docket Numbers 50-498 and/or 50-499) 77-03 (Staff Exh. 1), 77-07 (CCANP Exh. 7), 77-08 (Staff Exh. 4), 78-04 (CCANP Exh. 9), 78-07 (CCANP Exh. 10), 78-09 (Staff Exh. 7), 78-12 (Staff Exh. 8), 78-13 (Staff Exh. 9), 78-14 (Staff Exh. 12), 78-15 (Staff Exh. 13), 78-16 (Staff Exh. 11), 78-17 (Staff Exh. 16), 79-01 (Staff Exh. 17), 79-03 (CCANP Exh. 12), 79-04 (Staff Exh. 20), 79-05 (Staff Exh. 23), 79-09 (Staff Exh. 26), 79-12 (Staff Exh. 22), 79-13 (Staff Exh. 27), and 79-14 (Staff Exh. 32). Two additional I&E reports (77-01 and 79-11) are also listed in the index to the OIA report but have not been offered for admitted) into evidence in this proceeding. The OIA report makes no specific reference to the substance of these two I&E reports.

belief that this tape is one of those about which we had extended discussions with CCANP earlier in this proceeding (*e.g.*, Tr. 430-36, 475, 535-43).

As we have earlier stressed, reopening of the record would depend in large part on whether CCANP was proffering significant and material information not yet a part of the record. Most if not all of the information in the OIA report or its attachments is apparently already in the Phase I record. Although CCANP does not precisely define which documents or information in the OIA report it would seek to introduce into evidence, it mentions five items as being "of importance" (motion at 4-5). Three of them (numbers 1, 2, and 4) are various OIA conclusions, all based on other material in the report. For reasons previously outlined, these conclusions are not the type of factual information for which a reopening of the record would be warranted.

Item number 3 to which CCANP refers represents the OIA reports of interviews with personnel who assertedly provided information beyond that contained in I&E Report 79-19. CCANP cites observations by two QC inspectors concerning the morale of QC inspectors and the practice of not performing required inspections. While we cannot pinpoint the exact source of these observations (because of the anonymity policies of OIA), it appears that these allegations are comparable to those already in the record and dealt with in this Decision (*see* Findings 64, 66, 69, 74-75, 122-123, 194, 381-398).

The last item in the OIA report to which CCANP refers is an apparent altercation over quality between a QC inspector and a project engineer which occurred on March 7, 1979. The Applicants acknowledge that the specific allegation "may not have been addressed in Phase I" (response at 8). In contrast, the Staff characterizes this item as the only instance where CCANP is pointing to new factual evidence but claims that the fight between the inspector and the project engineer was in fact included in the testimony of record (Staff response at 7, *citing* Warnick, *et al.*, ff. Tr. 8032, at 13-14, 33-34, and Staff Exh. 20 (I&E Rept. 79-04, at 7)). We agree with the Staff that the asserted altercation was indeed the subject of Phase I testimony, and we have dealt with that fight in Finding 387, *infra*.

In sum, none of the items in the OIA report to which CCANP refers constitutes new significant, material factual information. The information from the report cited by CCANP would not be sufficient to warrant a reopening of the record.

D. We have considered the items of information referenced by CCANP not only individually but collectively to determine whether the record should be reopened. We have concluded that the information at

this stage would either be cumulative or not of a type which could lead us to reopen the record. We are therefore denying CCANP's motion to reopen the Phase I record. Nor do we view the particular information, in itself, as sufficiently significant or material to warrant including it in a later phase of this proceeding. In that regard, the information relates almost exclusively to B&R's performance of its contractor services. We disagree with CCANP's conclusion that, at least insofar as HL&P is concerned, the information could change our view of HL&P's character. Although the information might bolster our view of HL&P's former questionable managerial competence, it would not do so to a degree which would offset our view that HL&P has taken adequate steps to improve its competence.

At an earlier stage of Phase I, however, the information would have been useful. At least it would have circumscribed the quantity of then-undiscovered information about which all parties expressed an interest and thus could have served to remove some of the uncertainties concerning the testimony which was adduced. We regret that the Commission did not see fit to release the OIA report at an earlier date, when it could have proved useful in the litigation of certain issues before us.

## V. CONCLUSION

In conclusion, we perceive this project as one which, although in trouble at an earlier date, has now likely "turned the corner." The STP QA/QC program had serious implementation problems prior to the issuance of I&E Report 79-19 and the accompanying Order to Show Cause and Notice of Violation. The problems were traceable, in our opinion, not to character defects on the part of HL&P but, rather, to deficiencies in two key ingredients of competence: experience with respect to design and construction of large nuclear facilities such as STP on the part of both HL&P and B&R, and long lines of communication which resulted in HL&P's inexperienced management failing to receive the information it required to operate a successful QA/QC program. Indeed, with both HL&P and B&R lacking the necessary experience, the result was a synergistic magnification of the problems which resulted.

The changes effectuated by HL&P in our view have alleviated the communications problem and have the likelihood of greatly enhancing the experience to be made available to the STP.[46] They accordingly

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[46] In this respect, we regard the record on corrective actions here to be considerably more persuasive than the Licensing Board in the *Byron* proceeding apparently found to be the case there. *See Commonwealth Edison Co.* (Byron Nuclear Power Station, Units 1 and 2), LBP-84-2, 19 NRC 36 (1984).

should result in upgraded QA/QC performance at STP. Because the record does not include much information on project performance with the referenced changes, this assessment can only be preliminary at this time. The report which we are directing to be made in Phase II will likely make clear whether our preliminary expectations in fact prove realistic.

At this point, we wish to reiterate that the Intervenors in this proceeding raised serious QA/QC issues, both in submitting well-based contentions for litigation and in requesting a hearing on the Order to Show Cause — a request which, although denied by the Commission, resulted in the inclusion in this proceeding of additional important matters. They initially raised these issues long before the NRC recognized their significance and for this they are to be commended.

On the other hand, we must also observe that dealing with CCANP's claims presented considerable difficulty, for several reasons. In the first place, CCANP conducted lengthy cross-examination on technical issues but filed few proposed findings with respect to the technical information it elicited — even where that information appeared to support certain of its claims. Given the extensive amount of time utilized by such cross-examination, we would have expected CCANP to provide us with greater assistance in ascertaining the import of the information, particularly where it related to issues upon which CCANP filed proposed findings. In determining the extent of cross-examination to be permitted in later phases of this proceeding, we will consider carefully the probable productivity of such cross-examination.

More important, although we permitted — indeed encouraged — CCANP to select the issues which it wished to stress, we were somewhat dismayed to see CCANP in its proposed findings attempting to focus all the information in the proceeding upon which it was relying solely on the character aspect of Issue A, even where the information bears little if any relationship to HL&P's character and considerable relevance to other issues such as HL&P's competence.

Finally, as we indicated earlier, CCANP's failure to indicate any deficiencies it perceived in HL&P's various corrective actions may have left a gap in the record. We recognize CCANP's general legal position that reformation or corrective action is not possible and should not have been considered, at least in Phase I. Taking into account our early rejection of this position, and our acceptance of Issue B as a Phase I issue, it would have been helpful if CCANP had explained why it believed particular corrective actions were ineffective or inadequate (assuming that to be its position).

Notwithstanding the difficulties presented by CCANP's manner of presenting its claims to us, we have reviewed with great care the entire record of this proceeding, including the proposed findings of fact and conclusions of law submitted by the various parties. Based on the foregoing Opinion, the Findings and Conclusions on which it relies, and this entire record, it is our opinion that HL&P is not now deficient in character and has not demonstrated character deficiencies which would warrant denial of operating licenses; and that HL&P's competence, while questionable prior to the Staff's 79-19 Investigation and the issuance of the Show-Cause Order and Notice of Violation, was not so deficient as to preclude, without more, the award of operating licenses. Moreover, that competence appears to have substantially improved. We now have reasonable assurance that structures which are complete and work which has been performed comply with applicable regulatory requirements, and that future work activities (including implementation of the QA/QC program for construction) will be carried out satisfactorily. These conclusions are, of course, subject to the outcome of later phases of this proceeding, particularly the Phase II report we are directing under Issue B, p. 697, *supra*.

This Opinion is based upon, and incorporates, the Findings of Fact and Conclusions of Law which follow. Any proposed findings or conclusions submitted by the parties which are not incorporated directly or inferentially in this Partial Initial Decision are rejected as being unsupportable in law or in fact or as being unnecessary to the rendering of our Decision.

## Findings of Fact and Conclusions of Law

### I. FINDINGS OF FACT

#### A. Jurisdiction and Parties

1. This Partial Initial Decision involves the application of Houston Lighting and Power Company (HL&P, the project manager), the City of San Antonio, Central Power and Light Company, and the City of Austin, for licenses to operate the South Texas Project, Units 1 and 2 (STP).

2. The STP is located approximately 15 miles southwest of Bay City, on the west side of the Colorado River, in Matagorda County, Texas. The plant will be comprised of two pressurized water reactors,

each with a rated core power level of 3800 megawatts thermal and a net electrical output of 1250 megawatts.

3. Construction permits for the STP were issued by the Nuclear Regulatory Commission (NRC) on December 22, 1975. 41 Fed. Reg. 831 (1976). HL&P hired Brown and Root, Inc. (B&R) as architect-engineer, construction manager, and constructor.

4. On August 2, 1978, the NRC published a "Notice of Receipt of Application for Facility Operating Licenses"; of the availability of the Final Safety Analysis Report and Environmental Report; and of the "Consideration of Issuance of Facility Operating Licenses, and Opportunity for Hearing." 43 Fed. Reg. 33,968 (1978).

5. Five petitioners sought intervention, and two were admitted as parties: Citizens for Equitable Utilities, Inc. (CEU) and Citizens Concerned About Nuclear Power, Inc. (CCANP). In addition, the State of Texas was admitted as an interested State. LBP-79-10, 9 NRC 439 (1979). CEU withdrew from this proceeding on June 15, 1982, subject to certain conditions (Tr. 10,384). *See* our Memorandum dated June 24, 1982 (unpublished).

6. Eight contentions (some with multiple subparts) were admitted. CEU and CCANP jointly sponsored Contentions 1 and 2; CCANP was the sole sponsor of Contention 3; and CEU was the sole sponsor of Contentions 4 through 8. Memorandum and Order dated August 3, 1979 (unpublished). Contention 1 was later supplemented. Fourth Prehearing Conference Order dated December 16, 1981 (unpublished). After CEU's withdrawal from this proceeding, we granted CCANP's request to adopt Contention 4; we denied its request to adopt Contentions 5 through 8 and dismissed those contentions. Memorandum and Order dated October 15, 1982, LBP-82-91, 16 NRC 1364.

7. On April 30, 1980, the NRC Office of Inspection and Enforcement (I&E) issued I&E Report 79-19 (Staff Exh. 46, Appendix D), identifying twenty-two noncompliances in STP construction and the STP construction Quality Assurance/Quality Control (QA/QC) program. The Director of I&E also issued a Notice of Violation and an Order to Show Cause why construction of the STP should not be stopped pending certain actions. In addition, a civil penalty of $100,000 was proposed as a result of the items of noncompliance found in I&E Report 79-19 (Staff Exh. 46, Appendices A and B; *see also* Finding 68, *infra*). By letters dated May 23, 1980, HL&P admitted the validity of most of the findings of Investigation Report 79-19 and acknowledged and paid the civil penalty of $100,000 (Staff Exhs. 47, 90). On July 28, 1980, HL&P responded to the Show-Cause Order and committed to satisfying the requirements of that order (Staff Exh. 48). During the course of this hearing, we have

considered in great detail the methods selected by HL&P to meet those requirements.

8. On May 28, 1980, Intervenors CCANP and CEU filed with the Commission requests for a hearing on the Show-Cause Order. Earlier, by Memorandum dated March 10, 1980 (unpublished), we had proposed that our hearing on Contentions 1 and 2 (which involved QA/QC matters of the same sort as later became the subject of the Show-Cause Order) be held on an expedited basis "so that, if corrective action is required, it may be undertaken as early as possible in the construction schedule." We reiterated that view in our Memorandum of August 1, 1980 (unpublished). By Memorandum and Order dated September 22, 1980, the Commission denied the requests for a hearing on the Show-Cause Order but agreed with our previously expressed intent to expedite a hearing on QA/QC issues. The Commission also directed us to consider the "broader ramifications" of charges relating to HL&P's "competence and character." CLI-80-32, 12 NRC 281, 291-92 (1980).

9. By our Second Prehearing Conference Order, dated December 2, 1980 (unpublished), we articulated six issues (Issues A through F) addressing the Commission's concerns set forth in CLI-80-32. We denominated the early resolution of CLI-80-32 Issues A through E and Intervenor Contentions 1 and 2 as Phase I of our proceeding. The Phase I hearing was noticed in the *Federal Register* on April 9, 1981, 46 Fed. Reg. 21,289 (1981). On April 13, 1981, the Staff filed a Partial SER (NUREG-0780), assessing HL&P's management capability and the QA program for operations. Phase I evidentiary hearings commenced on May 12, 1981.

10. On September 24, 1981, the Applicants informed us that B&R had been dismissed as architect-engineer and construction manager. Bechtel Power Corporation (Bechtel) replaced B&R in those capacities. The Applicants further informed us, on September 28, 1981, that a report on B&R engineering had been prepared for HL&P by the Quadrex Corporation (the Quadrex Report). Later, on November 5, 1981, the Applicants advised us that they were unable to reach agreement with B&R for B&R to continue as constructor. On February 16, 1982, the Applicants notified us of the selection of Ebasco Services, Inc. (Ebasco) to replace B&R as project constructor.

11. At a prehearing conference on December 8, 1981, we divided the hearing into three phases (rather than the two phases which had previously been contemplated). Phase I comprised the topics previously included in the first phase, plus certain issues arising from the transition from B&R to Bechtel and Ebasco. The Board also admitted four further subparts to Contention 1 (Contentions 1.8(a)-(d)). Phase II is to address

the Quadrex Report (including its effect, if any, on determinations reached in Phase I) and Contention 4 (concerning hurricanes). It will also include the report we are directing under CLI-80-32 Issue B, p. 697, *supra*. (By Memorandum and Order dated July 14, 1983, we denied CCANP's motion to add a financial qualifications contention to Phase II. LBP-83-37, 18 NRC 52, *reconsideration denied*, LBP-83-49, 18 NRC 239 (1983).) Phase III will address CLI-80-32 Issue F (operations QA), Contention 3 (overpressurization), and any remaining issues. Fourth Prehearing Conference Order, dated December 16, 1981 (unpublished).

12. Evidentiary hearings on Phase I were held during the weeks of May 12 and 18, June 1, 15 and 22, July 20, and September 14, 1981, and January 19, February 9, and June 15, 1982. The record was closed on June 17, 1982 (Tr. 10,722). (By Memorandum and Order dated January 10, 1983 (unpublished), we denied a motion by CCANP to reopen the Phase I record. In Part IV of the Opinion section of this Decision, *supra*, we are denying another such motion by CCANP.)

## B. Findings on CLI-80-32 Issues

### *Issue A: HL&P's Managerial Character and Competence*

13. Issue A states:

> If viewed without regard to the remedial steps taken by HL&P, would the record of HL&P's compliance with NRC requirements, including:
>
> (1) the statements in the FSAR referred to in Section V.A(10) of the Order to Show Cause;
>
> (2) the instances of noncompliance set forth in the Notice of Violation and the Order to Show Cause;
>
> (3) the extent to which HL&P abdicated responsibility for construction of the South Texas Project (STP) to Brown & Root; and
>
> (4) the extent to which HL&P failed to keep itself knowledgeable about necessary construction activities at STP,
>
> be sufficient to determine that HL&P does not have the necessary managerial competence or character to be granted licenses to operate the STP?

Because of the segmentation of this issue into four subparts, our findings will treat each of the subparts *seriatim* and, thereafter, include our general findings with respect to the managerial character and competence questions which permeate the entire issue.

*(1) Alleged False Statements in the FSAR*

14. Sections III and V.A(10) of the Order to Show Cause, referenced in the first subpart of this Issue (*see* Finding 13), indicate that there were "apparent false statements" in Sections 2.5.4.5.6.2.4 and 2.5.4.5.6.2.5 of the Final Safety Analysis Report (FSAR) (Staff Exh. 46, Order to Show Cause at 11, 17).

15. The second and third paragraphs of Section 2.5.4.5.6.2.4 in the May 1978 FSAR require conduct of certain soil tests during backfill operations, as follows:

> At least one relative density test (ASTM D 2049) and one gradation test (ASTM D 422) were performed for every fourth field test to ensure compatibility between field and laboratory tests.
>
> Whenever fill or backfill was placed during a work shift, at least one field test and one laboratory relative density test were conducted during the shift, provided that the compaction operation was completed in some area.

A review of data from the testing laboratory on December 8, 1979, revealed that equipment failure had prevented the conduct of any relative density tests since November 17, 1979. The equipment was replaced on January 7, 1980. During the entire period, backfill operations continued and several sets of field tests were conducted without performing the specified relative density tests, contrary to the FSAR requirement. Further, testing laboratory personnel failed to document and correct this nonconforming condition. This is the basis for Noncompliance No. 3 as set forth in the April 30, 1980 Notice of Violation. FSAR Section 2.5.4.5.6.2.4; Staff Exh. 46, Appendix D (I&E Rept. 79-19, at 64); *id.*, Appendix A (Notice of Violation at 6); Shewmaker, *et al.*, ff. Tr. 9576, at 14-24, 48; Pettersson/White, ff. Tr. 6162, at 9-10; Staff Exh. 48, at 2-33 to 2-36.

16. The first paragraph of § 2.5.4.5.6.2.5 in the May 1978 FSAR requires inspection during placement of backfill:

> The testing agency provided continuous inspection of the placement of all backfill material and tested the material in the field for degree of compaction. The inspectors observed the type of material, lift thickness, operation of compaction equipment, and all other pertinent material or construction conditions affecting the quality of work and compliance with the specifications. The frequency of testing and selection of test locations for placed material were according to the requirements identified in these six categories: . . .

Also, 10 C.F.R. Part 50, Appendix B, Criterion XVII requires that "[s]ufficient records shall be maintained to furnish evidence of activities

affecting quality." In I&E Investigation Report 79-19, Allegation 3d indicates that the lift thickness and number of passes of compaction equipment were not documented (Staff Exh. 46, Appendix D, at 64-65). That information was needed to assure systematic placement and compaction of backfill material. This missing documentation is listed as Noncompliance No. 5 in the April 30, 1980 Notice of Violation. Staff Exh. 46, Appendix A, at 7; Shewmaker, *et al.*, ff. Tr. 9576, at 21, 25, 48; Pettersson/White, ff. Tr. 6162, at 10-11; Crossman, *et al.*, ff. Tr. 10,010, at 18; Tr. 9921-25 (Hayes, Shewmaker).

17. Based on information in I&E Report 79-19, the Order to Show Cause (Staff Exh. 46, at 11) summarized this situation in the following statement:

> During the review of backfill installation and testing activities two apparent false statements in the FSAR were identified regarding test and observation work actually performed. (Sections 2.5.4.5.6.2.4 and 2.5.4.5.6.2.5.)

Subsequently, in Section V.A(10) of the Order to Show Cause (*id.* at 17), HL&P was in effect directed, *inter alia*, to

> verify or correct if necessary, the FSAR statements contained in Section 2.5.4, Stability of Surface Materials, especially Section 2.5.4.5, Excavations and Backfill.

18. HL&P supplied direct testimony on this question through a panel consisting of C. Bernt Pettersson, B&R Assistant Project Civil Engineer for STP, and Jon G. White, HL&P Licensing and Technical Coordinator for STP. Mr. Pettersson had been in charge of soils work on the STP and was responsible for developing the FSAR section in question. The panel described how the FSAR sections were prepared and reviewed to assure consistency with design documents and compliance with regulatory requirements. They also described studies conducted in response to the Show-Cause Order, their findings, and the basis for and nature of subsequent changes made in the FSAR. Pettersson/White, ff. Tr. 6162.

19. Staff testimony on this issue was given by a panel consisting of Robert E. Shewmaker, H. Shannon Phillips and D.W. Hayes (Shewmaker, *et al.*, ff. Tr. 9576). During the period referred to in the testimony, Mr. Shewmaker had been Senior Structural Engineer, Division of Reactor Construction Inspection, Office of Inspection and Enforcement. He served as headquarters liaison for the special investigation that culminated in preparation of I&E Report 79-19, the Notice of Violation, the Order to Show Cause, and the Proposed Imposition of Civil Penalties (Staff Exh. 46). Mr. Phillips was the Region IV Resident

Reactor Inspector at STP from August 1979 until 1982 and served as a member of the special investigating team. He has had over 12 years' experience in quality-assurance-related activities. Mr. Hayes was Chief, Engineering Support Section I, Reactor Construction and Engineering Support Branch, Office of Inspection and Enforcement, Region III, and was assigned to head the special investigating team. He has had reactor inspection experience throughout his employment with AEC/NRC since 1970 and has had other nuclear experience since 1948. Shewmaker, *et al.*, ff. Tr. 9576, at 1-2 and attached Professional Qualifications. The panel discussed concerns about STP construction identified during the special investigation, summarized the enforcement action, addressed questions raised in CLI-80-32 Issue A, as well as responding to other issues and contentions before the Board.

Another NRC Staff panel discussed I&E activity after the Order to Show Cause, including matters related to this Issue. This panel consisted of William A. Crossman, Ramon E. Hall, William G. Hubacek, H. Shannon Phillips, Dan Paul Tomlinson, J.I. Tapia, and Richard K. Herr. Mr. Crossman was Chief, Section 3, Reactor Projects Branch, Office of Inspection and Enforcement, Region IV, and supervised the personnel inspecting nuclear power plants in Region IV, including STP. Mr. Hall was Chief, Systems and Technical Section, Office of Inspection and Enforcement, Region IV, and was responsible for supervision of engineering specialist inspectors in Region IV, including STP. Mr. Hubacek is currently retired. During periods relevant to this proceeding he was a Reactor Inspector, Office of Inspection and Enforcement, Region IV, and was responsible for project inspection of facilities under construction in Region IV, including STP. Mr. Phillips' position and experience are described above. Messrs. Tomlinson and Tapia were Reactor Inspectors, Engineering and Materials Section, Office of Inspection and Enforcement, Region IV. Mr. Herr was a Senior Investigator, Region IV. Crossman, *et al.*, ff. Tr. 10,010, at 1-3; Tr. 9997 (Herr, Hubacek).

20. The FSAR was issued in May 1978 (Tr. 6207 (White)). Accordingly, the statements therein, including the subsections forming the bases for Noncompliances Nos. 3 and 5 of the Notice of Violation, were written many months before the observations in I&E Report 79-19, in late 1979, that led to concern about the possible "false statements." Tr. 6207-10 (White, Pettersson).

21. HL&P asserts that the FSAR statements concerning relative density tests were true when written and that the incident set forth in Noncompliance No. 3 should be viewed as an instance where personnel did not adhere to specified procedures in field activities (a nonconformance), instead of a false statement suggesting intent to

deceive. HL&P concluded that, in the absence of the Order to Show Cause and Notice of Violation, the natural course of events would have been to report this as a nonconformance instead of changing the FSAR. Pettersson/White, ff. Tr. 6162, at 9-10; Tr. 6188-91, 6205, 6208-10, 6216 (Pettersson, White).

22. During the approximately 2 months in which the vibratory equipment required for the relative density test was not available, the samples to be used in those tests were collected and saved. Those samples subsequently were tested when the defective equipment had been replaced and it was found that the required relative densities had been met in the backfill. Technically, this is proper since the test results are not affected by the passage of time. During an inspection on June 23-26, 1980, it was verified that a backup vibratory head and spare mold for measuring relative density were available on site and Nonconformance No. 3 was closed. Pettersson/White, ff. Tr. 6162, at 10; Staff Exh. 46 (I&E Rept. 79-19, at 64); Shewmaker, *et al.*, ff. Tr. 9576, at 20; Tr. 9929-30 (Shewmaker); Pettersson, *et al.*, ff. Tr. 5796, at 25; Staff Exh. 63 (I&E Rept. 80-17, at 4).

23. The Applicants and Staff concluded that there was no safety significance in the fact that no relative density tests were performed between November 17, 1979, and January 7, 1980. Pettersson/White, ff. Tr. 6162, at 15-16; Crossman, *et al.*, ff. Tr. 10,010, at 11. No evidence to the contrary was presented.

24. The Staff viewed the principal significance of the gap in relative density determinations to be in the possibility that it could reflect a false statement. That possibility required evaluation because of its potential effect on NRC's confidence in HL&P's reliability and truthfulness. Accordingly, the Staff directed HL&P to verify or correct the FSAR statements in Section 2.5.4. That same possibility constitutes the basis for the Commission's directions to this Board, in CLI-80-32, to review and evaluate this matter to determine whether material false statements had been made in the FSAR. Upon completion of the investigations, the Staff concluded that the FSAR statements were not false. Crossman, *et al.*, ff. Tr. 10,010, at 12; Tr. 10,040 (Tapia); Tr. 9862-63 (Shewmaker).

25. The only evidence to the contrary was the Applicants' admission that certain instances of deviation from FSAR requirements in fact occurred prior to the May 1978 issuance of the FSAR. The Applicants explained that they had not become aware of the deviations until their in-depth review was undertaken in May/June 1980, approximately 2 years later. Tr. 6209-10 (Pettersson). We find this explanation to be credible and not to undermine the basic thrust of the Staff's conclusion as to the truthfulness of the FSAR statements when made.

26. As a result of its assessment, the NRC Staff permitted HL&P to revise the FSAR statements. The necessary revisions appeared in FSAR Amendments 12, 17 and 18, submitted on September 15, 1980, April 14, 1981, and May 1, 1981, respectively. FSAR § 2.5.4.5.6.2.4, at 2.5.4-56 (May 1, 1981); Crossman, *et al.*, ff. Tr. 10,010, at 13.

27. The laboratory relative density tests for the structural backfill had been performed, on the average, at least once for each four field tests and HL&P engineers and consultants determined that such frequency was adequate. Accordingly, the second paragraph of FSAR § 2.5.4.5.6.2.4 was amended to broaden the FSAR criteria from one "for every fourth field test • • •" to one "on the average for every four field tests • • •." The changes make the FSAR conform with actual practices in the field, causing it to read as follows:

> One relative density test (ASTM D 2049) and one gradation test (ASTM D 422) were performed on the average for every four field tests in the paint [sic] area to ensure compatibility between field and laboratory tests, for structural backfill in the plant area and for the ECW structures. For the ECW piping backfill, including the backfill immediately around the ECW piping within the plant area and at the ECW structures, a minimum of one relative density test and one gradation test was performed on the average for every seven field tests.

Shewmaker, *et al.*, ff. Tr. 9576, at 19-20; Pettersson/White, ff. Tr. 6162, at 14; Wilson/Kirkland, ff. Tr. 2697, at 14-15, 19-22; Staff Exh. 48, at p. 2-36; FSAR § 2.5.4.5.6.2.4, at 2.5.4-56 (May 1, 1981).

28. FSAR Section 2.5.4.5.6.2.4 also was revised to change the time limit on testing samples. The change was necessary because, for samples taken near the end of a shift, there could be too little time to return to the laboratory and conduct the test during that shift, as required by the 1978 FSAR. The new statement requires, instead, that in each shift in which work is completed the field test must be conducted and the sample for the laboratory test collected. The laboratory work on that sample then could proceed in some following shift. The third paragraph of that subsection now reads:

> Whenever fill or backfill was placed during a work shift, at least one field test was conducted during the shift and a sample for laboratory relative density testing was obtained, provided that the compaction was completed in some area.

Tr. 6074-75, 6124-25, 6196-98, 6202-03 (Pettersson); FSAR § 2.5.4.5.6.2.4, at 2.5.4-56 (May 1, 1981); Staff Exh. 48, at p. 2-36.

29. Item of Noncompliance No. 5 was based on lack of documentation of the lift thicknesses and number of passes with compaction equipment during backfill operations, which was interpreted as violating the

"continuous inspection" requirement of 1978 FSAR § 2.5.4.5.6.2.5 (Pettersson/White, ff. Tr. 6162, at 10-11). In a July 1980 inspection, it was verified that QA procedures had been changed to require documentation of loose lift thickness and number of roller passes, as well as the roller pattern used. Based on this modification, Item of Noncompliance No. 5 was closed. Staff Exh. 65 (I&E Rept. 80-19, at 2-3); Crossman, *et al.*, ff. Tr. 10,010, at 18; Pettersson, *et al.*, ff. Tr. 5796, at 25.

30. Section 2.5.4.5.6.2.5 of the FSAR subsequently was modified in Amendments 12 and 17 to clarify the inspection procedure and read as follows:

> The testing agency provided QC inspection of the backfill, the placement and testing of the material in the field for degree of compaction. The QC inspectors observed the type of material, lift thicknesses, operation of compaction equipment, and all other pertinent material or construction conditions affecting the quality of work and compliance with the specifications. The QC inspectors noted conformance with the limiting criteria of the specification and construction procedure for structural backfill and reported the acceptability of the operation. The frequency of testing and selection of test locations for placed material were according to the requirements identified in these seven categories: . . .

Shewmaker, *et al.*, ff. Tr. 9576, at 21; Pettersson/White, ff. Tr. 6162, at 14; FSAR § 2.5.4.5.6.2.5, at 2.5.4-56a (Sept. 15, 1980) and 2.5.4-57 (April 14, 1981).

31. Item V.A(10) of the Order to Show Cause (Staff Exh. 46) required verification or correction of the statements in FSAR Section 2.5.4. The HL&P review, and Staff concurrence, resulted in changes in the two FSAR subsections, as indicated. The rest of the Section specified in the Order to Show Cause was verified to be correct as stated originally. Item V.A(10) was closed out during NRC Inspection 80-17. Staff Exh. 113 (I&E Rept. 81-16, at 6); Crossman, *et al.*, ff. Tr. 10,010, at 13, 50.

32. The question of "false statements" in the FSAR has been examined thoroughly in extensive direct evidence presented by the Applicants and Staff, as well as several hundred pages of transcript covering examination of witnesses by all parties and the Board. It has been the Applicants' position that the matter should be viewed as a nonconformance with specified procedures, rather than false statements in the FSAR that had been prepared about 18 months earlier. Testimony of the Staff is consistent with that position. The Staff found no question of HL&P trying to confuse anybody or any willfulness on HL&P's part to include anything in the application that subsequently was not done in the field. It was simply a matter of failing to conform with two out of a

very large number of QA/QC control documents. Tr. 9862-63 (Shewmaker). The one deviation was unintended (Finding 25). No witness for either the Applicants or Staff differed with that position, either in direct testimony or in response to cross-examination, and no evidence to the contrary was developed by the Intervenors. *See* Findings 15-31, above and citations therein.

33. The Board finds that the FSAR statements that were the origins for concern expressed in the Order to Show Cause and CLI-80-32 were not generally false when made. We do not regard the single deviation mentioned in Finding 25 to be significant or to detract from our general finding of lack of falsity. There is no evidence that there was either intent by the Applicants to deceive the Commission or disregard for the truth.

34. We find that the incidents and remedial actions in connection with subpart A(1) of CLI-80-32 Issue A do not reflect adversely upon HL&P's character and, while pertinent to HL&P's or B&R's competence, are not sufficient to determine that HL&P does not have the necessary managerial competence to be granted licenses to operate the STP.

*(2) Noncompliances Set Forth in Notice of Violation and Show-Cause Order*

35. Issue A(2) asks whether HL&P's compliance record with NRC requirements, when considered alone and without regard to remedial steps, would be sufficient to determine that the company lacks the managerial competence or character to be granted operating licenses. *See* Finding 13, *supra*. We consider that, to be meaningful, our evaluation must include consideration of the number and severity of violations, any significant patterns that may exist in the occurrences, prior knowledge or involvement of management in them, ability of management to learn from those experiences, the willingness and attitude of HL&P officials in responding to NRC observations and enforcement actions, and the promptness and nature of those responses. All of those aspects relate to the ability of management to deal with problems inherent in constructing and operating a nuclear power plant and can reflect its integrity in dealing with NRC, including truthfulness, candor, commitment to safety, and willingness to shoulder its responsibilities as a licensee. Additional information in those regards can be obtained by examining the details and effectiveness of the specific remedial actions actually implemented, which will be considered to the extent pertinent in our consideration of Issue B.

36. The Notice of Violation and Order to Show Cause review, and are based on, noncompliances that were identified both before and during I&E Investigation 79-19 (Staff Exh. 46). Also, CLI-80-32, *supra*, expresses the Commission's concerns about activities and performance spanning several years of the project (12 NRC at 291). Accordingly, witnesses for HL&P and the NRC Staff, and this Board, have addressed the broad range of noncompliances covering the entire period from initiation of the South Texas Project through completion of Investigation 79-19 and thereafter until December 31, 1981.

37. Don D. Jordan, President and Chief Executive Officer of HL&P, presented direct testimony on the company's commitment to safe construction and operation of the STP and some of the steps taken by its management to assure that STP meets all applicable regulatory requirements. Jordan, ff. Tr. 1223. Mr. Jordan was cross-examined by all parties and the Board. Tr. 1224-1503.

38. HL&P presented direct testimony on company experience in STP construction and actions taken in response to the Order to Show Cause through a panel consisting of George W. Oprea, Jr., Joseph W. Briskin, Richard A. Frazar, and John M. Amaral (Oprea, *et al.*, ff. Tr. 1505). At the Board's request, Mr. Edward A. Turner joined the panel (Tr. 3360). Mr. Oprea, Executive Vice President of HL&P and a member of the HL&P Board of Directors, testified on implementation of the QA program at STP and HL&P management reaction to the Show-Cause Order. Mr. Briskin, the STP Manager, Houston Operations, was responsible for directing work of the engineering, procurement, project control services, accounting and project administration activities located in Houston. He testified on the organization and function of the Task Force, headed by him, that reviewed I&E Report 79-19 and the Show-Cause Order and developed the HL&P responses to it. Mr. Frazar was Manager, South Texas Project Quality Assurance and testified with respect to changes made in the STP administrative controls in response to the Show-Cause Order and changes in the STP QA program before and after issuance of the Show-Cause Order. Mr. Amaral, the Manager of Quality Assurance of Bechtel Power Corporation, described Bechtel's audit and recommendations concerning alternative organizational structures for the STP QA program and the bases for those recommendations. Mr. Turner was Group Vice President, Power Plant Engineering & Construction-Fossil, of HL&P. He was responsible for engineering and construction of all HL&P generating plants, including STP, from 1972 to 1976 and 1978 to 1980. Oprea, *et al.*, ff. Tr. 1505, at 1-5, 52-53, 77, 118-19; Tr. 3382-86 (Turner). There was extensive cross-examination

of the witnesses by all participants and the Board (Tr. 1543-2298, 3360-3630, 5063-5544).

39. HL&P also presented direct testimony on organization, QA activities, management involvement and responses to NRC enforcement actions by B&R, through a panel consisting of Dr. Knox M. Broom, Jr. and Raymond J. Vurpillat (Broom/Vurpillat, ff. Tr. 3646). Dr. Broom was Senior Vice President of the B&R Power Group and Assistant to the Group Vice President. His responsibilities included supervision of the Quality Assurance (QA) Department of the Power Group, which had responsibility for the B&R QA Program for the South Texas Project (STP). Mr. Vurpillat joined the B&R organization in August 1980, as Manager of the Power Group QA Department and was responsible for all QA programs implemented within the Group, including that at STP. At the Board's suggestion, this panel was joined by Mr. Stephen H. Grote, Senior Vice President, Operations, for the B&R Power Group, who was responsible for project management services, including cost engineering, scheduling, estimating, material management and project control, and contracts and proposals for all projects in the Power Group, including STP. From April 1979 until May 1981, he served as B&R executive sponsor of the STP, with responsibility for client communication and accountability above the project level. Broom/Vurpillat, ff. Tr. 3646; Tr. 4341-44 (Grote). There was extensive cross-examination of the panel by all participants and the Board. Tr. 3659-3871, 3894-4108, 4132-5055.

40. Staff direct testimony on activities leading up to the Order to Show Cause was presented by a panel consisting of William C. Seidle, William A. Crossman, William G. Hubacek, Robert G. Taylor and H. Shannon Phillips (Seidle, *et al.*, ff. Tr. 9205). During the period relevant to this testimony, Mr. Seidle was Chief of the Reactor Construction and Engineering Support Branch (RCESB), Region IV, and was responsible for implementing programs of inspection, investigation and enforcement for nuclear power plants in Region IV, including STP. At that time, Mr. Crossman was Chief, Projects Section, RCESB, and was responsible for supervising the project inspectors for plants under construction in Region IV, including STP. Mr. Taylor was a Construction Project Reactor Inspector from 1976 to 1978 and was responsible for inspecting nuclear power plants under construction in Region IV, including STP. Mr. Hubacek's and Mr. Phillips' positions and experience are described in Finding 19, *supra*. Seidle, *et al.*, ff. Tr. 9205, at 1-3 and Statements of Educational and Professional Qualifications. There was extensive cross-examination of this panel by other participants and the Board (Tr. 9208-9561).

41. Staff testimony on I&E Report 79-19 and the Order to Show Cause was presented by the Shewmaker panel, identified earlier in Finding 19, *supra*. Shewmaker, *et al.*, ff. Tr. 9576. Cross-examination of the panel is at Tr. 9578-9980.

42. Staff testimony on inspection and enforcement activities at STP since Investigation 79-19 and the Order to Show Cause was presented by the Crossman panel, all members of which have been identified earlier in Finding 19, *supra* (Crossman, *et al.*, ff. Tr. 10,010). Cross-examination of this panel is at Tr. 10,011-10,119.

43. It is fundamental in the NRC regulatory program that the reactor licensee is fully responsible for designing, constructing, testing and operating its facility in accordance with requirements imposed by the Commission. A vital feature of that program, which is of special importance in these proceedings, is the requirement for the licensee to comply with Quality Assurance Criteria for Nuclear Power Plants set forth in Appendix B to 10 C.F.R. Part 50. Seidle, *et al.*, ff. Tr. 9205, at 6.

44. The quality assurance program described in Appendix B envisions a pyramid control system, the base of which requires detailed inspection and test programs by the licensee or its contractors. All safety-significant actions must be accomplished by craftsmen using approved procedures and verified through up to 100 percent inspection by the licensee's onsite quality control personnel. It is this level of verification of procedures implementation that results in accept/reject decisions on specific items of equipment, construction activities, systems, technician or operator actions and procedures. *Id.* This is the level at which HL&P and B&R quality control inspectors were intended to function.

45. At the next level up in this pyramid system, the licensee must include audits that oversee and test the adequacy of the detailed quality control tests and inspections referred to above. Results of the audit are reported to licensee management, which then makes program corrections when needed and feeds appropriate changes back to the lower level through training or modifications in procedures or other programmatic improvements. This feedback system is designed to assure and enhance the reliability of the program in verifying that all safety-significant actions have been considered and implemented properly. *Id.* at 7. This is the system level at which HL&P and B&R audit programs were intended to function.

46. At the upper level of this system, licensee management must provide adequate organizational independence of QA/QC personnel from construction scheduling and costs, competent and adequate manpower to carry out the quality assurance and quality control programs, and policy guidance to the licensee's and contractors' organization and

personnel. *Id.* This is the level at which HL&P QA management was intended to function in providing programmatic direction to lower QA/QC echelons and the contractors.

47. The function of the NRC's Office of Inspection and Enforcement (I&E) is to seek reasonable assurance that the licensee's programs meet NRC regulatory requirements. To that end, it performs selective inspections, which are not aimed at verification of individual components, actions or procedures, but rather to evaluate functioning of the above management-control system. *Id.* at 7-8. In NRC Region IV, the Reactor Construction and Engineering Support Branch (RCESB) is responsible for carrying out those activities.

48. The RCESB has conducted inspections and investigations of the HL&P STP program since about 1974 and throughout the period of time covered by the Phase I record.[47] Some of the "inspections" are routine in nature and initiated by NRC personnel to review construction and other activities at the site for comparison with NRC criteria, as part of a program intended to identify problems and prevent them from attaining serious safety significance. Others have been conducted in response to problems reported to NRC by the licensee in accordance with NRC regulations. "Investigations," on the other hand, are initiated in response to allegations of program irregularities received by the Staff by telephone, letters or other means. Because most of these investigations involve allegations about safety matters, the threshold for initiating them is very low. "Inquiries" sometimes are conducted to obtain specific information desired by other NRC offices, NRC management or Congressional officials. Results of the inspections and investigations are written up subsequently as "I&E Reports." *Id.* at 8-9; Tr. 9352 (Seidle); Tr. 10,358 (Herr); Tr. 10,363 (Phillips).

49. Instances where the licensee fails to meet regulatory requirements are recorded as "noncompliances," which were categorized during the period in question at three levels of severity: violations, infractions and deficiencies. A violation was the most severe and was issued when the fabrication, construction, testing or operation of a Safety-Related Category I system was such that its function or integrity was lost. An infraction was less serious in that the system was impaired, but not lost. A deficiency was a noncompliance in which the threat to health, safety or interest of the public was remote and included such

[47] In April 1982, the NRC announced a forthcoming reorganization of its investigative functions, centralizing the conduct of "investigations" in a new Office of Investigations (OI). *See* NRC Announcement No. 38, dated April 20, 1982.

items as failure to follow procedures, and posting or labeling requirements which were not serious enough to constitute infractions. A fourth category, which was not viewed as a noncompliance, was a "deviation" and covered instances in which the licensee failed to keep a promise concerning controls or procedures, but the commitment was not a regulatory requirement. Licensees were required to take appropriate corrective actions for noncompliances and to report them to the NRC. Subsequent NRC inspections were made to assure that the corrective actions had been implemented properly, after which the noncompliance was closed out. Seidle, *et al.*, ff. Tr. 9205, at 10-11.

50. NRC enforcement is based on assessing deviations from the program of the specific facility under consideration. In carrying out its enforcement activities, the NRC does not attempt to compare licensee performance with that at any other facility. Tr. 9469 (Crossman).

(a) Noncompliances Before Investigation 79-19

51. During the approximately 6 years of STP activities preceding I&E Investigation 79-19, the Staff conducted a total of sixty-seven NRC-initiated inspections and eleven investigations in response to allegations of defects in construction or procedures received from various sources. Seidle, *et al.*, ff. Tr. 9205, at 10 and Appendix A. These resulted in issuance of: no "violations," thirty "infractions" and three "deficiencies," for a total of thirty-three items of noncompliance with NRC requirements or Applicants' specifications. In addition, eight "deviations" from controls or procedures to which the Applicants had committed to the NRC but which were not required by NRC were cited. *Id.* at 10-11 and Appendix B.

52. The eleven investigations did not result in the substantiation of most of the allegations that caused them to be initiated. This result can be attributed in part to the fact that the threshold for initiating an investigation is low because most investigations involve allegations concerning safety matters. Tr. 10,363 (Phillips). Eight of the eleven investigations produced no noncompliances. The remaining three resulted in three infractions for failing to follow specified methods in cadwelding procedures, inspections and record-keeping, one infraction for failing to follow specified procedures for release of a Stop Work Notice, and one deviation for failure to record the identity of the person making a supplemental entry in a QA record. Staff Exh. 17 (I&E Rept. 79-01, Notice of Violation); Staff Exh. 32 (I&E Rept. 79-14, Notice of Violation); Seidle, *et al.*, ff. Tr. 9205, at 31-33, 38-39, 52-53 and Appendices A and B.

53. HL&P took corrective actions for each of the noncompliances. Subsequent examinations by the Staff approved the resolution of each of them. Seidle, *et al.*, ff. Tr. 9205, at 33-35, 39-41, 56-57; Staff Exhs. 15, 16, 18, 19, 33, 34 and 35.

54. The remaining twenty-six infractions, three deficiencies and seven deviations originated in the sixty-seven inspections initiated by the NRC Staff between November 1973 and November 1979. The inspections covered a wide range of engineering, construction, and QA/QC activities and the noncompliances related principally to real or potential construction defects, organizational and procedural aspects of QA/QC, and various other types of problems in program implementation. Seidle, *et al.*, ff. Tr. 9205, at Appendices A and B.

55. Twenty-six inspections of concrete activities and records produced eight of the infractions and one deviation, several of which were addressed specifically in Staff direct testimony. HL&P responded to the noncompliances with appropriate corrective actions, which subsequently were inspected and approved by the Staff. *Id.* at 41-63 and Appendix B. *See also* Findings 293-301 and 327-337, *infra*.

56. Staff inspections and investigations of cadwelding activities produced a total of five noncompliances and one deviation. Some of these also were addressed specifically in Staff direct testimony. The Staff described HL&P's corrective actions for these events and the Staff inspections that approved them and closed out the noncompliances. Seidle, *et al.*, ff. Tr. 9205, at 32-41 and Appendix B. *See also* Findings 338-345 and 360-367, *infra*.

57. All of the noncompliances and deviations prior to I&E Investigation 79-19 may be summarized in five broad categories, as follows:

(a) failure to provide adequate procedures, instructions, specifications, drawings and schedules (six infractions and four deviations);

(b) failure to follow appropriate procedures and specifications (eighteen infractions);

(c) use of improperly qualified personnel (two infractions and two deviations);

(d) failure to maintain adequate records (two infractions, three deficiencies and two deviations); and

(e) inadequate or incomplete inspections (two infractions).

58. A Staff panel testified about the results of several inspections and investigations carried out during this period and summarized its findings and perceptions about those events, their root causes and the responses of HL&P and B&R to deficiencies identified by NRC. Seidle, *et al.*, ff. Tr. 9205. HL&P management was observed to be responsive and

committed to excellence in QA/QC activities. HL&P followed up actively and promptly with corrective actions on identified problems and sought out other problems where they existed. At no time did the company and its contractors make any effort to orchestrate any anti-QA/QC activities. Tr. 9506-07 (Seidle); Tr. 9850-67 (Phillips, Shewmaker, Hayes). Independence of QA from project management was viewed as satisfactory at STP (Tr. 9512-14 (Taylor, Seidle)). Mr. Phillips, the Resident Reactor Inspector for STP, testified that HL&P management was cooperative — probably the most open licensee that he ever dealt with — and seemed to be dedicated to having a model QA program, as reflected, for example, by the presence of the highest number of QA personnel on site that he had observed. His observation was that the allegations in the STP quality history were isolated from each other, but that a flood of them occurred just prior to the NRC decision to initiate Investigation 79-19. Tr. 9516-17 (Phillips).

59. The Staff panel concluded that HL&P was cooperative and diligent in correcting specific problems when cited, but that the same problems eventually resurfaced, evidencing HL&P's inability to control construction activity. Seidle, *et al.*, ff. Tr. 9205, at 64; Shewmaker, *et al.*, ff. Tr. 9576, at 4; Tr. 9506, 9527-28 (Seidle); Tr. 9857 (Phillips). Mr. Taylor did not detect any unwillingness on the part of HL&P to do the proper things, but felt that it lacked the knowledge of how to do them (Tr. 9511-12 (Taylor)). Panel members agreed that inexperience of the licensee was a major factor in occurrences of the problems (Tr. 9506-17). In addition, during the summer of 1978, B&R was understaffed with respect to QC personnel (Tr. 9277 (Seidle)).

60. Mr. Oprea, the HL&P executive with overall responsibility for the STP, testified that during these years, until well into 1979, he had felt that the QA program was working well and that the problems found at STP were isolated events on a large and complex project that was achieving generally satisfactory work. The HL&P audits had indicated that construction was proceeding generally in compliance with NRC and STP design requirements. Allegations concerning confrontations between construction and QC personnel also were viewed as isolated incidents, to which appropriate responses were taken by B&R management. Mr. Oprea had felt that the STP problems were typical of ones being experienced on other nuclear construction projects. The several citations for nonconformances in 1979, increased construction activity and the post-TMI situation caused him some concern about the project to the point of considering an independent audit of QA/QC activities. Oprea, *et al.*, ff. Tr. 1505, at 9-19; Tr. 2221-24, 5095-5100 (Oprea). Mr. Jordan testified that he hadn't thought that there was a QA

problem, but later recognized some deficiencies in the program, especially in its implementation (Tr. 1445-46 (Jordan)). Although not directly related to QA, Mr. Jordan also indicated that during this early period HL&P had problems concerning the adequacy of B&R's engineering performance. HL&P had been led to believe that around 50 percent of B&R's engineering would be completed at the time the construction permits were awarded. In fact, only approximately 8-9 percent of the engineering was complete at that time. Tr. 1228-29 (Jordan).

61. None of the noncompliances and deviations were based on untruthfulness, attempts to mislead NRC personnel, withholding information, lack of cooperation, reluctance to initiate and carry out corrective actions, refusal to acknowledge responsibility, or other such misconduct by HL&P management or personnel. Seidle, *et al.*, ff. Tr. 9205, at 64 and generally, Tr. 9208-9561; Tr. 9850-67.

62. Although HL&P responded properly in correcting specific problems as they arose, it was unable to prevent their recurrence, suggesting inadequate control over construction and the contractor, B&R. Specific items of concern to the Staff in this respect were the recurrent problems in cadwelding, failure to follow specified concrete pour procedures, and various QA/QC management problems. Of special importance, the NRC continued to receive allegations concerning lack of management support for QA/QC inspectors, poor inspector morale, harassment of civil QC inspectors by construction personnel, inadequate QA/QC staffing, and other QA/QC-related complaints, strongly suggesting lack of project control by HL&P. Seidle, *et al.*, ff. Tr. 9205, at 64; Staff Exh. 9 (I&E Rept. 78-13); Tr. 9505-07, 9539-40 (Seidle). The Staff determined that, during this period prior to the 79-19 Investigation, there was an "inordinate amount of friction" between B&R QC inspectors and B&R construction personnel. Indeed, there was more friction than the Staff inspector who authored that language had ever experienced during his more than 30 years' experience in QA/QC matters. Tr. 9369-70 (Taylor); Seidle, *et al.*, ff. Tr. 9205, at 117; *see also* Tr. 9468-69 (Hubacek).

63. Because of those problems, the NRC Staff reviewed past inspection and enforcement reports and concluded that the mid-term QA inspection, scheduled to occur in 1980, should be performed a year earlier. The report for that inspection revealed several QA deficiencies. Staff Exh. 27 (I&E Rept. 79-13); Shewmaker *et al.*, ff. Tr. 9576, at 4.

64. An additional series of allegations concerning harassment of QC personnel was conveyed to the Resident Reactor Inspector during November 1979, causing the Director of I&E to order an in-depth investigation (79-19) into QA/QC management support, harassment of

personnel, and effectiveness of the STP QA program (Shewmaker, *et al.*, ff. Tr. 9576, at 4-6; Seidle, *et al.*, ff. Tr. 9205, at 64). The nature of these allegations differed from earlier similar allegations in that a group of them was brought to the Staff's attention simultaneously rather than as individual isolated allegations (Tr. 9965 (Phillips)).

(b) Noncompliances Identified in Investigation 79-19

65. Problems identified during the special investigation that resulted in I&E Report 79-19 and resulting enforcement actions taken by NRC were addressed by the Staff's Shewmaker panel, identified in Finding 19. Shewmaker, *et al.*, ff. Tr. 9576.

66. The 79-19 Investigation was conducted because of allegations received on November 2, 1979, by the NRC Resident Reactor Inspector, Mr. Phillips, from workers at the South Texas Project concerning lack of management support, threats, and harassment of civil QC inspectors, similar to other allegations that had been received and investigated earlier. It was undertaken to determine the validity of the recurring allegations and to assess the effectiveness of the QA/QC program at the STP. *Id.* at 6; *see also* Finding 64, *supra.*

67. The investigation was carried out over about 3 months, between November 10, 1979, and February 7, 1980, and consumed 1113 manhours by one investigator and five inspectors, representing four NRC regional offices (I, II, III, and IV). It included observations, document reviews, witnessing of tests and over 100 formal and informal interviews with HL&P and B&R construction and management personnel, engineers, inspectors, Pittsburgh Testing Laboratory employees and other site personnel. Staff Exh. 46, Appendix D, at 1-2, 5-9; Shewmaker, *et al.*, ff. Tr. 9576, at 6-7; Tr. 9590-92 (Hayes, Phillips).

68. Some results of the special investigation were communicated to HL&P in a meeting on December 21, 1979 and in an exit interview on January 24, 1980. The full findings were transmitted to the company on April 30, 1980, as I&E Report 79-19, accompanied by: (a) a Notice of Violation, (b) a Notice of Proposed Imposition of Civil Penalties, and (c) an Order to Show Cause. Staff Exh. 46; *see* Finding 7, *supra.*

69. In the December meeting, Mr. Oprea and Mr. Turner were informed by the Staff that there were serious problems in the QA/QC program with respect to concrete placement and harassment of QC inspectors. In the January meeting, those findings were reiterated and HL&P was notified, in addition, that noncompliances had been identified in welding, nondestructive examination (NDE) and the backfill placement program. The Staff also reported that HL&P and B&R QA organi-

zations were not effectively implementing the auditing program or analyzing trends in nonconformances and that there were inadequacies in document control. Oprea, *et al.*, ff. Tr. 1505, at 20-21.

70. I&E Report 79-19 produced a total of twenty-two noncompliances, which are summarized as follows:

(a) existence of organizational defects in the STP QA/QC program;
(b) failures to provide adequate procedures, instructions, and specifications (three noncompliances);
(c) failures to follow proper procedures (three);
(d) failures to take proper corrective actions when defects were observed (six);
(e) failures to maintain adequate records (three);
(f) inadequate or incomplete inspections or audits (four);
(g) use of improperly qualified personnel (two).

Staff Exh. 46 (I&E Rept. 79-19; Appendix A, Notice of Violation); Shewmaker, *et al.*, ff. Tr. 9576, at 7-34.

71. As a result of the findings of I&E Report 79-19, the company was served with a Notice of Violation citing the noncompliances and requiring that HL&P respond within 25 days, admitting or denying each item of noncompliance, giving reasons for each, corrective steps taken, and the date when full compliance would be achieved. The NRC also proposed a civil penalty of $100,000. Staff Exh. 46, Appendix A, at 19, and Appendix B (Notice of Proposed Imposition of Civil Penalties).[48]

72. HL&P responded to the Notice of Violation on May 23, 1980, stating that each incident probably occurred, admitting to each item of noncompliance, and paying the $100,000 civil penalty. The company identified six "root causes" to which all of the incidents could be traced and indicated that its objective for the next several months would be to attack those causes. Shewmaker, *et al.*, ff. Tr. 9576, at 38; Staff Exh. 47 (HL&P Response to Notice of Violation).

73. Shortcomings identified in the QA/QC program included the following areas:

1. control of concrete placement activities;
2. welding and nondestructive examination activities;
3. control of backfill material placement and testing;
4. identification of recurring problems;
5. effectiveness of corrective actions;

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[48] The Notice of Violation recited that the infractions set forth therein warranted total civil penalties of $372,000 but, as a result of statutory limits, civil penalties of $100,000 were being proposed (Staff Exh. 46, Appendix A, at 19 and Appendix B).

6. independence and authority of civil QC inspectors;
7. auditing program.

Shewmaker, *et al.*, ff. Tr. 9576, at 40-41.

74. Item of Noncompliance No. 1 indicated that the quality control function in the B&R Civil area was not sufficiently independent from construction and had inadequate authority and freedom to identify problems and resolve them adequately. Some of the inspectors were subjected to production pressures, not always supported by B&R QC management, harassed, intimidated and threatened by construction personnel. In this situation, some inspectors felt that it would be easier to approve inadequate procedures and construction than to be confronted by construction or quality-control management. That notwithstanding, results of the investigation did not disclose any instances of any significance in which inspectors failed to do their jobs. The Shewmaker panel emphasized that no irreparable construction deficiencies were found in completed structures. The Staff witnesses concluded that there had been incidents of harassment of inspectors (tension, verbal abuse or friction); but, except possibly in one instance (Tr. 9932 (Hayes)), no intimidation (interference with job performance). Staff Exh. 46, Appendix A, at 1-5; Shewmaker, *et al.*, ff. Tr. 9576, at 7-8, 11-13, 42; Tr. 9237-43 (Taylor, Seidle); Tr. 9632 (Hayes); Tr. 9651 (Phillips); Tr. 9859 (Phillips); Tr. 9930-35 (Phillips, Hayes); Tr. 9958 (Shewmaker, Phillips, Hayes).

75. Allegations of harassment of B&R QC inspectors by construction personnel and friction existing among them have especially important implications for matters to be decided here about corporate competence and character. *See* Findings 62, 64, 66, *supra*. Several such allegations were substantiated in the special investigation, as well as the fact that efforts by HL&P had failed to find the root causes and correct those problems, in spite of having had knowledge about the complaints and allegations for 1 to 2 years. Shewmaker, *et al.*, ff. Tr. 9576, at 7-8, 35-36, 40; Tr. 1378 (Jordan); Tr. 3560-66 (Turner); Oprea, *et al.*, ff. Tr. 1505, at 11-15. These matters are discussed more fully in Findings 381-398, *infra*.

76. Several items of noncompliance dealt with poor practices in concrete placement, inspection and documentation. The QA/QC program was ineffective in preventing recurrence of those problems, which sometimes resulted in voids in structural concrete. The investigation team attributed much of the cause to unclear procedures and qualitative acceptance criteria, personnel with inadequate training, experience and education, and pressures on inspectors through harassment.

Shewmaker, *et al.*, ff. Tr. 9576, at 8, 41, 44; Staff Exh. 46, Appendix A. Some of these matters are further addressed in Findings 327-336, *infra*.

77. Other areas of construction to which noncompliances referred included backfill placement that may not have been sufficiently compacted to meet required densities, improper welding controls and welder qualifications, and inaccurate NDE performance and interpretation. Shewmaker, *et al.*, ff. Tr. 9576, at 8, 44, 45; Staff Exh. 46, Appendix A; Tr. 9921-30 (Hayes, Shewmaker, Phillips). Some of these matters are further discussed in Findings 276-291 and 302-315, *infra*.

78. The HL&P and B&R audit and surveillance programs were not properly implemented and effective trend analyses were not performed, allowing many of the problem areas to become chronic and continue to recur. Shewmaker, *et al.*, ff. Tr. 9576, at 8, 44; Staff Exh. 46, Appendix A; Tr. 2279 (Oprea). *See* Findings 115-116 for more details.

79. An especially important finding of the investigation team was that serious procedural and programmatic inadequacies in the HL&P and B&R QA/QC organizations had resulted in failures to identify quality control problems and to take appropriate steps to correct them and prevent their recurrence. The Staff viewed HL&P management as having been over-reliant on B&R to implement the QA/QC program and negligent in not keeping itself better informed about site activities and problems. Shewmaker, *et al.*, ff. Tr. 9576, at 35-37, 42; Tr. 9859 (Phillips); Tr. 9938 (Hayes); *see also* Finding 116, *infra*.

80. QA/QC organizational problems were not attributed to inadequacies in the written QA/QC program, but to lack of detailed involvement by HL&P in the total scope of construction activities at STP, which hindered HL&P in implementing the requirements and procedures and in maintaining adequate control over its general contractor, B&R. Shewmaker, *et al.*, ff. Tr. 9576, at 7-8, 35-37, 42; Tr. 9602, 9864 (Hayes). Mr. Jordan, in response to a question, indicated his agreement with the NRC findings and stated that in his view the QA organization had been satisfactory, but implementation of the program had been poor (Tr. 1364-65, 1446 (Jordan)). Mr. Amaral agreed. He also testified that there had been too little management involvement and that, in fact, this was the underlying cause among all of the root causes. Tr. 1714-15, 1740-44, 1748, 1917-18, 2061, 2242 (Amaral). Mr. Oprea stated that he did not disagree with Mr. Amaral's diagnosis of the problems and that he now visits the site more often, reads more reports, and talks with many personnel at the site (Tr. 2238, 2241, 2243-45, 2264 (Oprea)). Mr. Frazar distinguished carefully between the written program, which complied with NRC regulations, and its implementation, which some-

times did not (Tr. 1794-1814). Mr. Amaral and Mr. Turner agreed (Tr. 1917-18, 1950, 2065, 3421).

81. Because the findings in I&E Report 79-19 showed widespread noncompliance by both HL&P and B&R, and in view of the past record of inspection and enforcement at STP, the Staff issued an Order to Show Cause why safety-related construction activities on the South Texas Project should not be stopped 90 days from date of the Order and remain stopped until the Licensee completed ten specific items identified in the Order that would permit the Staff to evaluate whether further activities at the STP could be conducted in accordance with Appendix B, 10 C.F.R. Part 50. HL&P responded to this Order on July 28, 1980, providing the basis for permitting continued construction of the STP. Shewmaker, *et al.*, ff. Tr. 9576, at 9-10, 39-48; Staff Exh. 46 (Order to Show Cause at 12-17); Staff Exh. 48 (Licensee's Response to Order to Show Cause).

82. The ten specific items that HL&P was directed to carry out included the following:

1. Contract with an experienced, independent consulting firm, knowledgeable in QA/QC and nuclear construction, to evaluate the STP QA/QC program management.
2. Review safety-related aspects of Category I structural backfill.
3. Review safety-related welding and concrete structures and report on necessary repairs and scheduling.
4. Rescind a B&R brochure on the STP QA program and issue a new one consistent with 10 C.F.R. Part 50, Appendix B.
5. Define personnel authority for stop work more clearly and describe implementation methods.
6. Develop and implement more effective ways for identifying and correcting "root causes" of problems.
7. Develop and implement a more effective program for control of field changes.
8. Develop and implement a more effective system for records control.
9. Develop and implement an improved audit system.
10. Verify or correct, if necessary, the statements in Section 2.5.4 of the FSAR.

Staff Exh. 46 (Order to Show Cause at 12-17); Shewmaker, *et al.*, ff. Tr. 9576, at 9-10.

83. HL&P responses to the findings of Investigation 79-19 began during the period in which the investigation was still under way, before publication of the I&E Report and Show-Cause Order on April 30, 1980.

Shortly after the meeting between the NRC Staff and HL&P management on December 21, 1979, the company voluntarily stopped all complex concrete pours. In January 1980, after several weeks of study, HL&P retained an outside consultant (Bechtel Corporation) to conduct an in-depth audit of the QA/QC program. HL&P also retained outside consultants to review and advise management on other problems that had been identified, including backfill, harassment and welding. More personnel in Houston management were assigned to the STP site and outside consultants were added to the HL&P staff to enhance its capabilities. As a result of all of those activities, the company discovered additional program deficiencies and proceeded to report them to NRC and address them, as well. For example, HL&P voluntarily stopped safety-related welding in April 1980. Tr. 9857-61 (Phillips, Shewmaker); Oprea, *et al.*, ff. Tr. 1505, at 20-23; Tr. 1440-42 (Jordan); Finding 93, *infra.*

84. Not all of the actions taken to improve QA/QC prior to the issuance of the Show-Cause Order were successful. In January 1980, a lecture was given by the project QA manager to construction and QA/QC personnel, and a brochure entitled "Implementation of the Brown & Root Quality Assurance Programs at the South Texas Project Job Site" was issued. In the opinion of the Staff, the lecture and brochure overemphasized the importance of construction pressures at the expense of quality assurance. Shewmaker, *et al.*, ff. Tr. 9576, at 42-43. The Show-Cause Order directed that the brochure be rescinded and replaced (Finding 82, Item 4, *supra*). HL&P agreed to do so and, on July 30, 1980, a new brochure was distributed and discussed at a seminar (Staff Exh. 48, at 4-1 and Exhibit 19; Staff Exh. 64 (I&E Rept. 80-18, at 3); Crossman, *et al.*, ff. Tr. 10,010, at 43-44).

85. The HL&P written response to the Show-Cause Order was submitted in timely fashion on July 28, 1980 and described corrective actions taken and to be taken. These will be discussed in detail subsequently. *See, e.g.*, Findings 122-124, 200-219, 275 *et seq.*; Staff Exh. 48 (Licensee's Response to Order to Show Cause).

86. The Staff indicated that it did not find a total breakdown in the QA/QC program (Tr. 9851 (Phillips)). To the contrary, in many ways the program exceeded NRC requirements and worked well, resulting in most activities being carried out correctly (Tr. 9601 (Hayes); Tr. 9851, 9855 (Phillips)). The HL&P record in reporting construction deficiencies under 10 C.F.R. § 50.55(e) was better than that of most utilities and the company was viewed by the panel as open and honest (Tr. 9855 (Phillips)). No irreparable construction deficiencies were found and, in fact, no noncompliance was issued at the level of a violation, indicating

that the Staff did not feel that the functional integrity of any system had been lost. The Staff did not view any of the noncompliances reported during Investigation 79-19 to be severe enough to indicate that HL&P management was irresponsible or grossly negligent. Shewmaker, *et al.*, ff. Tr. 9576, at 8, 49; Tr. 9829 (Hayes); Tr. 9853-54 (Phillips).

87. The Staff concluded that the record of HL&P compliance with NRC requirements, if viewed without regard to the remedial steps taken by HL&P following 79-19, was not sufficiently poor to conclude that HL&P does not have the managerial competence or character to be granted operating licenses for the South Texas Project. The lack of involvement in the construction activities was the result of inexperience in nuclear construction, rather than irresponsible corporate management. The Staff also concluded that, given the absence of irreparable deficiencies in the construction already completed, if corrective action proposed by HL&P were implemented, the STP would be in compliance with NRC requirements and operating licenses should be granted. Further, it observed that HL&P consistently had shown a willingness to implement corrective action. The Staff's examination of the STP revealed shortcomings in project management during construction that it viewed as relevant to, and probative of, how HL&P would perform under an operating license, but HL&P's prior behavior was not considered by Staff reviewers to be determinative. Shewmaker, *et al.*, ff. Tr. 9576, at 48-50; Tr. 9854, 9861-64, 9935-40 (Phillips, Shewmaker, Hayes); *see* Finding 248, *infra*.

(c) Noncompliances After Investigation 79-19

88. Staff testimony on NRC inspection and enforcement activities after Investigation 79-19 and the Order to Show Cause, as reflected in I&E reports issued since that time, was presented by the Crossman panel (identified earlier in Finding 19). The purposes of this testimony were: (1) to outline noncompliances identified in inspections and investigations conducted since issuance of I&E Report 79-19, (2) to describe the status of HL&P corrective activities for the noncompliances identified in I&E Report 79-19, and (3) to summarize HL&P responses to directives set forth in the Order to Show Cause. Only noncompliances identified since the 79-19 I&E report will be discussed here — the remedial actions will be discussed subsequently in connection with Issue B. Crossman, *et al.*, ff. Tr. 10,010; Staff Exhs. 31, 35, 40, 45, 49-89, 92-100, 113-132. Cross-examination of the panel by parties and examination by the Board is at Tr. 10,011-10,118.

89. After Investigation 79-19 and up through December 31, 1981, the NRC performed seventy-four inspections or investigations at the STP, during which fourteen items of noncompliance were identified, distributed as follows:

(a) failure to develop appropriate procedures (one noncompliance),
(b) failures to follow procedures (six),
(c) failure to assure quality of purchased material (one),
(d) inadequate or incomplete inspection (one),
(e) failures to report construction deficiencies in a timely manner (four), and
(f) failure to respond to B&R audit findings (one).

These noncompliances were described by the panel as being similar to those for which HL&P had been cited in the past. Crossman, *et al.*, ff. Tr. 10,010, at 5 and Appendix A.

90. Two instances of document falsification were substantiated by NRC after the Order to Show Cause. In one instance, a B&R employee admitted that he had initialed and dated a document indicating that a "hold point" inspection had been performed when, in fact, it had not. Shortly after I&E Report 80-14 (Staff Exh. 60) describing this incident was issued, the individual was terminated. Crossman, *et al.*, ff. Tr. 10,010, at 13-15. *See also* Finding 424, *infra*.

91. The other instance involved a B&R foreman who was alleged to have falsified two plant maintenance records concerning inspection of vacuum degasifier pumps and who admitted falsifying one such record and also ordering a subordinate to sign off on maintenance cards for equipment that was inaccessible in a locked building. The findings and conclusions of the Staff investigation of these allegations are reported in I&E Report 80-21 (Staff Exh. 67). The supervisor of the person making these allegations subsequently quit and two other supervisors reported to foster this behavior were transferred off site several months after the investigation. Crossman, *et al.*, ff. Tr. 10,010, at 15-17. *See also* Finding 424, *infra*.

92. Based on all of the inspections and investigations, and taking into account the various noncompliances and corrective actions taken or planned, this panel concluded that there is reasonable assurance that structures in place at the STP as of early 1982 are in conformity with the construction permits and provisions of NRC regulations and that there are no major safety-related problems with the completed structures or physical systems (Crossman, *et al.*, ff. Tr. 10,010, at 52). *See also* findings on Issue E, *infra*.

(d) Evaluation of Root Causes of Noncompliances

93. As pointed out earlier, Mr. Oprea testified that circumstances in late 1979 led him to consider an independent audit of the QA/QC program. *See* Finding 60, *supra*. After several weeks of study and preliminary meetings with NRC personnel concerning the findings of Investigation 79-19, HL&P management recognized the greater breadth and seriousness of the problems and decided to retain the Bechtel Corporation to carry out that study. The scope of the study was defined during two meetings between HL&P and Bechtel in January and February 1980. Later, after the report of Investigation 79-19 had been issued, the scope of the Bechtel study was broadened to include evaluation of alternative types of various QA/QC management organizations, in response to Item 1 of the Show-Cause Order. *See* Finding 83, *supra*; Oprea, *et al.*, ff. Tr. 1505, at 18-19, 22-23, 31, 119; Tr. 1362-64 (Jordan); Tr. 2087-98, 2254-55, 5465-68 (Oprea); Staff Exh. 48 (Licensee's Response to Order to Show Cause), Exhibit 1.

94. The Bechtel report identified six "root causes" of deficiencies in the QA program. HL&P advised the NRC of its intent to concentrate on improvements in the following areas:

1. better clarity in writing specifications and procedures;
2. improved documenting and trending of nonconformances;
3. improving the training of personnel in QA goals, emphasizing STP reliability and safety;
4. improving systems controls to assure that QA activities are initiated, performed, reviewed and documented properly;
5. improving adherence to procedures through audits;
6. increased visibility and participation in QA activities by upper management.

The Bechtel and HL&P studies indicated that problems in the QA program could be traced to one or more deficiencies in those areas. Oprea, *et al.*, ff. Tr. 1505, at 26-27, 119-20; Staff Exh. 48 (Licensee's Response to Order to Show Cause), Exhibit 1.

95. Mr. Amaral, previously identified as Manager of Quality Assurance for Bechtel Power Corporation (Finding 38, *supra*), was in charge of the Bechtel study. He identified the root cause underlying all others as lack of visibility and participation by management. Tr. 2061, 2287, 2294 (Amaral). He indicated that much of management's inadequacy in its knowledgeability about and participation in STP activities could be attributed to communication problems between field personnel and upper management. Tr. 1714-16, 1850-51, 1897-98 (Amaral).

96. Much of the communication problem was caused by long organizational lines, with several administrative layers between field supervisors and executives. This, coupled with inexperience, produced poor communications in the detection and resolution of problems. Further, the remoteness of management weakened authority of onsite inspectors in their dealings with construction personnel. Mr. Amaral suggested that this situation could have contributed to an atmosphere in which QC inspectors could be harassed. In addition, the communication problem was intensified by the fact that audit reports were not issued beyond the level of the organization being audited, virtually eliminating feedback from upper management to correct problems discovered in the audits. Mr. Amaral concluded that HL&P has since taken steps to resolve the communication problem by several actions, especially by its 1980 transfer of Mr. Frazar, the corporate QA manager, to the plant site and having him report directly to Mr. Oprea. Tr. 1714-16, 1739, 1743, 1850-51, 1897-1901, 1934-35 (Amaral).

97. The excessively long chain of command can be illustrated by the fact that, before Investigation 79-19, Mr. Turner, then Vice President, Power Plant Construction and Technical Services, was responsible for both QA and project management and reported to Mr. Oprea. Oprea, *et al.*, ff. Tr. 1505, at 7. Mr. Frazar, the Corporate QA Manager, reported to Mr. Turner. Within the QA Department, the Projects QA Manager reported to Mr. Frazar and supervised the STP Project QA Supervisor, who was located in Houston. The site QA supervisor, Mr. Logan Wilson, was stationed at STP and directed the HL&P QA staff, under supervision of the STP Project QA Supervisor. Information on problems originating at the field inspector level, then, had to move through six management levels at various locations before reaching Mr. Oprea. Indeed, there were four layers of supervision between the site QA organization and Mr. Oprea. Oprea, *et al.*, ff. Tr. 1505, at 7, 42; Tr. 1714-15 (Amaral, Frazar).

98. The intent was that HL&P should serve in an oversight capacity to provide programmatic direction to B&R on implementing the STP QA program. Oprea, *et al.*, ff. Tr. 1505, at 8. Mr. Amaral defined programmatic direction as establishment of the policies and basic procedures by which the program should be implemented. He testified that at the time of the Bechtel audit HL&P did not have adequate experienced staff to provide that direction. Tr. 2228 (Amaral). Mr. Amaral felt that the problems of too little management involvement and poor communications continued because HL&P personnel were inexperienced in constructing and operating nuclear power plants. Tr. 1905-06, 2228-29 (Amaral).

99. Mr. Jordan, HL&P President and Chief Executive Officer, had no prior involvement with nuclear construction or operation before plans were initiated for STP. He knew that construction and operation of a nuclear power plant would be more complex than for a fossil fuel plant, but did not realize just how complex it could be until Investigation 79-19. Tr. 1396-98 (Jordan).

100. Mr. Oprea has been in charge of the project since its inception and is the second-ranking officer of the company. He had an extensive background of engineering experience, but no prior experience with nuclear power plant design or construction before the decision to build STP. Oprea, *et al.*, ff. Tr. 1505, at 3-4.

101. Mr. Turner also had many years of engineering experience, much of it in power plant design and construction. However, he too had no nuclear power plant experience prior to the STP. He expressed the view that lack of corporate experience was an important factor in causing the QA/QC program to be out of compliance with NRC requirements. Tr. 3421 (Turner).

102. Mr. Frazar lacked prior experience in either QA/QC or nuclear construction and readily admitted that his inexperience could have contributed substantially to some of the STP problems (Tr. 3244-46 (Frazar)). Mr. Amaral testified that Mr. Frazar was articulate and bright but lacked the experience required for his position (Tr. 1766-67 (Amaral)). Mr. Jordan expressed confidence in Mr. Frazar's abilities. He conceded, however, that Mr. Frazar needed additional experienced help and that, with the same choice to make today, he (Jordan) would employ somebody with more experience than Mr. Frazar had at the time he was placed in his position. Tr. 1443-45, 1466-68 (Jordan).

103. Mr. Frazar indicated that Mr. Wilson (the site QA supervisor) did not have experience adequate for his position (Tr. 3244 (Frazar)). Mr. Amaral expressed a similar view about Mr. Wilson (Tr. 1935 (Amaral)). Mr. Amaral also testified that some of the managers in the B&R organization also were inexperienced. Specifically, Mr. Thomas G. Warnick, the B&R site QA Manager, seemed overwhelmed by his job and Mr. Amaral thought that the job was beyond him. Tr. 1938-39, 2066 (Amaral). Mr. Amaral had recommended that HL&P and B&R both retain qualified site managers (Tr. 1599 (Amaral)). He also stated that of the approximately twenty to twenty-five supervisory QA/QC positions in HL&P and B&R, about fifteen required changes (Tr. 2069-70 (Amaral)).

104. Mr. Jordan felt that failure to perceive problems stemmed from management's failure to receive the types of information needed for informed decisions and that HL&P's failure to perform adequate audits

and trend analyses contributed to that problem (Tr. 1394-95 (Jordan)). He indicated further that HL&P responded to each individual item of noncompliance adequately, but that the lack of proper trending to examine the situation in depth prevented it from seeing emerging trends in a timely fashion (Tr. 1446-47 (Jordan)).

105. Dr. Broom, who has been identified earlier as Senior Vice President of the B&R Power Group (Finding 39, *supra*), testified that personnel occupying the position of STP General Manager for B&R changed six times between 1977 and 1981, an average of once each 8 months, and the STP site manager was filled by seven persons during that period, giving an average change frequency of once in 7 months (Tr. 4362-63, 4366 (Broom)). Reasons cited by B&R for this high rate of turnover included slipping schedules and rising costs, which forced removal of some managers. Others were changed because they had been placed in the position only for an interim period. Some left in response to more lucrative offers from other companies. Tr. 4366-75 (Broom, Grote).

106. Dr. Broom indicated that a new STP General Manager might require 3-6 months to become fully effective and that it would be preferable for that position to be occupied by the same person for several years (Tr. 4364-66 (Broom)). In spite of potential effects on continuity and employee morale and effectiveness, neither Dr. Broom nor Mr. Grote felt that the unusually large turnover contributed significantly to the STP difficulties (Tr. 4378-84 (Broom, Grote)). Staff witnesses were uncertain about the specific effects of those changes on the STP problems, but one indicated that the poor quality of some of the B&R managers did, in his view, contribute in major fashion to them (Tr. 9522-26 (Seidle, Taylor, Crossman)).

107. Mr. Amaral testified that HL&P management originally did not have a "quality first" philosophy and was not knowledgeable enough about QA/QC. He emphasized the importance of having a commitment to quality throughout the entire organization and indicated that this had not been adequate throughout HL&P and B&R. Tr. 1591, 1752-54, 1850-51 (Amaral). Mr. Oprea stated that the spirit of quality always was there in HL&P, but that there was an implementation problem (Tr. 2295 (Oprea)).

108. Mr. Jordan testified that there long has been a corporate commitment to safety and that his view of QA is that quality should be built into the facility (Jordan, ff. Tr. 1224, at 3-8; Tr. 1266-77 (Jordan)). Soon after becoming President of HL&P, in 1974, he issued a policy statement to that effect (Tr. 1278-83 (Jordan)). His sensitivity to the complexity of nuclear power plants has increased and now he spends more time on STP matters (Tr. 1396-98, 1452 (Jordan)). He had lacked

information needed to recognize some problems, but now spends more time reviewing various aspects of the STP (Tr. 1373, 1394-95 (Jordan)). He did not feel that it would be accurate to say that HL&P had abdicated its responsibility to its contractors or failed to keep itself knowledgeable concerning activities at the STP (Jordan, ff. Tr. 1224, at 8).

109. Mr. Oprea agreed with the diagnosis of the problems as advanced by Mr. Amaral (Tr. 2233-38 (Oprea)). He had felt his knowledge of STP activities was adequate before the Show-Cause Order, but he was dumbfounded when HL&P received the Show-Cause Order (Tr. 2090, 2239-40 (Oprea)). Mr. Amaral testified that Mr. Oprea had not been getting the root causes, but only information on isolated problems that were occurring from time to time (Tr. 2242 (Amaral)). Mr. Oprea agreed with that assessment and indicated that HL&P had been involved in curing problems but not in ascertaining their causes (Tr. 2243, 2235 (Oprea)). Mr. Frazar also stated that HL&P had been treating the symptoms and not the causes of the problems (Tr. 5421-22 (Frazar)). He concluded that there had been inadequate attention to supervision and support of QA personnel by B&R (Tr. 5405 (Frazar)).

110. Mr. Oprea stated that he had always been sensitive to the STP, but that his intensity had increased since Investigation 79-19 (Tr. 2243-44 (Oprea)). Before then, there had not been enough physical visibility of management at the STP site. He had visited the site at intervals of about 4-6 weeks, but subsequently has increased the frequency to about once per week. During those visits, he talks with various workers and others at the site to obtain information and increase management visibility. At the time of his testimony, he indicated that he was spending all of his time on nuclear issues and 90 percent of it on the STP (Tr. 2241-45, 2264, 3395, 3422 (Oprea)).

111. The Staff did not disagree with any of the root causes described by the Applicants' witnesses. The view of the Seidle panel was that the principal root cause was inexperience of HL&P and B&R management with construction and operation of nuclear power plants. Other important factors included the attenuated chain of command and the high rate of turnover in B&R site management personnel. Tr. 9508-14 (Seidle, Crossman, Taylor); Tr. 9517 (Phillips); Tr. 9522-26 (Seidle, Taylor, Crossman); Tr. 9532-34 (Seidle, Taylor). Part of the problem was specifically attributed by the Staff to deficiencies on the part of B&R personnel in management-level positions (Tr. 9522-23 (Taylor)). Mr. Seidle indicated that the inadequate communication and poor feedback from management to field personnel on actions initiated by them led to a perception that there was too little support for QC personnel (Tr. 9519-21 (Seidle)).

112. The Staff's Shewmaker panel also concluded that lack of detailed involvement by HL&P in the construction activities was a major reason behind the problems. The principal failure was not inadequacy of the written QA/QC program but in its implementation. Shewmaker, *et al.*, ff. Tr. 9576, at 7-9, 49. Inexperience in nuclear construction made HL&P rely too much on its contractor in carrying out QA commitments and caused HL&P management to become too involved in attention to details, to the neglect of evaluation of the total operation. Other important factors included production pressures, separation of management from the site operations and turnover in key personnel. Tr. 9864, 9936-40 (Hayes, Shewmaker, Phillips).

*(3) Extent to Which HL&P Abdicated Responsibility*

113. In CLI-80-32, *supra*, the Commission posed the question whether HL&P had abdicated too much responsibility for construction to B&R. According to the Commission, abdication of responsibility could form an independent and sufficient basis for revoking or denying a license on grounds of lack of competence or character of the licensee or applicant. 12 NRC at 291. HL&P's historical record on this question is the subject of Issue A(3) (*see* Finding 13). For convenience, we have evaluated under this issue the extent to which HL&P abdicated responsibility for construction of the STP to B&R, without regard to remedial steps. We are considering the effectiveness of remedial actions taken by HL&P separately in addressing Issue B.

114. Several Staff witnesses addressed Issue A(3). Mr. Seidle testified that the NRC holds HL&P responsible for development and implementation of a viable QA/QC program. HL&P is authorized to delegate the authority for conducting the program to its contractors and subcontractors, but cannot delegate the responsibility. He observed that: "perhaps they abdicated some of the responsibility, not so much at the highest levels of management, but perhaps at the field level" (Tr. 9506 (Seidle)). His contacts with corporate managers convinced him that they were responsive and totally committed to quality assurance and quality control, but that their management controls down to the worker level were not working effectively. He did not see any effort by the licensee or its contractors to orchestrate anything that would be anti-QA/QC. Mr. Taylor, Mr. Crossman and Mr. Phillips attributed much of the problem to lack of experience in constructing nuclear facilities. Tr. 9505-12, 9516-17 (Seidle, Taylor, Crossman, Phillips). There are differences in QA/QC requirements for construction of nuclear and non-

nuclear facilities (*e.g.*, Tr. 9509-10 (Crossman); Tr. 9864 (Hayes); Tr. 9890 (Shewmaker); Tr. 9939-40 (Phillips)).

115. The Staff Shewmaker panel (identified at Finding 19, *supra*) testified that HL&P relied too much on B&R in implementing the QA/QC program and inadequately followed up on surveillance and audit findings relative to that program. It concluded that HL&P did not take responsibility for the QA/QC program at the site and did not assure that the program there was proper. Shewmaker, *et al.*, ff. Tr. 9576, at 35-37. Mr. Hayes stated that part of the reason for program weaknesses was HL&P inexperience. He found the licensee to be responsible in its actions. Tr. 9829 (Hayes). Mr. Phillips elaborated on the basis for that finding in some detail and all other members of the panel agreed with his statements. *See, generally*, Tr. 9847-67.

116. The Staff Crossman panel (*see* Finding 19, *supra*) testified that during Investigation 79-19, HL&P admitted that it had failed to perform semi-annual audits of B&R site organizations and procedures and annual audits of B&R construction site activities, as required by the PSAR and HL&P procedures. It was this and similar findings that led the NRC to conclude that HL&P had abdicated too much responsibility for STP construction to B&R. Crossman, *et al.*, ff. Tr. 10,010, at 30-31.

117. After 79-19, HL&P revised its auditing procedures to require direct observation of the work being performed. I&E Report 80-27 concluded that HL&P had developed a matrix to assure that all procedures would receive proper consideration in planning audits. A 1981 I&E Report (81-07) documented that HL&P actually was performing effective audits at the prescribed frequency. Crossman, *et al.*, ff. Tr. 10,010, at 31; Staff Exh. 71 (I&E Rept. 80-27); Staff Exh. 92 (I&E Rept. 81-07).

118. HL&P President Jordan expressed the view that it would not be fair to state that HL&P abdicated its responsibility for STP to its contractors. He testified that HL&P was fully aware of the necessity for providing guidance and programmatic direction to its contractors. He indicated that HL&P recognized from the outset that nuclear construction required active participation by the owner and that HL&P had assigned highly qualified personnel in large numbers to manage the STP. Jordan, ff. Tr. 1224, at 8-9; Tr. 1389-93 (Jordan). With respect to this point, Staff witness Phillips testified that HL&P employed talented individuals and that the number of QA personnel on the site far exceeded the numbers that he was accustomed to seeing at other sites (Tr. 9516, 9939 (Phillips)). In fact, HL&P became so involved in project details that it was unable to take a broad view of the project and properly exercise its

management overview QA responsibilities. It could not see the forest for the trees. Tr. 9936 (Hayes); Tr. 9937 (Shewmaker).

119. Mr. Amaral, HL&P's expert witness on QA/QC organization, testified that in his judgment HL&P had not abdicated too much authority to Brown & Root (Tr. 1920-21 (Amaral)).

120. Mr. Oprea indicated that HL&P had not at any time abdicated its responsibility for QA at the STP, but had always recognized that responsibility for the QA program rested with HL&P. Over the years, HL&P management had become more involved in the project and more sensitive to the importance of its QA program. This involvement increased steadily over time from the beginning of the project, with HL&P forcing actions to be taken and becoming more involved in decisionmaking. He indicated that this increased involvement resulted in progressively closer supervision of the contractor by HL&P, which he explained was consistent with trends throughout the utility industry in general over the past several years. Oprea, *et al.*, ff. Tr. 1505, at 49-50; Tr. 5457-62 (Oprea). The increasing HL&P involvement from late 1980 on was confirmed by Mr. Goldberg (Tr. 10,488 (Goldberg)).

121. The record contains many examples of the exercise by HL&P of licensee responsibility in managing the STP. One such example is found in its reporting of deficiencies under 10 C.F.R. § 50.55(e). That regulation requires that the holder of a construction permit must notify the NRC of each deficiency found in design and construction which, if uncorrected, could adversely affect safety of operations. The history of HL&P's reporting under that regulation is summarized in Appendix C of testimony by the Crossman panel. Crossman, *et al.*, ff. Tr. 10,010, at 51-52 and Appendix C. Mr. Phillips, the Resident Reactor Inspector, reviewed the HL&P system for reporting those deficiencies and fifty-eight files of reports covering the period April 26, 1977 to July 3, 1980. He found that they contained objective evidence of timely evaluation of the items, and that "[t]heir record of identifying and reporting construction deficiencies, in accordance with 10 C.F.R. 50.55(e) was open and honest, and probably was better than any other utility that I've been at." Staff Exh. 92 (I&E Rept. 81-07, at 10); Tr. 9855, 10,068-69 (Phillips); Tr. 10,067 (Crossman); Staff Exh. 133 (I&E Rept. 81-37, at 6); *see also* Finding 158, *infra*.

122. Another specific example of HL&P exercising responsibility for the QA/QC program arises out of actions taken in response to the problem of low morale among QC inspectors. Mr. Oprea instructed Mr. Frazar to convey HL&P's concern to B&R, which was done through a strong presentation to a B&R QA executive board in January 1978. Mr. Frazar also instructed the HL&P QA staff to perform extra surveillance

during the following few months. That staff reported that B&R subsequently implemented several corrective actions, leading to improvements in the situation. This improvement was reported back to B&R in a subsequent meeting in May 1978. Oprea, *et al.*, ff. Tr. 1505, at 13-14; Tr. 5349-52, Tr. 5417-22 (Frazar, Oprea); App. Exhs. 44, 45.

123. Subsequently, in the summer of 1978, NRC officials from Region IV met with Mr. Turner and HL&P QA staff members to discuss concerns about the morale of B&R QC inspectors. In response, HL&P and B&R took several steps including: direction to the B&R Project QA Manager to spend more time in the field, increase in numbers of construction engineering personnel, changes in project procedures and increased HL&P surveillance of construction activities. Mr. Oprea testified that these changes, combined with those earlier in the year, appeared to improve the morale of QC personnel. Oprea, *et al.*, ff. Tr. 1505, at 15.

124. Yet another example of HL&P assuming responsibility for controlling activities of its contractors is the memorandum sent to B&R in the summer of 1979, expressing dissatisfaction with performance of the B&R site management. It detailed several specific deficiencies in management of STP construction and directed B&R to take corrective actions and report back to HL&P promptly. This stern document was sent after deliberation among HL&P managers and included a threat to consider other alternatives for completing the STP if B&R did not immediately show significant improvement in management, control and execution of its work. CEU Exh. 5; Tr. 5414-16, 5433-37 (Turner). The B&R response, dated 9 days later, itemized corrective actions taken and planned by it (App. Exh. 43).

125. Still another example — not primarily motivated by QA/QC problems but nonetheless strongly representative of HL&P's assumption of responsibility for the project — is HL&P's discharge of B&R and its replacement of that contractor with Bechtel and Ebasco. HL&P recognized that STP might never be completed if B&R remained and took strong action as a result. Goldberg, *et al.*, ff. Tr. 10,403, at 5-7; Tr. 10,413-18, 10,459-60, 10,467-69, 10,485-86, 10,521 (Goldberg). One Staff witness characterized the replacement of B&R as "a testimony to [HL&P's] character" (Tr. 10,082 (Hall)).

*(4) Extent to Which HL&P Failed to Keep Knowledgeable*

126. Another key question posed by the Commission in CLI-80-32 for review in this proceeding is "whether the facts demonstrate an unacceptable failure on the part of Houston to keep itself knowledgeable

about necessary construction activities." The Commission observed that: "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." 12 NRC at 291. The Board established Issue A(4) (*see* Finding 13) to examine the extent to which HL&P failed to keep itself knowledgeable. For convenience, we will evaluate that question here and will consider the effects of remedial actions taken by HL&P under Issue B.

127. Mr. Jordan did not feel that it was fair to state that HL&P failed to keep itself knowledgeable about STP activities. He and Mr. Oprea had communicated frequently and there had been nothing to indicate that there was a significant problem in QA/QC. The frequency of those meetings increased, as complexity of the project grew, to become daily occurrences. At the time of Mr. Jordan's testimony in May 1981, there were weekly HL&P management meetings which included updating of company executives on the STP situation by Mr. Oprea and Mr. Goldberg. In addition, Mr. Jordan met at the site at least once per month with the management committee, chief executives of each partner and B&R executives. He attended as many meetings as possible of the STP Management Committee, consisting of all the co-owners, and met periodically with B&R management to review the project status. Jordan, ff. Tr. 1224, at 8-10; Tr. 1261-66, 1372-75 (Jordan).

128. Mr. Jordan expressed the view that individual problems at the STP had been addressed adequately, but that there had been a lack of trending which might have indicated the deeper problems sooner. At the time of his testimony, he received more reports on STP activities and spent more personal time on the subject than ever before. He conveyed his intent to continue to stay in touch with other company officers concerned with the project, especially Mr. Oprea and Mr. Goldberg. In addition, he will receive regular written reports from the contractor and HL&P staffs, continue to attend meetings of the STP Management Committee and with contractor management, and will continue to attend significant hearings and proceedings related to the project. Jordan, ff. Tr. 1224, at 10-11; Tr. 1445-52 (Jordan).

129. Mr. Amaral testified that, at the time of the Bechtel audit, there was too little management involvement in assuring quality construction, and management was not knowledgeable enough about QA/QC (Tr. 1748, 1850 (Amaral)). He attributed this largely to problems with long communication lines and concluded that it subsequently was solved by HL&P changes in organization, especially moving Mr.

Frazar to the site and having him report directly to Mr. Oprea (Tr. 1851, 1897-1901 (Amaral)). *See* Finding 96-98, *supra*. The excessively long communication lines in effect prior to Investigation 79-19, coupled with the lack of experience of HL&P management personnel, resulted in HL&P management's failing to grasp the significance of information provided to it and, as a result, not being adequately knowledgeable about QA/QC problems which were occurring. *See* Tr. 9859 (Phillips); Tr. 9936-37 (Hayes); Tr. 1850-51 (Amaral).

130. Mr. Oprea stated that HL&P had taken appropriate steps to keep informed of day-to-day conditions at the site. HL&P employees monitored construction and QA activities at the B&R engineering offices and on site and participated in many meetings and personal contact with the B&R staff. Knowledge gained by them was communicated to management through committee meetings, correspondence and verbal contacts. Oprea, *et al.*, ff. Tr. 1505, at 47-48.

131. He indicated that there had been a substantial amount of communication and that he had received a large volume of information, including audit reports and I&E reports. Mr. Turner had kept him informed on issues that he considered to be significant and, as late as October 1979, he had felt that he was adequately informed about activities at the project. Two or three months later, Investigation 79-19 disclosed additional information and he discovered that some drastic problems existed at the site, causing him to be "dumbfounded" because of the change in the project in only 2 or 3 months. Tr. 2238-42 (Oprea). Mr. Amaral explained that Mr. Oprea had been receiving reports on individual problems that were occurring, but that he had not been getting the causes of those problems. Mr. Oprea agreed with that assessment. Tr. 2238-43 (Oprea, Amaral); *see also* Findings 109, 137.

132. The Staff Shewmaker panel (*see* Finding 19) testified that HL&P failed to maintain adequate knowledge of site activities to assure that QC problems were being properly identified and effectively corrected. It attributed that situation to inadequate involvement and over-dependence on B&R. Mr. Hayes subsequently explained that by "lack of involvement" the Staff meant that HL&P did not stay informed in enough detail about activities at the site, problems identified there, whether they were being corrected and whether steps were taken to prevent their recurrence. Shewmaker, *et al.*, ff. Tr. 9576, at 42; Tr. 9952 (Hayes).

*(5) Summary of Significant Evidence on Competence and Character of HL&P, as Reflected in Issue A*

133. The concerns expressed by the Commission in CLI-80-32 about the history of the South Texas Project were described as: "relevant to the issue of the basic competence and character of Houston." Questions posed by the Commission (*see* Findings 113, 126) were presented within the context of the greater overall question as to whether HL&P lacked the competence and character to be granted operating licenses. Accordingly, the main thrust of the Commission's direction to this Board was to evaluate the competence and character of HL&P as an applicant for operating licenses. 12 NRC at 291; Finding 11. The several parts of Issue A were explored in detail in Findings 13-132. This group of findings summarizes information and views compiled during testimony on Issue A that in our opinion bear most directly on the competence and character of HL&P.

134. Mr. Jordan, President and Chief Executive Officer of HL&P, indicated that he was acutely aware that this Board had been instructed by the Commission to inquire into the adequacy of HL&P's managerial competence and character to complete and operate the STP and that those questions are extremely serious. He testified that HL&P was fully aware of the absolute necessity for providing guidance and programmatic direction to its contractors. He was deeply disturbed by the findings of Investigation 79-19, but felt that company management appreciates the magnitude of the task at STP and is equal to it. Jordan, ff. Tr. 1224, at 3, 7, 10-11.

135. He stated that there never had been any question as to HL&P's corporate integrity (Jordan, ff. Tr. 1224, at 3). In his view, integrity involved running a business in a straightforward, honest and nondevious manner that allows respect by self and others. He testified that it is fair to measure a corporation by how it obeys laws and how it performs with respect to its business charge. Tr. 1295-96, 1380 (Jordan).

136. As for competence, Mr. Jordan observed that the company's record in providing service to its customers in a rapidly growing region speaks favorably for its competence. He did not feel that results of the NRC investigation indicated or implied that there was a lack of competence in the corporation. Tr. 1291-92, 1447-48 (Jordan). He stated that some competent persons on the project hadn't performed as well as they might have, but that their rapid movement to develop cures upon discovery of problems was a credit to them and to the corporation (Tr. 1448-52 (Jordan)). He concluded that HL&P had had a substantial team all along, but that the present (May 1981) team was much larger and had more technical competence (Tr. 1300-01 (Jordan)).

137. Mr. Oprea testified that he views any violation of NRC regulations as serious and does not respond to them in casual or cavalier fashion (Tr. 5294-96, 5303-04, 5323-27 (Oprea)). His first reaction to the Show-Cause Order was shock because, although he had expected some noncompliances, he did not anticipate that degree of severity. Subsequently, he recognized that there was a need to examine the QA program thoroughly to make certain that the requirements of Appendix B were fully recognized, understood and embraced by all concerned. In retrospect, he felt that the Show-Cause Order had helped HL&P focus on need to improve the QA program. Tr. 5463-64, 5468 (Oprea).

138. Mr. Oprea stated that any malfunction in any part of his organization concerned him, but that an organization with over 3000 persons on site must expect to have isolated incidents. Throughout his years of experience, he has believed that problems should be solved promptly because even small problems may take on unreal proportions if allowed to smolder for a few weeks. Tr. 5471-74 (Oprea).

139. Mr. Oprea stated that, although the Show-Cause Order was very helpful to HL&P in initiating action, before Investigation 79-19 he already had been considering bringing in an outside party to audit the QA program. He testified that Bechtel and Mr. Amaral would have been brought in anyway for that purpose. Accordingly, they might have found the same information that came out of the NRC inspection, but perhaps at a slightly later date. Tr. 5464-68 (Oprea).

140. Mr. Oprea did not believe that there ever had been a breakdown in the QA program, even including Investigation 79-19 (Tr. 2229-30 (Oprea)). Mr. Phillips, Staff Resident Reactor Inspector, expressed a similar view (Tr. 9851-52 (Phillips); *see* Findings 86, *supra*, and 155, *infra*).

141. Mr Amaral, who led the Bechtel audit, stated that when Bechtel initially evaluated the STP, HL&P had enough or, if anything, more inspectors than would normally be employed for the amount of project activity. He indicated that when an inspection force becomes large one can suspect that problems exist in construction and that the extra inspectors were hired to attempt to solve them. This was the case at the STP. Tr. 1966-67 (Amaral). Mr. Goldberg observed that the excessive QC staffing level was in part the result of B&R's lack of experience. He characterized B&R's efforts as typical of a first-generation nuclear project and opined that B&R's performance would have been better had it been B&R's third or fourth such effort. Tr. 10,476 (Goldberg). *See also* Finding 118, *supra*.

142. Mr. Amaral testified that, before the Show-Cause Order, the QA/QC personnel in HL&P and B&R did not all possess the professional

credentials and experience desired for that type of work. At the time of the Bechtel audit, HL&P did not, in his judgment, have an adequate and experienced enough staff to provide programmatic direction for the project. He had recommended acquisition of qualified quality professionals and, as an interim step, that HL&P should acquire the services of an outside organization with the required expertise. Its personnel could be integrated into the HL&P and B&R organizations until permanent personnel could be obtained. That was done. Finding 212, *infra*; Oprea, *et al.*, ff. Tr. 1505, at 121-22; Tr. 1744-45, 1905, 2228-29 (Amaral).

143. Mr. Amaral stated that the written QA/QC program had met the requirements of Appendix B and would have been satisfactory if properly implemented. The problem was that it wasn't. Mr. Frazar agreed with that assessment. The modified program analyzed during a recent Bechtel audit did meet the requirements, including implementation, and could be classified as about the same as programs of other successfully constructed plants. Mr. Amaral stated, further, that some elements of the program were novel and should be looked at by others. Tr. 1917-20 (Amaral); Tr. 1792-1814 (Frazar).

144. Mr. Oprea did not have differences with the testimony and recommendations of Mr. Amaral concerning personnel. HL&P instituted several changes in accordance with those recommendations, including transfers of some personnel to different positions and additional training of others. Tr. 2236-38 (Oprea); Tr. 1932-40, 1996-2001, 2065-67 (Amaral).

145. Mr. Amaral felt that the attitude of Mr. Oprea and Mr. Turner was positive and could be characterized as a strong desire to overcome the QA problems (Tr. 1966 (Amaral)). His judgment was that Mr. Oprea wanted the best for the project and that his response to the Bechtel input was very satisfying. Most of the Bechtel recommendations had been implemented at the time of the hearing. Tr. 2247-48 (Oprea, Amaral).

146. The Staff's Seidle panel testified that HL&P was cooperative and diligent in correcting problems identified by NRC investigators (Seidle, *et al.*, ff. Tr. 9205, at 64). In response to Board questions, Mr. Seidle stated that in his contacts with HL&P management he could recall no case in which the managers with whom he dealt were not responsive and totally committed to quality assurance and quality control. He did not see any effort by the licensee or its contractors to orchestrate anything that would be anti-QA/QC. Tr. 9506-07 (Seidle). Initially, he had thought that the QA organization was receiving adequate backup from management, but general comments in allegations received by Region IV inspectors raised doubts in his mind. Those allegations led to

a meeting in August 1978, between NRC and HL&P management personnel to discuss the concerns, including alleged problems in the implementation of the site QA/QC civil program, QC inspector morale, and the adequacy of site QA/QC staffing. At the time of that meeting, B&R QA was understaffed by approximately nineteen or twenty persons and HL&P QA was understaffed by two persons. Mr. Seidle did not feel that there was anything contrived in the alleged lack of support, but that poor communication and inadequate feedback caused the perception among QC inspectors that management was not responding to their reports. Seidle, *et al.*, ff. Tr. 9205, at 27-28; Tr. 9277, 9518-21 (Seidle); Staff Exh. 9 (I&E Rept. 78-13).

147. Mr. Taylor's perception was that both HL&P and B&R desired to have a viable QA system, but were limited by lack of experience in nuclear construction. He did not detect any unwillingness on the part of HL&P QA personnel to do the proper things. Tr. 9507-12 (Taylor).

148. Mr. Phillips stated that HL&P management appeared to be dedicated to have not just a routine QA program but a model one. As set forth earlier (Finding 121), he viewed them as cooperative and probably the most open licensee that he had ever dealt with. He agreed with Mr. Taylor that inexperience was the factor that probably contributed most heavily to the problems. Tr. 9517 (Phillips).

149. The Board asked whether anyone on the panel had found anything in HL&P's responses to personnel changes that would reflect unfavorably on its corporate character or competence. Mr. Seidle and Mr. Crossman volunteered negative responses and no panel member disagreed. Tr. 9527.

150. In response to a Board question, Mr. Seidle stated that a review of the testimony and exhibits supporting it had suggested that the HL&P managerial systems might have been breaking down. HL&P's inability to control construction activity had made it appear that there might be a question of HL&P's managerial competence. Tr. 9539-40 (Seidle).

151. Mr. Hayes testified that the record of HL&P as disclosed during the 79-19 Investigation was "poor." Mr. Shewmaker and Mr. Phillips agreed with that evaluation. Tr. 9726-27 (Hayes, Shewmaker, Phillips). They indicated that they were not aware of any specific NRC statement or policy or regulation that defines the specific attributes to use in evaluating whether an applicant has the required "character" to be granted an operating license (Tr. 9740 (Hayes, Shewmaker, Phillips)). Mr. John W. Gilray, QA reviewer from the Office of Nuclear Reactor Regulation (NRR), also perceived HL&P's implementation of its QA program to have been "poor" and not in accord with the requirements of 10 C.F.R. Part 50, Appendix B (Tr. 10,704 (Gilray)).

152. The Shewmaker panel judged that HL&P's record was not sufficiently poor to conclude that it lacked the necessary managerial competence or character to be granted operating licenses. It indicated that lack of involvement by HL&P in construction activities was a reason for the problems observed, and attributed that to inexperience in nuclear construction rather than irresponsible corporate management. Further, no irreparable construction deficiencies were found in any of the construction already completed. Also, HL&P had shown a willingness to implement corrective actions. The panel indicated that although shortcomings in HL&P management of construction are relevant to, and probative of, how it will perform under an operating license, such prior behavior should not be determinative. Shewmaker, *et al.*, ff. Tr. 9576, at 49; *see* Finding 248, *infra*.

153. Those observations led the Staff to the opinion that HL&P's record prior to Investigation 79-19 was insufficient by itself for the Staff to conclude that HL&P did not have the necessary managerial competence and character to be granted an operating license. Further, assuming implementation of the remedial steps ordered by the NRC and proposed by HL&P, the Staff believed that the STP would be in compliance with the NRC requirements for an operating license. Shewmaker, *et al.*, ff. Tr. 9576, at 49-50.

154. In response to questions about the reasons for reaching that conclusion, Mr. Phillips explained that it was the result of a complex evaluation process, on which he subsequently elaborated as summarized in Findings 155-163, *infra* (Tr. 9848-51, 9875 (Phillips)).

155. Mr. Phillips indicated that there had been failures to meet, maybe, eleven of the eighteen criteria in Appendix B, but that there had not been a total breakdown in the QA program. The panel considered all of the nonconformances reported in 79-19 (*see* Finding 70, *supra*) and concluded that none had been at a severity level that constituted being irresponsible and none had been deliberately caused by management. None had resulted in irreparable construction deficiencies. Tr. 9853-54, 9859 (Phillips).

156. Management had not been deceptive in any way during or after the inspection and was not unwilling to correct any deficiencies when pointed out. He concluded that the character of HL&P management was good because they demonstrated responsibility in several ways and tried to obey the Code of Federal Regulations. Tr. 9854 (Phillips).

157. HL&P often exceeded the minimum requirements and commitments that had been made to NRC. Mr. Phillips considered that to be another demonstration of its inexperience, causing it to do things to excess, just as in other instances lack of experience had led HL&P to fail

to perform entirely up to some requirements. His perception, based on dealing with HL&P daily as Resident Inspector, was that it sincerely wanted to build a quality nuclear facility and placed the health and safety of the public first. Tr. 9855 (Phillips).

158. HL&P's attitude was always good in assisting with NRC inspections or investigations. It provided the necessary information, even when detrimental to the company. Its record of identifying and reporting construction deficiencies under 10 C.F.R. § 50.55(e) was open and honest and probably was better than any utility that Mr. Phillips had ever seen. Tr. 9855 (Phillips); *see* Finding 121, *supra*.

159. HL&P had thought that its program was very good, until it learned differently during Investigation 79-19. Then, it took the extraordinary step of asking NRC Region IV for a meeting in December 1979, in which it proposed to take corrective actions for undesirable situations on which noncompliances had not even been formulated. In that meeting, it voluntarily decided to stop complex concrete pours until it could assess the situation, although noncompliances were not issued until April 30, 1980. Tr. 9855-57, 9859 (Phillips).

160. HL&P retained Bechtel in January of 1980 to conduct an in-depth audit of its QA program and Woodward-Clyde Consultants to investigate backfill conditions. It tried on its own, unsuccessfully, to investigate the allegations of harassment of QA inspectors and subsequently engaged a consultant to determine the reasons for recurring problems in that area. Tr. 9857-58 (Phillips).

161. HL&P conducted its own special audit immediately after completion of the onsite NRC investigation and identified additional deficiencies. It stopped welding in April 1980, and engaged a consultant to review that area. HL&P responses to essentially all NRC reports were responsible, good and cooperative, and were followed by corrective actions. Mr. Phillips indicated that all of those actions were voluntary, before issuance of Investigation Report 79-19, and he interpreted them as strong evidence of good character. Tr. 9858-59 (Phillips); *see* Finding 198, *infra*.

162. When it realized that its audit program was not functioning as effectively as it should and that the problem could be attributed to poor communications and separation of management from the site, HL&P moved to improve the situation by shifting key Houston management personnel to the STP site on a full-time basis. Also, Mr. Phillips testified that subsequently it was not unusual for Mr. Oprea to stop by his (Phillips') office and inquire as to whether any problems had been perceived by him. For one of the very top officials of the company to do that was interpreted by Mr. Phillips as positive evidence of corporate

character. Tr. 9860 (Phillips). Mr. Oprea stressed to the Board his willingness and desire to communicate with NRC about project developments (Tr. 1948-49 (Oprea)). *See also* Tr. 5229-30 (Oprea, Frazar). We also regard these expressions of intent by HL&P to represent a positive character trait.

163. Mr. Phillips stated that, for each failure in the program, he could identify many instances in which there were not failures (Tr. 9860 (Phillips)). Mr. Shewmaker followed up on that thought by pointing out that normal inspection reports tend to be negative, not listing everything that is correct although there normally are more compliances than noncompliances in site activities (Tr. 9861 (Shewmaker)).

164. Mr. Shewmaker indicated that, based on his observations, the attitude of high management of HL&P was to resolve problems as rapidly as possible. He viewed HL&P as willing and desiring to meet NRC requirements. HL&P officials frequently phoned him to ensure that their planned actions would meet NRC interpretations and intent of the regulations. Tr. 9861-63 (Shewmaker).

165. As stated earlier with respect to alleged false statements in the FSAR, there was no question of HL&P deliberately trying to confuse anybody or any willfulness on their part to include anything in the application that subsequently was not done in the field (Finding 32).

166. In response to direct questions by the Board, each member of the panel confirmed that he did not disagree with any of the comments of the other members, which have been summarized in Findings 154-165, *supra* (Tr. 9864-67 (Shewmaker, Hayes, Phillips)).

167. All members of the panel felt that their contacts with HL&P management were sufficient and at high enough management levels to be able to reach reliable conclusions about managerial competence and character in the organization (Tr. 9946-48 (Hayes, Shewmaker, Phillips)).

168. The panel indicated that HL&P personnel were very open and candid with them and gave full cooperation. HL&P did not exhibit any reservation about the role and responsibility of NRC in regulating the project. Tr. 9947-48 (Hayes, Shewmaker, Phillips). HL&P has been generally responsive to Staff inquiries and anxious to keep the Staff informed about project developments (Tr. 10,067, 10,075, 10,085-86 (Crossman, Phillips, Tapia)). This view of HL&P's openness and candor was confirmed by the report of NRC's Systematic Assessment of Licensee Performance (SALP) for the period July 1, 1980-June 30, 1981, which judged HL&P's responses to requests for information to be "timely and of good quality" and as demonstrating "achievement of su-

perior safety performance" (Category 1) (Staff Exh. 133 (I&E Rept. 81-37, at 2, 5)).

169. There was no evidence of attempts to cut corners to economize in construction activities at the site. To the contrary, HL&P was carrying out testing and other activities over and beyond the minimum requirements. Tr. 9949-50 (Phillips, Shewmaker).

170. Panel members agreed that the absence of irreparable construction deficiencies was not just a matter of luck. The procedures and QA program and efforts exerted resulted in most of the work being done properly and structures being well-constructed, with deficiencies only in some areas. Tr. 9957-58 (Shewmaker, Phillips, Hayes). Their concern had been that several weaknesses in the program had been identified and had persisted for some time. With more critical work about to be started, they felt that it was necessary for those weaknesses to be corrected. As regulators, they could not sit back and take a chance that the situation would straighten itself out, but had to ensure its correction. Tr. 9958-60 (Hayes, Shewmaker).

171. In response to Board questions, Mr. Hayes stated that failure of HL&P to stay informed in enough detail about activities at the site did not mean that from a technical point of view it was incompetent. He indicated that HL&P had the technical expertise to deal with each of the problems individually but lacked the experience to apply that expertise across the board to other activities as well. Tr. 9952-54 (Hayes).

172. Mr. Shewmaker did not think that one can totally separate experience from competence, but that experience is only one of a number of factors that must be considered in evaluating competence of the company. He cited a different factor as a positive example — the fact that HL&P realized in many instances that the best way to solve a problem was to bring in outside experts with a great deal of competence in the field. He expressed the view that an important management function is to recognize capabilities of the company organization and personnel and get additional resources when appropriate. Tr. 9954-55 (Shewmaker).

173. Mr. Phillips concurred with the views expressed by Mr. Hayes and Mr. Shewmaker. He pointed out that any professional person can do less than an adequate job at times in isolated instances, or can fail to take appropriate action, without being incompetent. That is the way in which he viewed the HL&P management situation — management had failed to maintain good communications, but was still competent. Tr. 9956-57 (Phillips).

*(6) Board Conclusions on HL&P's Character and Competence, as Reflected in Issue A*

174. The task assigned to this Board by the Commission of evaluating the character and competence of HL&P as a license applicant is rendered difficult by the lack of definitive criteria in NRC regulations, policies and decisions identifying the attributes of character and competence that constitute acceptable credentials for a license applicant. Accordingly, it has been clear throughout that we must consider very carefully all evidence compiled during the extensive hearings, including views of witnesses and participants about HL&P character and competence, and their reasons for holding those views, and then exercise our judgment in arriving at a decision. Findings presented above on Issue A distill the testimony to present its essence pertinent to the question before the Board. We now proceed to our conclusions about the character and competence of HL&P, based on our interpretation of those findings.

175. Examination of the findings for Issue A to evaluate character reveals that HL&P was cooperative, truthful, and straightforward in its dealings with the Staff. No instance was reported in which company personnel attempted to deceive or mislead. In no instance did the Staff find that HL&P withheld information because of potential adverse findings.

176. Staff witnesses stated that the company appeared to be dedicated to having a model program and often went beyond NRC requirements in its efforts to do so. It consistently was willing to accept NRC authority and requirements and was not unwilling to correct deficiencies when identified. In fact, during the 79-19 Investigation, HL&P initiated action to correct deficiencies even before 79-19 noncompliances had been issued. Immediately upon completion of Investigation 79-19, HL&P initiated its own further investigations, which disclosed other problems that it reported to NRC. There was no evidence of attempts to economize in construction at the expense of safety or quality.

177. Upon consideration of all of the evidence, the Board finds that the instances of noncompliance set forth in the Notice of Violation and the Order to Show Cause are insufficient to determine that HL&P does not have the necessary character to be granted licenses to operate the STP.

178. Turning to competence, we view that term to include both the qualification and training of project personnel and the experience of those personnel in activities comparable to that under consideration here — *i.e.*, the construction of a large nuclear plant.

179. A review of all of the testimony on Issue A indicates clearly that the STP program before and during Investigation 79-19 possessed deficiencies, as evidenced by inspection reports, noncompliances issued

by NRC and testimony presented to the Board by the many Staff and HL&P witnesses. However, none of the noncompliances was at the level of a "violation," which would have indicated that the function or integrity of a safety system was lost. None resulted in irreparable structural defects. None resulted from deliberate management actions or encouragement to avoid compliance with NRC regulations or to economize on facility cost at the expense of safety or quality of construction.

180. The weight of the evidence convinces us that STP construction to which our attention was directed has been accomplished, for the most part, using sound procedures and has produced good quality structures meeting or exceeding applicable safety requirements. We conclude that successful execution of those complex activities over several years was not the work of a totally incompetent organization. Nor, as pointed out by a Staff panel, can it be attributed to mere luck (Finding 170). The testimony of outside and Staff experts is convincing that deficiencies described in the inspection reports and noncompliances were exceptions rather than the rule on the project (Finding 163). These observations must not be construed as an attempt on our part to minimize either their importance or the vital need for HL&P to avoid similar errors and problems in the future. There is no denying that the errors found on this project have been too many and too serious to allow them to continue without strong regulatory action. That notwithstanding, it is important that we distinguish between errors committed by competent personnel and incompetence itself (Findings 171-173).

181. In spite of detailed probing in extensive cross-examination and by the Board in its questioning, not one witness expressed the view that the past record of HL&P demonstrated that its managerial competence was inadequate to receive operating licenses. To the contrary, those witnesses expressing a view on the subject concluded that, even without considering the remedial actions to be discussed in Issue B, HL&P did have the required competence. We note, however, that with respect to one aspect of competence — experience in constructing large nuclear plants — both HL&P and B&R demonstrated important deficiencies.

182. Based on careful evaluation of all of the testimony, the knowledgeability and demeanor of HL&P witnesses, and conclusions of Staff witnesses who participated in detailed investigations and inspections of HL&P and its contractors, we are convinced that the noncompliances found before and during Investigation 79-19, although reflective of deficiencies in experience (one component of competence), and although indicating that HL&P's competence was questionable in this one respect, do not demonstrate inadequate organizational competence of HL&P.

Instead, we view them as problems arising from various reasons discussed in many of the above findings, but especially lack of experience in nuclear construction, inadequate involvement of management in activities at the STP, and an excessively long chain of command between QA/QC inspectors at the site and upper management. Moreover, where particular personnel proved inadequate to their assigned tasks, they were replaced or transferred to other tasks more suited to their capabilities. To that extent, HL&P took steps to mitigate the prime area of competence in which it was weak.

183. Accordingly, the Board finds that the instances of noncompliance set forth in the Notice of Violation and the Order to Show Cause, although demonstrating a weakness in one aspect of competence, are insufficient to determine that HL&P does not have the necessary managerial competence to be granted licenses to operate the STP.

184. With respect to the question of abdication of authority, the Board finds that in some instances HL&P left too much responsibility in the hands of B&R for certain phases of the STP program. Based on evidence presented in this proceeding, we find that the lapses in project control reported by the Staff were not caused by lack of either technical competence or of a sense of responsibility on the part of HL&P. The principal reasons for those failures were based on lack of experience in management of nuclear construction and poor communications brought about by an excessively long chain of command between field QA/QC personnel and corporate management in Houston (Findings 95-98, 106-112). In other instances, the utility exerted clear and forceful control over its contractor, as illustrated by examples cited in Findings 121-125. As set forth in Finding 96, HL&P recognized its lack of experience and the excessively long chain of command and took steps to remedy those deficiencies. (*See* Issue B, *infra*, for our evaluation of those steps.)

185. The evidence dealing directly with competence and character, summarized in Findings 133-173, included consideration of the question of abdication of authority. Based on that evidence, the Board finds that the instances in which too much authority was left to B&R resulted primarily from HL&P's lack of experience and are insufficient to determine that HL&P does not have the necessary managerial competence or character to be granted licenses to operate the STP.

186. With respect to the failure of HL&P to keep itself knowledgeable about construction activities, the Board finds that, prior to the 79-19 Investigation, there was too little management involvement in the site program and that management was not sufficiently knowledgeable about QA/QC activities (Findings 126-132). Management received much factual information about construction activities but often was unable to

evaluate it properly and in a timely fashion. Based on the record in this proceeding, we conclude that this situation also was caused by inexperience in nuclear construction and poor communications because of an attenuated chain of command between the site and upper echelon management in Houston. Through hiring of new personnel and organizational modification, however, HL&P took steps to alleviate these deficiencies. We will evaluate those steps under Issue B.

187. The evidence dealing directly with competence and character, summarized in Findings 133-173, included consideration of the knowledgeability of HL&P management about construction activities. Based on that evidence, the Board finds that the instances in which Houston management did not keep itself adequately knowledgeable reflect a defect in competence which, if not remedied, would raise serious questions of HL&P's eligibility for operating license; but that, taking into account the fact that corrective actions were taken (but without regard to the effectiveness of those corrective actions), the instances are insufficient in themselves to support a determination that HL&P does not have the necessary managerial competence or character to be granted licenses to operate the STP.

### *Issue B: Adequacy of HL&P's Remedial Actions*

188. Issue B states:

> Has HL&P taken sufficient remedial steps to provide assurance that it now has the managerial competence and character to operate STP safely?

189. As background for Issue B, the number, types and severity of program deficiencies are vitally important in evaluating competence and character of the company and could result in denying an operating license if found to be sufficiently serious or incurable. The Board has studied that aspect of the matter under Issue A and has determined that the deficiencies were insufficient in themselves (considering number, types, and severity) to determine that HL&P does not have the necessary competence and character to be granted licenses to operate the facility, particularly given the willingness and practice of HL&P to adopt corrective actions for perceived deficiencies. *See* Findings 35, 87, 177, 183, *supra*.

190. An equally important consideration in evaluating company competence and character is the adequacy of its responses to observed deficiencies and of steps taken by it to remedy them. HL&P responses and several remedial steps taken by its management have been outlined

in our earlier findings on various subparts of Issue A and in our evaluation of HL&P's competence and character based on Issue A questions. In considering Issue B, we will occasionally refer to those earlier findings and supplement them with information on additional remedial steps, the effectiveness of all such steps, and their significance in evaluating HL&P competence and character.

191. Board examination of the question of alleged false statements in the FSAR (Issue A(1)) has been summarized in Findings 14-34, *supra*. As set forth therein, our finding was that, with one exception which we regard as of little significance (Finding 25), the statements were not false when made; and, further, that there was neither intent by HL&P to deceive the Commission nor disregard for the truth. The remedial actions taken by HL&P, with the concurrence of the NRC Staff, included modifying some parts of the FSAR and changing certain QA procedures to bring field activities and FSAR commitments into agreement with each other. Those changes have been made. They also did not compromise the degree of protection of the public health and safety represented by the earlier FSAR commitments and construction procedures.

192. Noncompliances issued before Investigation 79-19 were summarized in Findings 51-64. Appropriate remedial steps were taken by HL&P in each instance, as documented by subsequent Staff inspections describing the actions and ultimately closing the record on each noncompliance. Staff witnesses testified that HL&P was responsive and followed up promptly and actively on the identified problems and sought other problems where they existed. They were cooperative and open in their dealings with NRC personnel. *See* Findings 58, 61, 168, *supra*.

193. Findings 122-124 describe examples of remedial actions taken by HL&P to correct deficiencies in B&R conduct of construction activities at the site. In each instance positive results were reported to result from those actions. With B&R no longer serving as construction contractor, the specific procedures and other corrective actions adopted by B&R are no longer in effect; but HL&P intends to assure that the root causes underlying the changes it brought about in the B&R program will be adequately considered by the replacement contractors. Tr. 10,458-59 (Goldberg); Finding 125; *see also* Staff Exh. 131 (I&E Rept. 81-36, at 6-7); Tr. 10,090-93 (Phillips, Crossman, Hubacek).

194. Mr. Seidle testified for the Staff that after a meeting between HL&P and NRC, in August 1978, to discuss morale of B&R QC inspectors, management was more responsive to complaints and more accessible to personnel on site. An inspection in the fall of 1979 showed several improvements in access of site personnel to upper management,

feedback from management to field personnel and the overall working relationship between QA/QC and construction personnel. Tr. 9547, 9558-59 (Seidle); Staff Exh. 27 (I&E Rept. 79-13, at 27-28).

195. In a meeting on preliminary findings from Investigation 79-19, held on December 21, 1979, HL&P was informed by NRC personnel that there were serious problems in the QA/QC program and construction practices for concrete placement and that QC inspectors had experienced harassment. On December 28, 1979, HL&P voluntarily committed to stopping placement of safety-related concrete and executing a nine-point program to correct conditions found by the Staff in its inspection. Details about those commitments were outlined by Mr. Frazar. Oprea, *et al.*, ff. Tr. 1505, at 20, 78-80; *see* Finding 159, *supra*.

196. In early January 1980, HL&P assigned additional people from Houston to the STP site to make them more directly and visibly involved in work there and to support the continuing NRC investigation. Oprea, *et al.*, ff. Tr. 1505, at 79-80; App. Exh. 1; Tr. 2226-27 (Oprea). *See* Findings 83, 96, 162, *supra*.

197. In the NRC exit interview for the special investigation on January 24, 1980, HL&P was informed of further details of noncompliances related to welding, nondestructive examination (NDE), backfill activities and QA program deficiencies. Within 2 weeks, in response to this information, HL&P committed to further actions to improve conditions at STP, including: improved trending of nonconformances, revised audit activities, improved training, changes in the welding, NDE and backfill placement programs, and an independent audit of the QA/QC program by an outside consultant, to be conducted at least every 18 months. NRC subsequently was advised of progress on those changes. Oprea, *et al.*, ff. Tr. 1505, at 21-23, 80-83; App. Exh. 3.

198. Upon completion of the NRC onsite investigation, HL&P initiated its own special audit and identified additional deficiencies. A stop-work order on safety-related welding was issued by the B&R Power Group QA Manager on April 11, 1980. Saltarelli, *et al.*, ff. Tr. 7536, at 19; *see* Finding 161, *supra*.

199. After Investigation 79-19, HL&P revised its QA/QC auditing procedures. Reports on subsequent I&E inspections described improvements in this area. *See* Finding 117, *supra*.

200. When the NRC reported its preliminary findings from the special investigation in late 1979, HL&P management recognized the greater breadth and seriousness of the problems and increased movement that had been initiated earlier to retain a consultant to conduct an independent evaluation of the QA/QC program. Oprea, *et al.*, ff. Tr. 1505, at 18-19, 24-25, 119-26; Staff Exh. 48 (Licensee's Response to Order to

Show Cause), Exhibit 1; Tr. 1363-64 (Jordan); Tr. 2084-99, 2104-12, 5462-74 (Oprea).

201. After investigations and interviews of potential candidates, Mr. Oprea, with concurrence of Mr. Jordan, determined that Bechtel Corporation had the required capabilities and experience to undertake an outside independent audit of the HL&P QA program. In January 1980, Bechtel was retained for that purpose, under direction of Mr. Amaral. It was virtually given a "blank check," as described by Mr. Oprea, in conducting the study and making recommendations concerning the program. Mr. Amaral testified that his organization received good cooperation from HL&P and B&R personnel during the audit and that no pressures were placed on them with respect to how the audit should be conducted. Oprea, *et al.*, ff. Tr. 1505, at 23; Tr. 1364 (Jordan); Tr. 1844-47 (Amaral); Tr. 2084-88, 2251-55 (Oprea); *see* Finding 93, *supra.*

202. The Bechtel Report identified six "root causes" for deficiencies in the QA program. The underlying root cause was perceived to be lack of visibility and participation by management, much of which could be attributed to communication problems between field personnel and upper management. HL&P and Staff witnesses agreed with that diagnosis. Much of the HL&P remedial program thereafter was based on correcting the root causes identified in the Bechtel Report. The knowledgeability of management about STP activities and flow of information from field to management and feedback to the field personnel improved thereafter. *See* Findings 94-98, 104, 108-112, 127, 129, 143, *supra.*

203. Upon issuance of I&E Report 79-19, the Notice of Violation and Order to Show Cause on April 30, 1980, Mr. Frazar was assigned responsibility for investigating the twenty-two items of noncompliance and responding to the Notice of Violation. On May 23, 1980, HL&P responded to the Notice of Violation, admitting to the noncompliances and identifying six areas to which problems in the QA program could be traced and in which improvements would be made. Oprea, *et al.*, ff. Tr. 1505, at 25-28, 54-55, 84; Staff Exh. 47 (HL&P Response to Notice of Violation); *see* Findings 71-74, 94, *supra.*

204. Subsequently, Mr. Briskin directed an expanded task force in analyzing and responding to eight of the ten items addressed specifically in the Order to Show Cause. Mr. Frazar and the QA group were assigned responsibility for responding to two items concerning QA activities. Item No. 1 required that HL&P utilize an independent expert consultant to evaluate management of the QA program and consider several specific alternatives for future QA program organization. Bechtel was assigned responsibility for carrying out that analysis. HL&P's response to NRC on those matters is presented in the Licensee's Response to Order to

Show Cause (Staff Exhibit 48) and contained commitments for corrective actions to be taken by HL&P. Additional commitments were made by HL&P during a public meeting in Bay City on August 19, 1980 (Oprea, *et al.*, ff. Tr. 1505, at 73-74).

205. Mr. Briskin's testimony, updated through May 8, 1981 (and introduced into evidence the following week), included a summary of 236 HL&P commitments and their status at that time — 210 had been closed in writing, another 8 closed verbally, 16 were ready for reviews, and 2 were not then ready for review. Procedures followed by the task force, its findings, and actions taken subsequently are discussed in testimony and cross-examination of Messrs. Oprea, Briskin, Frazar, and four panels testifying on backfill, concrete and welding activities. Oprea, *et al.*, ff. Tr. 1505, at 23-31, 36-49, 53-76 and separate "Show Cause Commitments" (dated May 8, 1981), 83-117; Pettersson, *et al.*, ff. Tr. 5796; Wilson/Kirkland, ff. Tr. 2697; Murphy, *et al.*, ff. Tr. 6327; Fraley, *et al.*, ff. Tr. 7241; Saltarelli, *et al.*, ff. Tr. 7536. Cross-examination and Board examination of these panels is at Tr. 1543-2298, 3360-3630, and 5063-5544 (Oprea, *et al.*); Tr. 5919-6137 (Pettersson, *et al.*); Tr. 2710-2896 (Wilson/Kirkland); Tr. 6329-6432 (Murphy, *et al.*); Tr. 7242-7505 (Fraley, *et al.*); and Tr. 7544-7817 (Saltarelli, *et al.*).

206. In response to Item 1 of the Order to Show Cause, Bechtel surveyed five NRC-specified alternatives for future QA/QC management organization and one additional alternative. Its report to HL&P described advantages and disadvantages of each alternative, emphasizing that origins of the problems were in the "root causes" identified in the Bechtel Audit Report and that the organizational structure was of lesser concern. The alternatives and recommendations of Bechtel and from the Management Analysis Corporation (MAC), another consultant retained by HL&P, were evaluated by Mr. Oprea, in consultation with Mr. Frazar. They then were reviewed with Mr. Jordan before reaching the final decision to adopt an alternative that was basically similar to the existing organization. The alternative selected included certain modifications in procedures, a strengthened HL&P role in the QA program at STP, and greater management involvement in STP activities. Some of the specific changes that were made are outlined in Findings 208-214, *infra*; Oprea, *et al.*, ff. Tr. 1505, at 31-33, 120-26; Staff Exh. 48 (Licensee's Response to Order to Show Cause), Exhibit 1 (Bechtel Report). As set forth in our Opinion (note 37, *supra*), because of the transition to Bechtel and Ebasco, the recommended organizational structure is not being followed.

207. Mr. Jordan testified that the causes underlying problems revealed by Investigation Report 79-19 indicated a need for management

improvements, especially expansion and restructuring of the QA/QC organization. He participated actively in discussions with Mr. Oprea and decisions concerning the QA organizational alternatives studied in the Bechtel report and in key changes in assignments of personnel. Jordan, ff. Tr. 1224, at 6-8 (Jordan). Details of those activities are discussed in findings that follow.

208. As part of the HL&P response to the Order to Show Cause, Mr. Jordan assigned Mr. Oprea, Executive Vice President and the company's most senior engineering-oriented executive, to full-time supervision of the company's nuclear activities. That had the effect of having Mr. Oprea devote almost all of his attention to the STP. Jordan, ff. Tr. 1224, at 7; Tr. 1270-73, 1318-19 (Jordan).

209. Mr. Jordan approved creation of a new position — Vice President, Nuclear Engineering and Construction, reporting to Mr. Oprea — and actively participated in recruiting Mr. Jerome H. Goldberg to fill it. Mr. Goldberg was first contacted by HL&P in August 1979, but did not begin serious negotiations (because of his own unavailability) until the spring of 1980. He joined HL&P in October 1980. Mr. Goldberg added significantly to HL&P's capability because of his 26 years' experience in nuclear engineering, including 17 years as a manager. He was a former vice president of Stone and Webster. Jordan, ff. Tr. 1224, at 8; Tr. 1270, 1273-74, 1317, 1319-25 (Jordan); Tr. 859-60, 910-39, 944 (Goldberg); Goldberg/Frazar, ff. Tr. 906, at 3-4; Tr. 9527 (Crossman).

210. Mr. Jordan agreed with Mr. Oprea about the need for stronger QA/QC organizations in both HL&P and B&R and approved moving the head of the corporate QA department to the STP site with full-time responsibility for the Project, reporting directly to Mr. Oprea. This shortened the chain of command by eliminating four layers of QA supervision between the onsite supervisor and Mr. Oprea, giving closer management supervision and greater independence of QA from construction scheduling and costs. Jordan, ff. Tr. 1224, at 7; Tr. 1897-1901 (Amaral); *see* Findings 96-97, *supra*.

211. Mr. Jordan testified that HL&P was actively searching for a Vice President of Nuclear Operations to serve under Mr. Oprea and take over preparations for that phase of the program as soon as feasible. That since has been accomplished through employing Mr. Dewease (*see* Finding 230, *infra*). Brown & Root employed an experienced replacement to head up its QA group. Mr. Jordan testified that HL&P had not attempted to replace its Corporate QA Manager because of confidence in the abilities of Mr. Frazar. Subsequently, a new Corporate QA Manager for STP and a new Project QA Manager have been employed, and

Mr. Frazar was moved into another position in the company. *See* Findings 213, 252, *infra*; Tr. 1444-45, 1454-56 (Jordan); Tr. 1768 (Oprea).

212. About fifteen or sixteen persons from the Management Analysis Corporation (MAC) were brought into the HL&P and B&R organizations to fill QA/QC needs. Those additions allowed 100 percent attainment of Bechtel's recommendations to HL&P concerning the strengthening of the qualifications of QA/QC personnel, as an interim move until permanent qualified and experienced personnel could be recruited for the positions. Mr. Amaral's recommendation to Mr. Oprea to strengthen the Corporate QA Manager position was initially fulfilled by adding a MAC employee, Mr. Zwissler, to serve as backup for Mr. Frazar until a new site QA Manager could be recruited. Oprea, *et al.*, ff. Tr. 1505, at 121-22; Tr. 1766-69, 1786-91, 1901-07, 2069 (Amaral, Frazar). (As set forth in Findings 211 and 213, that recruitment has been accomplished.)

213. Mr. Oprea later identified Mr. James E. Geiger as the new employee who was to head QA for the STP. Mr. Geiger has 22 years of QA experience, including employment by Bechtel as QA Manager for the San Onofre Project. Mr. Geiger was later promoted to Corporate QA Manager for STP and was replaced as Project QA Manager by Mr. Al Walker, who had had 9 years' QA/QC experience in nuclear plant construction. Oprea, *et al.*, ff. Tr. 1505, at 42; Tr. 5063-66, 5378-83 (Oprea); Geiger, *et al.*, ff. Tr. 10,580, at 1-3; Tr. 10,583 (Geiger).

214. The involvement of HL&P and B&R senior executives in STP QA activities was enhanced by increasing their participation in meetings and increased review of reports on STP QA activities. Also, the depth of HL&P reviews of B&R QA activities was increased, and enhanced programmatic direction was provided at all levels. Oprea, *et al.*, ff. Tr. 1505, at 41-47; *see* Findings 108, 110, 127-128.

215. HL&P also took steps to enhance the QA abilities of senior officials who retained responsibility for STP and to reinforce management attitude toward quality. In 1980, Messrs. Jordan and Oprea (as well as a number of B&R officials and employees) attended a seminar on the elements of a good QA program sponsored by Mr. Philip Crosby, a noted QA consultant. Jordan, ff. Tr. 1223, at 10; Tr. 1279-80 (Jordan); Broom/Vurpillat, ff. Tr. 3646, at 47; Tr. 1706-13 (Amaral).

216. Mr. Amaral stated that HL&P had diligently pursued staff upgrading and was aggressively pursuing personnel. He indicated that there were some pretty tough spots to fill and that HL&P was doing a "herculean" job at trying to catch up. Tr. 1761-64 (Amaral). According to him, the most recent Bechtel audit indicated that HL&P did have ade-

quate and competent enough staff to provide programmatic direction at the STP. Tr. 2229 (Amaral).

217. Mr. Frazar testified that there is a corporate commitment to have an annual audit of the QA/QC program by some organization with qualifications similar to Bechtel. Mr. Oprea suggested that at some future time it might be preferable for the auditing organization to be one other than Bechtel to obtain a different viewpoint. Mr. Amaral agreed. Tr. 1942-44 (Frazar, Oprea, Amaral).

218. Mr. Jordan stated that the changes that were made in response to 79-19 were enhancing the role and visibility of HL&P and producing an organization of growing strength. He testified that he was spending more time on the STP and indicated his intention to continue his increased role in oversight of the project through consultation with company executives, participation in appropriate meetings, and close contacts with contractor executives. Jordan, ff. Tr. 1224, at 10-11.

219. Mr. Oprea testified that the corrective actions taken by HL&P will help prevent recurrences of the violations because those actions were directed towards correcting their root causes (Tr. 5365-68 (Oprea)). In addition, the more stringent position of HL&P management and pressure exerted by it in requiring effective actions in construction and inspection activities creates a positive attitude throughout the entire organization (Tr. 5375-76 (Oprea)).

220. Members of the Staff's Crossman panel reviewed the actions of HL&P on each noncompliance described in I&E Report 79-19 and the ultimate disposition of those items. They testified that all items were addressed by HL&P through appropriate changes in procedures, personnel, inspections, tests and formulation of commitments to NRC concerning future actions in management and implementation of the project. Disposition of each noncompliance is discussed more thoroughly in I&E reports cited by the panel, which describe NRC reviews and inspections of corrective actions subsequent to I&E Report 79-19, as well as the bases for decisions by NRC inspectors who concluded ultimately that the noncompliances should be considered closed. In each instance, it was determined that no threat to safety existed as a result of the noncompliance, that NRC regulations had been met through the corrective actions, and that reasonable bases existed for concluding that future performance of HL&P and its contractors could be expected to be consistent with all appropriate requirements. Crossman, *et al.*, ff. Tr. 10,010, at 7-35.

221. The Crossman panel also reviewed actions of HL&P in response to the ten directives listed in the Order to Show Cause. For each of those items, the Staff testimony summarized the nature of the problem

to be addressed, the steps taken by HL&P in response to the NRC directive, and results of the NRC inspections leading to closing of the item. More detailed information on the NRC review of HL&P actions and the bases for decisions to close the items are reported in specific I&E reports cited in the testimony. Crossman, *et al.*, ff. Tr. 10,010, at 35-50.

222. The broad scope of Investigation 79-19 had left thirty unresolved issues and seven open allegations requiring subsequent investigation. The panel reported that all of those matters had been addressed satisfactorily and closed. Crossman, *et al.*, ff. Tr. 10,010, at 51 and Appendix B.

223. The evidence presented before the Board is convincing that the remedial actions taken by HL&P for deficiencies in the STP program were prompt, appropriate and (to the extent carried out as of the closing of the Phase I record) for the most part effective. Testimony of the witnesses and results of inspections and other staff observations indicate that there was no effort by HL&P to avoid responsibility for the problems and no unwillingness to initiate and carry out such actions as were necessary to correct them. To the contrary, HL&P management has energetically taken steps to correct unsatisfactory and undesirable situations and has exhibited an active desire to ensure quality construction and conformance with NRC requirements at the STP. On the other hand, the Staff's SALP evaluation for the period July 1, 1980-June 30, 1981, during which some of B&R's revised procedures were in effect, indicated that B&R was continuing to experience difficulty in effectively correcting deficiencies in a timely fashion (Staff Exh. 133 (I&E Rept. 81-37, at 5-6)) and, in that respect, was only "minimally satisfactory" (*id.* at 3). Further, during the evaluation period, there were continuing allegations of B&R harassment and intimidation of its employees (*id.* at 9). This report raises questions as to the adequacy of B&R's revised procedures.

224. The improvement in managerial competence of HL&P is most forcefully represented by two actions taken by HL&P shortly after Mr. Goldberg joined the company in October 1980. First, based on his extensive prior experience, Mr. Goldberg soon realized that there were serious engineering problems and, in January 1981, HL&P's executive management commissioned the Quadrex Corporation to study B&R's performance in that area (letter, Jack R. Newman to Licensing Board, dated

September 28, 1981; Tr. 2404-06, 10,460 (Goldberg)).[49] Second, he perceived other problems in B&R's performance and, as early as January 1981, recommended that HL&P study alternatives for either upgrading B&R's performance or carrying on the project with other contractors (Tr. 10,518, 10,520 (Goldberg)).

225. To some extent, HL&P's remedial actions included improved procedures under which B&R would carry out various activities, and improved procedures under which it would supervise B&R's QA/QC activities. Although the quality goals underlying the new procedures are to remain in effect, B&R's implementing procedures will not be used by Bechtel and Ebasco. Bechtel and Ebasco procedures for implementing their QA programs, not spelled out in this record, will be substituted. Tr. 10,458-59 (Goldberg); Staff Exh. 131 (I&E Rept. 81-36, at 6-7); Tr. 10,090-93 (Phillips, Crossman, Hubacek); *cf.* Finding 254, *infra*. Given the questions raised by the SALP report (Finding 223), together with the lack of any description of Bechtel and Ebasco implementing procedures (or any evidence as to their effectiveness), we find it necessary that the record be supplemented in Phase II in order to complete the record as to reasonable assurance of the effectiveness of current procedures.

226. The Board finds that, subject to the supplementation of the record in Phase II, HL&P has taken remedial steps which appear sufficient to provide reasonable assurance that it has the managerial competence and character to operate STP safely.

### *Issue C: Character and Competence to Operate the STP*

227. Issue C states:

> In light of (1) HL&P's planned organization for operation of the STP; and (2) the alleged deficiencies in HL&P's management of construction of the STP (including its past actions or lack of action, revised programs for monitoring the activities of its architect-engineer-constructor and those matters set out in Issues A and B), is there reasonable assurance that HL&P will have the competence and commitment to safely operate the STP?

228. HL&P presented its plans for the operation of the STP through a panel consisting of Jerome H. Goldberg, Vice President, Nuclear Engineering and Construction, HL&P, and Jerrold G. Dewease, Vice

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[49] The Quadrex Report itself states that the Quadrex review was initiated by HL&P in January 1981 (Quadrex Report (May, 1981), Vol. I, at 1-1). Although the Quadrex Report is not currently a part of the record of this proceeding, we take official notice of the foregoing date. 10 C.F.R. § 2.743(j).

President, Nuclear Plant Operations, HL&P (Goldberg/Dewease, ff. Tr. 10,548). This panel also sponsored into evidence various sections of Chapter 13 of the STP FSAR, as amended through Amendment 25, addressing HL&P's plans for operation of the STP (App. Exh. 56; Tr. 10,553 (Goldberg)).

229. The Applicants' witnesses both indicated that organizational changes were ongoing and that future changes were anticipated (Tr. 10,553-54 (Dewease, Goldberg)). Nonetheless, although operation of the STP is at least 4 years away, HL&P has made considerable progress both in defining the organizational structure that will ultimately be used to manage STP's operation and in filling key operating positions.

230. Mr. Dewease will oversee the nuclear plant operations staff. He will report directly to the Executive Vice President, as will the Manager of QA for Operations and the Director, Nuclear Fuels. Goldberg/Dewease, ff. Tr. 10,548, at 4. Based upon his past job assignments and testimony before this Board, Mr. Dewease appears to have appropriate qualifications to occupy the position of Vice President, Nuclear Plant Operations. He has approximately 23 years of professional experience, including 14 years of nuclear experience with the Tennessee Valley Authority in such positions as instrument engineer, assistant engineering supervisor, quality assurance supervisor and plant superintendent. In his most recent position prior to joining HL&P he was Assistant Director of Nuclear Operations for TVA in which he had responsibilities involving the plant operations staffs of four nuclear plants. He also was responsible for the TVA training center. Goldberg/Dewease, ff. Tr. 10,548, at 2-3.

231. The organization for plant operations is divided into four functional areas: operating, technical, maintenance and training. In addition, two other organizations, the radiation protection group and an administrative group, support the plant. Goldberg/Dewease, ff. Tr. 10,548, at 5-6; App. Exh. 56, FSAR, §§ 13.1, 13.4 and Fig. 13.1-2.

232. The operating section includes licensed operators and auxiliary operators to operate the reactors. It is estimated that this section will eventually consist of seventy-eight persons under the direction of the Operating General Supervisor. The Operating General Supervisor will hold a senior reactor operator (SRO) license for each unit. Six shift supervisor positions are planned for the operating section. Shift supervisors will hold an SRO license for each unit and their functional duties will be established prior to fuel load, emphasizing primary responsibility for safe operation of the plant. Goldberg/Dewease, ff. Tr. 10,548, at 6-7. Shift supervisors, when serving as the senior person on site, will have full authority to order plant shutdown in an emergency (Tr. 10,555

(Dewease)). Unit supervisors, who will also be licensed SROs, will report to shift supervisors and will be responsible for reactor operations command in the control room. Goldberg/Dewease, ff. Tr. 10,548, at 7.

233. As of March 1, 1982, HL&P had one Shift Supervisor, three Unit Supervisors and seventeen support personnel in the operating section. The Shift Supervisor and one of the Unit Supervisors who had been hired were previously licensed SROs on operating commercial nuclear power plants. At that time, the reactor operations personnel retained by HL&P were involved in writing system descriptions and/or operating procedures. Moreover, as systems are turned over to HL&P, these employees were to participate in preoperational testing. Goldberg/Dewease, ff. Tr. 10,548, at 7-8.

234. The technical section is under the direction of the Technical General Supervisor and is made up of four subgroups: reactor engineering; chemical operations, chemical analysis and results engineering (*id.* at 8). The reactor engineering group will consist of a lead reactor engineer and one reactor engineer for each unit. These positions have already been filled, two by persons with extensive nuclear experience and the other by an engineer with appropriate nuclear training. *Id.* at 8-9; Tr. 10,560-62 (Dewease). The reactor engineers are developing the core physics and thermal hydraulic testing programs to monitor core performance. In addition, they are developing the initial start-up test program, the onsite special nuclear materials accountability program and the new fuel receipt, inspection and storage procedures. Goldberg/Dewease, ff. Tr. 10,548, at 9.

235. The chemical operations group is to consist of forty-two persons, including a supervisor, six foremen, fifteen chemical operators and twenty operator trainees and auxiliary operators. As of March 1, 1982, HL&P had hired one chemical operations foreman, three chemical operators and four chemical operator trainees. The chemical operations group will be responsible for the operation of chemical process systems, demineralizer systems, radioactive waste processing systems and nonradioactive waste processing systems. Persons within this group have been utilized to write procedures and develop training materials. *Id.* at 10.

236. The chemical analysis group will ultimately consist of twenty-three people, including a supervisor, two lead technicians, a nuclear plant chemist and nineteen chemical technicians and monitors. As of March 1, 1982, this group consisted of a supervisor, lead technician and six chemical technicians. The chemical analysis group is responsible for plant chemistry and radiochemistry. Personnel within the chemical analysis group have been occupied in writing procedures, developing training

materials, conducting the preoperational environmental sampling program and providing chemical analysis support for hydrostatic tests. *Id.* at 10-11.

237. The results engineering group will consist of a lead results engineer and approximately eleven results engineers. As of March 1, 1982, HL&P had retained the lead results engineer and six of the results engineers. The lead engineer and one of those engineers have had nuclear experience. Two results engineers have completed the 30-week Westinghouse Reactor Operator Training course. *Id.* at 11-12. The results engineers prepare test procedures, perform tests and prepare test reports for initial start-up, maintenance and performance testing of plant systems. Results engineers will also develop solutions to problems and analyze equipment malfunctions in various plant systems. This group has been engaged in developing the programs to implement the various testing activities its personnel will be performing during start-up and eventual plant operation. *Id.* at 12.

238. The maintenance group is divided into four subgroups: electrical, mechanical, instruments and controls, and maintenance support. HL&P has made substantial progress in staffing these various subgroups, and the personnel hired have been performing preventive and corrective maintenance on the reservoir makeup pumping facility and meteorological tower equipment. The maintenance personnel will provide support for various start-up and operations functions. *Id.* at 12-14.

239. The training section is responsible for plant staff training activities and consists of three subgroups: operating training, simulator training and general training. The simulator training group will utilize a plant-specific simulator that, as of the close of the Phase I record, was on order and scheduled to be installed by mid-1983. A substantial number of the instructor positions within the training organization have been filled and those personnel are going to various technical schools and preparing course work. *Id.* at 15-16.

240. The radiation protection group will consist of thirty-three individuals, including one supervisor, two health physicists and thirty radiation protection technicians, monitors and trainees. As of March 1, 1982, HL&P had retained one supervisor and one health physicist. The supervisor has 30 years' experience in applied radiation protection in both the Navy and commercial nuclear power plants. *Id.* at 16.

241. Finally, an administrative group consisting of fifteen to twenty employees is envisioned to provide clerical and administrative support to the plant operations staff (*id.* at 17).

242. With respect to technical support from outside the operations group, HL&P is developing its own capability to perform non-LOCA transient analysis (*id.* at 17). In January 1980, Nuclear Services Corporation completed a study for HL&P to determine (in light of the experience at Three Mile Island) the requisite technical staff HL&P would require to provide in-house technical support during plant operation (*id.*). In this regard, HL&P's goal is to have an onsite staff technically capable of performing the design or design verification for all technical areas, especially those that are uniquely nuclear (*id.* at 18). Mr. Goldberg's engineering and construction organization will also provide technical support, as needed (*id.* at 4). In aid of that goal, HL&P has assigned twenty-six people to Bechtel in order to gain practical experience in the design activity associated with the STP so that HL&P may better maintain the plant after it is completed and is operating. For specialized areas, HL&P anticipates it will continue to employ outside consultant assistants. *Id.* at 18; Tr. 10,558 (Goldberg).

243. Taking into account the stage of construction of the STP, HL&P's overall staffing for the plant operation is well under way. Since 1977, when staffing began, over 100 persons out of approximately 450 for two-unit operation have been hired. Those people hired are performing various preoperational activities. In addition, before fuel is loaded at the STP, HL&P will conduct tests of the plant equipment and systems. A separate HL&P organization, designated as the Startup Group, has been established for this purpose. This group is already writing start-up test procedures. As each plant system nears completion, the HL&P Startup Group, along with HL&P Plant QA, Bechtel QA and Bechtel Engineering, will review the status of the system to determine what must be accomplished before the system will be ready for testing and operation. Goldberg/Dewease, ff. Tr. 10,548, at 20-22.

244. HL&P's plan for its shift organization is similarly well developed. A Shift Supervisor with an SRO license will be on site any time a unit is loaded with fuel. *Id.* at 29. Whenever he or she is the senior person on site, this supervisor will have total authority to shut down the plant (Tr. 10,555 (Dewease)). All personnel on shift are responsible to this individual. Reporting directly to him will be an organization for each reactor unit headed by a Unit Supervisor who has an SRO license and a Chemical Operations Foreman with associated staff. Each unit also will have two operators with RO licenses, a Radiation Protection Technician/Monitor and a Chemical Technician/Monitor. HL&P does not currently contemplate a Shift Technical Advisor (STA) in its shift organization but, rather, plans to provide for the expertise envisioned for an STA through increased training of its Shift Supervisors. Id.

however, in the future the NRC requires that a specific Shift Technical Advisor position be established, HL&P has committed to creating such a slot, possibly using an additional licensed operator (probably an SRO) for that purpose. Goldberg/Dewease, ff. Tr. 10,548, at 29-31; Tr. 10,557, 10,565 (Dewease).

245. Procedures are being drafted to limit access to the control room and to govern the turnover in personnel between shifts (Goldberg/Dewease, ff. Tr. 10,548, at 31). A Plant Operations Review Committee (PORC) has been established in accordance with technical specifications to advise the plant superintendent on matters important to safety. Among the activities conducted by the PORC are review of procedures, tests, changes to technical specifications and safety-related systems, technical-specification violations, 24-hour notification items, plant operations and the security and emergency plans. PORC procedures are designed to minimize the possibility of suppression of dissenting opinions regarding safety matters. *Id.* at 33-34. Moreover, there is a corporate level committee known as the Nuclear Safety Review Board (NSRB), with the function of reviewing matters such as proposed changes to procedures, equipment, systems, technical specifications and the operating licenses. The NSRB will further routinely audit various aspects of plant operations. *Id.* at 5, 34-35. Although HL&P has not considered whether a public representative should be included on this Board, and has received no requests for such representation, it indicated that the company has been disposed to allow public participation in other sensitive areas and, at the time of plant operation, would consider that question (Tr. 10,564 (Goldberg)).

246. HL&P's plans for the operation of the STP were addressed by the Staff through a panel consisting of Lawrence P. Crocker and Glen L. Madsen. Crocker/Madsen, ff. Tr. 10,721.[50] Mr. Crocker is the Section Leader, Management Technology Section, Licensee Qualifications Branch of the Division of Human Factors Safety, Office of Nuclear Reactor Regulation (NRR), NRC. He participated in the management and plant staffing review for operation of the STP. Mr. Madsen is the Chief of Reactor Project Branch 1, Region IV, NRC. He is responsible for inspection activities at the STP, including those activities relating to the transition program. *Id.* at 1-2, Professional Qualifications.[51] This panel submitted as evidence the Staff's Partial Safety Evaluation Report

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[50] The testimony of the Crocker/Madsen panel, together with earlier prepared testimony of Mr. Crocker and Mr. Frederick R. Allenspach (NRR) and the Staff's partial SER, were not presented orally but, by agreement of all parties, were stipulated into the record (Tr. 10,718-21).

[51] Mr. Allenspach (*see* note 50, *supra*) is within Mr. Crocker's section and assisted him during the management review.

(PSER) (NUREG-0780, dated April 1981) relating to the adequacy of HL&P's plans for the operation of STP (*id.*, Sections 13 and 17). The evaluation of management was made against the guidelines of NUREG-0731, and HL&P's management was found to be properly organized and prepared for eventual plant operations (*id.* at 13-1). The PSER was issued in response to CLI-80-32 (as well as to the earlier suggestion of this Board, set forth in our Memorandum dated March 10, 1980) and constitutes the Staff's evaluation as of April 1981. Future amendments will be included in the final SER. PSER at 1-1.

247. As a result of its review, the NRC Staff concluded that the Applicants' planned management and operating organizations meet the requirements of current NRC rules and regulations, are in conformance with NRC guidelines, and are acceptable to the NRC Staff. PSER at 1-1.

248. Management of facility construction at STP has been more complex, from an organizational standpoint, than management of plant operation is likely to be. This is so because, unlike construction, almost all operating personnel will be under HL&P's direct control rather than that of contractors. Further, the work force for plant operation is considerably smaller than for plant construction. Tr. 9896-99 (Hayes); Tr. 9903-04 (Shewmaker); Tr. 9906-08 (Phillips).

249. Taking the degree of organizational complexity for operation into account, and based on the testimony of the Goldberg/Dewease and Crocker/Madsen panels, together with cross-examination by the Staff and Board examination of the Goldberg/Dewease panel,[52] we conclude that there is now reasonable assurance that HL&P will have the competence and commitment to operate the STP safely. Because of the preliminary nature of the testimony on this issue, this finding is based on our expectation that the testimony will be updated prior to issuance of any Decision authorizing facility operation.

### *Issue D: Adequacy of Current Construction QA Programs*

250. Issue D, as admitted in the Second Prehearing Conference Order, *supra*, states:

> In light of HL&P's prior performance in the construction of the STP as reflected, in part, in the Notice of Violation and Order to Show Cause dated April 30, 1980, and HL&P's responses thereto (filings of May 23, 1980, and July 28, 1980), and actions

[52] Because of the preliminary status of the information presented, CCANP elected not to cross-examine the Goldberg/Dewease panel. Tr. 10,554.

taken pursuant thereto, do the current HL&P and Brown & Root (B&R) construction QA/QC organizations and practices meet the requirements of 10 C.F.R. Part 50, Appendix B; and is there reasonable assurance that they will be implemented so that construction of STP can be completed in conformance with the construction permits and other applicable requirements?

251. Subsequent to the admission of Issue D, and as a result of Brown and Root's replacement by Bechtel and Ebasco as engineering manager and construction contractor, respectively, the Board advised the parties that it would consider the adequacy of the construction QA/QC program as modified to reflect the new organizational developments. Fourth Prehearing Conference Order, *supra*, at 3-4. Issue D has therefore been modified by replacing the reference to "Brown and Root (B&R)" with "Bechtel/Ebasco."

252. The current QA/QC organization and program were presented by HL&P through a panel made up of James E. Geiger, Donald T. Krisha and Clyde L. Hawn (Geiger, *et al.*, ff. Tr. 10,580). At the time this testimony was offered, Mr. Geiger was the HL&P Project Quality Assurance Manager for the STP. His extensive QA/QC experience includes the position as Project QA Manager for San Onofre Units 1, 2 and 3. *Id.* at 1-3. As of July 1982, Mr. Geiger became the Corporate QA Manager for STP and was replaced as Project Quality Assurance Manager by Mr. Al Walker. Mr. Walker has 9 years' QA/QC experience in nuclear plant construction. Tr. 10,583 (Geiger). Mr. Krisha is the QA Manager for the Houston area office of Bechtel and is currently assigned as the STP Project QA Manager (Geiger, *et al.*, ff. Tr. 10,580, at 1). Mr. Krisha's QA/QC experience includes serving as Bechtel QA Manager/Domestic Projects, where he was responsible for managing the Bechtel QA activities at the Palo Verde, Vogtle and Rancho Seco Nuclear Generating Stations (*id.* at 4). Mr. Hawn is the Quality Program Site Manager for Ebasco Services, Inc. (Ebasco) at the STP (*id.* at 1). Mr. Hawn's QA experience includes holding such positions as Senior QC Supervisor, QA Supervisor, Quality Program Site Manager and QA Manager at WPPSS Nuclear Project Nos. 3 and 5, Laguna Verde, Waterford Unit 3 and the Tokamak Fusion Test Reactor prior to his assignment to the STP (*id.* at 6). This panel also sponsored into evidence App. Exhs. 55 and 55A, which provide a description of the quality assurance program currently being implemented at the STP (Tr. 10,582 (Geiger)).

253. The Staff presented John W. Gilray to testify on the adequacy of HL&P's current QA/QC organization and program for the balance of design and construction (Gilray, ff. Tr. 10,689). Mr. Gilray is the principal quality assurance engineer within the Quality Assurance Branch (QAB) of the Office of Nuclear Reactor Regulation (NRR), Division of

Engineering. Since the Show-Cause Order of April 30, 1980, Mr. Gilray has been the QAB reviewer responsible for the evaluation of changes in HL&P's docketed QA/QC program for design and construction to determine its acceptability. *Id.* at 1. Specifically, Mr. Gilray reviewed HL&P's most recent submittal to the Staff on March 9, 1982, being Revision 3 to its docketed QA program for the remaining design and construction activities at the STP (*id.* at 4-5). In addition, the Staff presented the testimony of Lawrence P. Crocker and Glen L. Madsen concerning the qualifications of Bechtel and Ebasco (Crocker/Madsen, ff. Tr. 10,721). *See* Finding 246, *supra,* for an identification of this panel.

254. HL&P's Revision 3 to its QA program describes three programs: the previously updated and Staff-approved QA program for HL&P, and the QA programs of the two recently assigned principal contractors, Bechtel and Ebasco. The revised HL&P portion of the QA program provides for an improved QA organization with increased authority and responsibilities for surveillance by HL&P personnel during the day-to-day design and construction activities. Gilray, ff. Tr. 10,689, at 5. Bechtel has committed to apply its Staff-approved quality assurance topical report BQ-TOP-1, Revision 3A, as modified in Part B of Revision 3 of HL&P's latest QA program for Bechtel's engineering, procurement, and construction management activities at the STP. Similarly, Ebasco has committed to apply its Staff-approved quality assurance topical report ETR-1001, Revision 10a, as modified in Part C of Revision 3 of HL&P's latest QA program for the quality assurance and quality control of Ebasco's construction services at the STP. *Id.* These topical reports are Bechtel's and Ebasco's descriptions of generic QA/QC programs that satisfy Appendix B criteria. These programs were then modified to conform to the plant-specific needs of STP. Geiger, *et al.*, ff. Tr. 10,580, at 9-11. The program commitments made by HL&P as a result of the Show-Cause Order have been carried into the current QA/QC organization and program, with modification necessary to accommodate the replacement of B&R by Bechtel/Ebasco (*id.* at 13-15).

255. Bechtel's organization for performing its QA function at the STP is under the direction of Bechtel's Los Angeles Power Division. Reporting to the Los Angeles Power Division Manager of QA is a QA Manager for the Houston area office. This manager provides technical and administrative direction to the STP Project QA Manager, who, with the assistance of higher levels of QA management, is responsible for assuring the satisfactory implementation of the Bechtel project quality program at the STP. The Bechtel STP organization consists of three sections reporting to the Project QA Manager: design QA, construction QA, and site QC associated with Bechtel's job site activities. The first

two of these sections are supervised by a project quality assurance engineer (PQAE) and the last section by a project quality control engineer (PQCE). *Id.* at 15-17.

256. The design PQAE is responsible for assuring the implementation of the quality program within the design office through review, surveillance, and audits of engineering and procurement activities. The construction PQAE is responsible for assuring that Ebasco and other contractors' construction activities comply with approved quality program and engineering requirements by surveillance of in-process and completed work, review of documentation, and audits for quality program compliance. *Id.* at 16-17.

257. This QA surveillance over construction is pursuant to Bechtel's construction manager role and represents an additional layer of QA review not present when B&R had both construction and construction manager roles (Tr. 10,619 (Geiger)). Moreover, HL&P will monitor Bechtel's surveillance over Ebasco (Tr. 10,622 (Geiger)). This is all in addition to Ebasco's primary obligation, as constructor, to have a QA/QC program that complies with 10 C.F.R. Part 50, Appendix B. Bechtel's site PQCE is responsible for performing QC inspections associated with Bechtel's job site activities; specifically, receipt, storage and maintenance of permanent plant items. The site PQCE is also responsible for verifying the effectiveness of the contractor's QC program by surveillance and redundant inspections of selected work activities which had previously been accepted by the contractor's QC personnel. The Project QA Manager, the PQAEs and the PQCE all have "stop work" authority over quality-related activities at STP. Geiger, *et al.*, ff. Tr. 10,580, at 17.

258. Bechtel QA is responsible for review and approval of Ebasco's QA/QC procedures and instructions (*id.* at 18). HL&P in turn will monitor Bechtel's approval of Ebasco's implementing procedures (Tr. 10,622 (Geiger)). Bechtel will also audit and monitor the activities and documentation of organizations and individuals involved in the implementation of the constructor's QA/QC program (Geiger, *et al.*, ff. Tr. 10,580, at 18). Bechtel management will be informed of QA/QC activities through audit reports, monthly trend reports, management staff meetings and an annual review meeting that covers the status of the QA/QC programs of the various Bechtel divisions and projects (*id.* at 18-19).

259. Bechtel's QA program is functionally divided into engineering, procurement and construction. Project engineering is responsible for all Bechtel engineering design work performed by and for the project and for checking and reviewing functions performed on the project. Procurement specifications for material and equipment are prepared by engineer-

ing and reviewed by QA for adequacy of specified QA program and documentation requirements. Procurement supplier quality (PSQ) performs a surveillance and inspection function over supplier activities and reviews completed supplier quality verification documents at the supplier's facility. The inspection of items received is performed by Bechtel's QC group at the construction site. QA monitors this process and performs audits and surveillances to assure effective implementation and has the authority to stop supplier work and shipments until required corrective action has been taken and verified. *Id.* at 19-21.

260. The Bechtel construction management organization is responsible for the overall construction program for the STP, including such functions as planning, scheduling, monitoring, and evaluating the Ebasco and contractor construction and QA/QC activities. Each contractor, including Ebasco, is held responsible for performing construction work within the scope of its contract in accordance with approved procedures and a quality program. Contractors are responsible for audits and surveillances of their respective work and QC activities. Bechtel QA is responsible for conducting audits, surveillances, and selected redundant inspections of the Ebasco contractor work and QA/QC activities. *Id.* at 21.

261. Ebasco's STP QA/QC organization consists of three basic groups: QA, QC, and Quality Records. Each of these groups is headed by a site supervisor who reports to the Quality Program Site Manager. The QA group is responsible for performing planned and scheduled audits of Ebasco activities, including the performance of trend analyses of nonconformance reports, and deficiency reports to identify any trends adverse to quality. The QC group is responsible for performing inspections and witnessing or performing examinations and tests of all Ebasco nuclear-safety-related construction activities. The Quality Records group is responsible for assembling documentation packages, verifying the completeness and accuracy of the records, providing adequate safeguards and retrievability of records while under Ebasco control, and for transmitting completed records to HL&P. *Id.* at 22-23.

262. HL&P will conduct a series of reviews of engineering, procurement, construction management, and construction activities to assure proper implementation of its contractors' QA programs. Initially, HL&P has reviewed and approved all aspects of the docketed QA/QC program. HL&P will also conduct a series of audits, surveillances and selective inspections to assure that the procedures of Bechtel, Ebasco, and other constructors not only accurately reflect regulatory requirements but are in fact being implemented. *Id.* at 24-25. In a selective inspection HL&P takes a plant component which has been previously in-

spected and approved by its contractor and performs a reinspection (Tr. 10,620 (Geiger)). In contrast, a surveillance of contractor's activity would involve the situation in which HL&P performs a QC function of ongoing work (Tr. 10,620-21 (Geiger)). HL&P will remain closely involved in the project through daily activities of its QA personnel, weekly meetings with Bechtel and Ebasco QA personnel and receipt of monthly trend reports. An annual independent assessment of the STP QA program will be conducted throughout the life of the project by an organization not involved in the project. Geiger, *et al.*, ff. Tr. 10,580, at 25-26.

263. The Staff review of Bechtel's staffing of key positions within its QA/QC organization indicated that persons with appropriate experience are being assigned (Crocker, *et al.*, ff. Tr. 10,721, at 7). The project QA Manager has 8 years of nuclear QA experience; the design office PQAE has 16 years of QA/QC experience; the construction PQAE has 17 years of nuclear QA/QC experience; and the site PQCE has 15 years of QA/QC experience (Geiger, *et al.*, ff. Tr. 10,580, at 30-31). Similarly, key persons within the Ebasco QA/QC program have had appropriate experience; the site QA supervisor has 11 years' experience in design, construction and QA of power plants and the site QC supervisor has 12 years' experience (*id.* at 32-33).

264. Accordingly, based upon the programs outlined above, it appears that HL&P, Bechtel, and Ebasco QA/QC organizations have the requisite independence from cost and scheduling in order to perform their functions (Tr. 10,632 (Geiger, Krisha)). All organizations report to upper level management off site (Geiger, *et al.*, ff. Tr. 10,580, at 13, 15, 22, and Figures 1, 2, and 3 attached thereto). The Staff performed a detailed review and evaluation of the HL&P program, including Bechtel's and Ebasco's QA programs, and concluded that these programs described the necessary requirements, procedures and controls that, when properly implemented, will comply with the requirements of Appendix B to 10 C.F.R. Part 50. Gilray, ff. Tr. 10,689, at 5-6. The Staff concluded that based upon past experience and association with Ebasco and Bechtel, both corporations are well-qualified in the activities they have been assigned at the STP. The Staff further found that based upon preliminary reviews both organizations are selecting individuals with considerable qualifications and experience to manage their responsibilities at the STP. Crocker/Madsen, ff. Tr. 10,721, at 7.

265. Cross-examination by the Intervenors of the Geiger panel and of Mr. Gilray did not elicit any evidence counter to the direct testimony of these witnesses. The cross-examination of Mr. Gilray served to elucidate some of the changes and improvements to the QA/QC program

which have occurred since issuance of the Show-Cause Order and assumption of responsibilities by Bechtel and Ebasco (Tr. 10,690-10,702 (Gilray)). In particular, we note that proficiency tests for QA/QC inspectors are not to be limited to oral or written tests but rather will also include physical demonstrations that the inspector can perform the inspections to which he will be assigned — a situation which did not always obtain under the B&R QC activities (Gilray, ff. Tr. 10,689, at 3; Tr. 10,697-98 (Gilray); *see also* Tr. 10,711 (Gilray)).

266. In response to Board questions, Mr. Gilray indicated that, based on his past association with Bechtel and Ebasco, the construction QA/QC program would likely be properly implemented. He stated that in most cases QA/QC program implementation by these organizations had been satisfactory. He acknowledged that, in certain cases, Bechtel and Ebasco have had problems, but he opined that they "have learned by their mistakes." Tr. 10,705 (Gilray). He added that, although some problems would likely arise, they would be no worse than what would be expected on a normal large construction project. With respect to Bechtel, he commented that the problems which had arisen were not generic but were specific to particular plants. Tr. 10,717 (Gilray).

267. The three-layer QA/QC program provides an additional layer of quality review to that present under the HL&P-B&R program. Management officials from HL&P and Ebasco expressed the view that the new arrangement on balance provides advantages and does not detract from the ability of the construction contractor to perform a quality job. Tr. 10,508-09 (Goldberg, Crnich). Mr. Gilray expressed a similar view for the Staff (Tr. 10,707-08, 10,713-14).

268. We conclude that the current HL&P, Bechtel, and Ebasco QA/QC organizations and practices meet the requirements of 10 C.F.R. Part 50, Appendix B. We also conclude that there is reasonable assurance that the QA program for the STP will be implemented so that construction of the STP will be completed in conformance with the construction permits and other applicable NRC requirements. Of necessity, however, this latter conclusion is based in large part on the experience of Bechtel and Ebasco at other sites, together with the background and experience of personnel assigned by Bechtel and Ebasco to the STP. For, at the time the Phase I record was closed, Bechtel and Ebasco had not yet undertaken significant safety-related activities at the STP. As pointed out in our opinion on Issue B, however, we are requiring the Staff (and other parties, including the Applicants, if they wish) to supplement the record in this regard by reporting to us during the Phase II hearings concerning the implementation of the QA/QC program for construction. *See* p. 697, *supra*.

269. Although Issue D by its terms is limited to the adequacy of the QA/QC program for continued construction, the replacement of B&R by Bechtel and Ebasco caused us additionally to hear testimony on Bechtel's organizational framework for continued construction, including consideration of plans for design, a review of past problems, project construction and HL&P management involvement. Fourth Prehearing Conference Order, *supra*, at 4. The Applicant addressed these questions through a panel of Jerome H. Goldberg, HL&P's Vice President for Nuclear Engineering and Construction, Burton L. Lex, Bechtel's STP Project Manager; and John Crnich, Construction Manager for Ebasco at STP (Goldberg, *et al.*, ff. Tr. 10,403). The Staff presented the Crocker/Madsen panel (*see* Finding 246, *supra*) (Crocker/Madsen, ff. Tr. 10,721).

270. Bechtel and Ebasco have each had extensive experience in nuclear power plant construction activities. Bechtel is one of the world's largest engineering firms engaged in nuclear power plant design, construction and start-up activities. During the past 8 years it has been involved in the design of fifty nuclear power units (total capacity 51,000 MW) and in the construction of forty-one units (total capacity of 43,000 MW). Ebasco over the last 20 years has served as constructor or construction manager on seventeen nuclear units, as architect-engineer for five nuclear units (at which construction was performed by others), and has constructed one nuclear unit according to another architect-engineer's design. It also has specific experience in the take-over of construction management activities at a non-nuclear facility where work had been started by others. Crocker/Madsen, ff. Tr. 10,721, at 5-7; Goldberg, *et al.*, ff. Tr. 10,403, at 7-9; App. Exhs. 52 and 53.

271. All professional personnel assigned by Bechtel to its transition team (and identified on this record) have had appropriate previous nuclear experience, and assignments to the team appear to have been made to provide for continuity from the transition phase through to project completion. Ebasco also appears to be staffing its organization with persons having considerable nuclear experience. Crocker/Madsen, ff. Tr. 10,721, at 6-7. Moreover, HL&P has taken an active role in both the transition program and in planning for the completion of the design and construction of the STP. It is providing overall project direction to Bechtel's project manager. It has taken special care to assure that the root causes identified in its response to I&E Report 79-19 and the Order to Show Cause are considered by both Bechtel and Ebasco in their transition program and plans for the completion of STP. Goldberg, *et al.*, ff. Tr. 10,403, at 36-44. Significantly, HL&P has expended considerable effort in upgrading the skills and experience of its own managerial and

technical personnel. HL&P replaced many key personnel with individuals who had greater experience and/or training, all in an effort to improve construction performance. Tr. 10,480-84 (Goldberg); *see also* Findings 209-216, *supra*.

272. The foregoing organizational plans and activities and the personnel identified thus far provide reasonable assurance that HL&P, Bechtel and Ebasco have organized themselves in such a manner that the balance of design and construction can be completed in conformity with the construction permits, the Atomic Energy Act, as amended, and the Rules and Regulations of the Commission.

***Issue E: Adequacy of Existing Structures***

273. Issue E states:

> Is there reasonable assurance that the structures now in place at the STP (referred to in Sections V.A(2) and (3) of the Order to Show Cause) are in conformity with the construction permits and the provisions of Commission regulations? If not, has HL&P taken steps to assure that such structures are repaired or replaced as necessary to meet such requirements?

274. The structures referred to in Sections V.A(2) and (3) of the Show-Cause Order are the Units 1 and 2 Reactor Containment Buildings (RCB), Unit 1 Fuel Handling Building and Unit 2 Mechanical-Electrical Auxiliary Building (MEAB) (Staff Exh. 46, Show-Cause Order, at 6). As set forth in the Show-Cause Order, deficiencies with respect to those structures included improper construction practices during the placement of concrete, concrete voids, improper cadwelding practices, improper placement of Category I backfill, a dimensional error in one of the buildings (*see* Findings 318-326 on Intervenor Contention 1.1, *infra*), and inadequate welding controls (*id.* at 1-11). As a result of these deficiencies, the Show-Cause Order directed that a review be made of existing structures to determine whether work in the three areas of soil, concrete, and welding had been properly performed and, if repairs were required, to describe the extent of the repairs and a schedule for completion of work (*id.* at 14-15). This process has now been substantially completed.

275. In HL&P's July 28, 1980, response to the Show-Cause Order (*see* Finding 85), the status of the work in the three areas was reported, verification of the work performed to date was set forth, and a repair program, where appropriate, was outlined (Staff Exh. 48, at 14). We turn to each of the three areas.

*(1) Adequacy of Category I Structural Backfill*

276. The Show-Cause Order directed HL&P to perform five tasks relative to the structural backfill at the STP. HL&P was directed to review information or obtain data to: (1) verify the test fill program that established the soil conditions, lift thickness, compactive effort, and equipment characteristics necessary to develop the requisite in-place densities; (2) perform a comparison of backfill material tested and described in FSAR Section 2.5.4.8.3 (addressing liquefaction) with the backfill used in the field; (3) determine the sequence of construction followed for existing backfill, including the loose-lift thickness and number of passes of the equipment to obtain the required density; (4) determine the adequacy of the density of the existing backfill material, including that under structures founded on backfill; and (5) explain the rationale behind the construction procedure of using 18-inch loose-lifts compacted by eight passes of the equipment to achieve the required densities. Staff Exh. 46, Show-Cause Order, at 14.

277. In addition to the Show-Cause concerns, the Staff reported six items of noncompliance with respect to the STP structural backfill program in Inspection Report 79-19. Specifically, those items of noncompliance found that: (1) Pittsburgh Testing Laboratories' (PTL) procedures did not provide instructions for depth of in-place density testing (Staff Exh. 46, Appendix A, Item of Noncompliance 4); (2) B&R construction procedures failed to set forth an identified and documented basis for the acceptability of the required minimum of eight roller passes (*id.*, Item of Noncompliance 2); (3) PTL did not record the actual number of roller passes or the actual lift thicknesses in the earthwork inspection reports (EIRs) (*id.*, Item of Noncompliance 5); (4) the PTL relative density test apparatus was broken for a period between November 1979 and January 1980, and backfill placement proceeded although the required laboratory test could not be performed (*id.*, Item of Noncompliance 3); (5) Woodward-Clyde Consultants (WCC) used a nonconforming hammer for standard penetration tests of the backfill from January 28, 1980 to February 4, 1980 (*id.*, Item of Noncompliance 16); and (6) WCC used a nonconforming split spoon for its standard penetration testing (*id.*, Item of Noncompliance 17). *See also* Pettersson, *et al.*, ff. Tr. 5796, at 23-24.

278. In January 1980, to respond to initial concerns raised by the Staff inspection team still conducting Inspection 79-19, HL&P and B&R initiated a soil test boring program to assess and verify the adequacy of the in-place Category I structural backfill at the STP. This program was conducted by geotechnical engineers from WCC. Pettersson, *et al.*, ff. Tr. 5796, at 26. The program, completed in April 1980, verified the

overall adequacy of the Category I structural backfill, but recommended further confirmatory investigations in four specific areas to assure engineering adequacy of the backfill. *id.* and Staff Exh. 48, at 2-2.

279. At the time the Staff Show-Cause Order was issued in April 1980, data obtained during the WCC test boring program were already under analysis. Upon issuance of the Show-Cause Order, HL&P established a special Task Force to respond to the Show-Cause Order, comprised of geotechnical and QA engineers from both HL&P and B&R. The Task Force was to perform a study to verify the acceptability of previously placed backfill, the testing methods used in determining the adequacy of that backfill and the adequacy of the in-place Category I structural backfill. Pettersson, *et al.*, ff. Tr. 5796, at 27. WCC, which was in the process of completing its verification analysis, was assigned by the Task Force to investigate, analyze and conduct further verification studies. *Id.* and Staff Exh. 48, at 2-2 and 2-3. In addition HL&P deemed it desirable that an independent assessment of the Category I structural backfill analysis be performed. Accordingly, in May 1980, the firm of Shannon and Wilson, Inc., was retained as consultant to B&R to establish an independent review committee of geotechnical experts to review the Category I structural backfill construction for the STP and to review the work of the Task Force. Pettersson, *et al.*, ff. Tr. 5796, at 27; Staff Exh. 48, at 2-4 and 2-5.

280. The Applicants presented panels of witnesses from the Task Force and from the Expert Review Committee, respectively, in response to the concerns relative to the backfill expressed in the Show-Cause Order and Board Issue E. The first panel consisted of C. Bernt Pettersson, Assistant Discipline Project Engineer for B&R at the STP; Timothy K. Logan, Project QA Supervisor for HL&P's W.A. Parish Generating Unit and HL&P's QA representative on the STP Soils Task Force; Charles S. Hedges, Project Manager for WCC's work at the STP; and W. Stephen McKay, Corporate Manager for Quality Assurance at PTL. This panel addressed the development of the structural backfill program at the STP and the Task Force's effort in response to the Show-Cause Order. Pettersson, *et al.*, ff. Tr. 5796.

281. The second panel consisted of Stanley D. Wilson, a private consulting engineer and founding partner of Shannon and Wilson, Inc., and Thomas E. Kirkland, senior principal engineer and engineering group leader in Shannon and Wilson's Seattle office. This second panel described the Expert Committee's evaluation of the Task Force's work and its findings on the adequacy of the Category I structural backfill at STP. Wilson/Kirkland, ff. Tr. 2697, at 5. This panel further sponsored

into evidence the Expert Committee's final report concerning the Show-Cause Item #2 structural backfill investigation. App. Exh. 6.

282. The Staff addressed the resolution of the structural backfill issue through its Crossman panel (*see* Finding 19, *supra*) (Crossman, *et al.*, ff. Tr. 10,010).

283. The Applicants' Task Force panel first explained how backfill was placed at the STP. Backfill was placed, compacted, and accepted in individual layers or lifts. The backfill placed at one time in a specific area is called a placement and several placements of backfill are generally required to complete one lift over an entire building foundation area. All placements were compacted before an overlying placement was made. Pettersson, *et al.*, ff. Tr. 5796, at 7.

284. Although no specific code or standard governs placement and the compactive effort of Category I structural backfill for the safety-related structures at the STP, compacted properties of the backfill must be consistent with the structural design criteria for foundations and embedded walls of all Category I structures. *Id.*; Regulatory Guide 1.70. To satisfy this general requirement, specifications were developed in 1974 jointly by B&R and WCC to decide upon material properties of the backfill. Material from the Eagle Lake area (Colorado River Alluvium), approximately 55 miles from the STP site, was determined to be the best source area for the fill material. Pettersson, *et al.*, ff. Tr. 5796, at 8. Upon re-evaluation of this choice in light of the Show-Cause Order, it was again determined that the fill material had all the desired characteristics of an ideal structural backfill (Tr. 2807 (Wilson)).

285. Based on the 1974 laboratory testing of this material, WCC initially recommended that an 80 percent relative density requirement for backfill at STP would provide an ample factor of safety against liquefaction. Pettersson, *et al.*, ff. Tr. 5796, at 8. B&R, with the approval of HL&P, adopted a specification requirement for the STP providing for a minimum relative density of 80 percent and an average relative density of 84 percent (*id.* at 9; Tr. 2736 (Kirkland); Tr. 6091-92 (Hedges)). Construction procedures were developed in an effort to implement these end-process goals in 1976. It was determined that a 10-ton steel drum vibratory roller should be used to compact lifts with a maximum loose-lift thickness of 18 inches. It was further decided that after eight or twelve passes (depending on whether the lift were an underlying or surface lift), it would be appropriate to begin in-place density testing to evaluate the adequacy of compaction. Although not set forth in the construction procedures, the Applicants' witnesses asserted that it was understood by construction that the density tests were end-process tests and that the compaction effort would be continued beyond the minimum

number of passes until proper density was achieved. Pettersson, *et al.*, ff. Tr. 5796, at 11 and 12; Tr. 5949-51 (Pettersson, Hedges); Tr. 5952 (Logan); Tr. 6104-05 (Logan, Hedges).

286. With respect to monitoring this process, PTL inspectors were to provide continuous inspection of the placement of all material (Pettersson, *et al.*, ff. Tr. 5796, at 13). In this context, continuous inspection was interpreted to mean observing the placement process sufficiently to assure that the minimum construction procedures were met and that the final acceptance density was achieved (Tr. 2815 (Wilson)). For example, in the inspectors' earthwork inspection reports (EIRs), a checklist indicated not the actual loose-lift thickness but only that the lift was 18 inches or less. Similarly, inspectors did not check the actual number of roller passes performed to achieve the requisite density but rather only that the minimum number of passes required had occurred. Pettersson, *et al.*, ff. Tr. 5796, at 14. The requirement for a minimum number of passes, which stems from construction procedures, assures a minimum uniformity throughout the entire structural backfill (Tr. 6105, 6118 (Hedges)). If the requisite density is achieved, the number of passes required to achieve that density, beyond the minimum required to achieve uniformity, becomes technically irrelevant (Tr. 6104, 6135 (Logan)).

287. To determine the density of each lift after compaction, PTL inspectors generally performed at least one field density test for every 20,000 square feet of unrestricted backfill. For every fourth field density test, at least one laboratory maximum-minimum test and one gradation test was performed. Pettersson, *et al.*, ff. Tr. 5796, at 10. It was then recorded on the EIR and Density Test Reports whether the required relative density had been achieved (*id.* at 15). In addition, backfill material qualification, placement, inspection, and testing were monitored by HL&P QA personnel (*id.* at 17).

288. All the questions raised in the Show-Cause Order relative to backfill have been adequately answered. Specifically, HL&P found no material difference between the soil properties tested in 1974 and the soil properties found during the 79-19 Inspection. Pettersson, *et al.*, ff. Tr. 5796, at 29; Crossman, *et al.*, ff. Tr. 10,010, at 38; Staff Exh. 120. Construction procedures for Category I structural backfill were developed based upon specification requirements and existing industry practices. Pettersson, *et al.*, ff. Tr. 5796, at 29; Crossman, *et al.*, ff. Tr. 10,010, at 36; *see also* Staff Exh. 40. The original test fill program showed that approximately 80 percent relative density could be obtained by four passes over loose-lifts of between 18 to 24 inches. However, the Expert Committee report found that sixteen to twenty passes or more

are presently needed to consistently meet the desired densities. It further stated that this number of passes is consistent with the number actually performed in the field before the requisite density was met. App. Exh. 6, at 30. Nonetheless, B&R site geotechnical engineers originally recommended that provisions for a minimum of twelve roller passes be initially incorporated into construction procedures. B&R subsequently concluded that the minimum of twelve passes would actually only be necessary on the surface lift. Crossman, *et al.*, ff. Tr. 10,010, at 36. This was so because underlying lifts would receive further densification upon compaction of overlying lifts. Pettersson, *et al.*, ff. Tr. 5796, at 12. Although not set forth in the procedures, HL&P and B&R indicated that it was generally understood the twelve passes represented an appropriate place to begin end-process testing. Pettersson, *et al.*, ff. Tr. 5796, at 11-12.

289. The Staff reviewed the procedures used to perform the test fill program, and the technical reference document entitled, "Test Program for Compaction of Category I Structural Backfill," and the results of the Expert Committee's report (Crossman, *et al.*, ff. Tr. 10,010, at 36; Staff Exhs. 40, 58, and 94). Based upon the Expert Committee's report, the Staff concluded that the Category I structural backfill is adequate at STP (Crossman, *et al.*, ff. Tr. 10,010, at 39; Staff Exh. 94). The Staff concluded that the density of lower lifts is significantly increased by compaction of subsequent lifts and that this multiplying effect demonstrated that a minimum of eight passes of compaction equipment was adequate to begin in-process testing. As a practical matter, it was pointed out by the Staff that if the requisite density was not achieved using the minimum number of passes, additional passes with compaction equipment were made until the required density was achieved prior to continuing the construction effort. Crossman, *et al.*, ff. Tr. 10,010, at 37. The Staff reviewed the findings of both the Task Force and Expert Committee and based upon those findings determined that Item 2 of the Show-Cause Order was satisfied. *See* Crossman, *et al.*, ff. Tr. 10,010, Corrections and Update, at 3; Staff Exh. 94.

290. During cross-examination of the Pettersson panel, CCANP introduced six documents into evidence, all 10 C.F.R. § 50.55(e) reports from HL&P to the Staff concerning backfill. CCANP Exhs. 24, 25, 26, 27, 28 and 30. The first five of these exhibits were interim and final reports concerning the discovery by WCC in January-February 1980, through its boring program, of four areas within the Unit 2 area where backfill densities were below the 80 percent minimum relative density specification referred to in Findings 285-288, *supra*. The final report concludes that the deviations were slight, that the backfill was ad-

equate for the purposes intended, and that no remedial action was required. The Expert Committee concluded that

> The studies established that these zones have adequate factors of safety against liquefaction and that negligible pore pressures which might build up in these zones during the Safe Shutdown Earthquake are not significant with respect to the adequacy and safety of the overall structural backfill.

CCANP Exh. 28. Finally, the Applicants' witnesses testified that the four small areas were insignificant and would not impair the overall adequacy of the existing backfill (Tr. 2824-26, Kirkland, S. Wilson).

291. The other backfill exhibit introduced by CCANP concerned a report of differential soil settlement resulting in a tilting of the Unit 2 Mechanical Electrical Auxiliary Building (MEAB) and a curvature in the basemat under that building. The Applicants explained their corrective actions for this situation and expressed the view that the tilt did not affect the integrity of the MEAB or the piping systems, which had not yet been installed. CCANP Exh. 30; Tr. 6026-30 (Pettersson).

292. CCANP did not submit proposed findings with respect to its Exhibits 24-28 or 30. We see no reason to disagree either with the explanations of the Applicants with respect to the four areas which failed to meet the relative density specification and the differential settlement under the MEAB, or with their evaluation of the safety significance of these questions.

*(2) The Concrete Verification Program*

293. The Show-Cause Order directed HL&P to review safety-related concrete structures, including embedments such as supports and the fuel transfer tube. If, after this review, repairs were required, HL&P was to describe the extent of the repairs necessary and to provide a schedule for completion of that work. Staff Exh. 46, Show-Cause Order, at 15. In addition, among the twenty-two items of noncompliance in Inspection Report 79-19 were citations for failure to implement corrective action relative to concrete placement activities and unqualified Civil QC inspectors (Staff Exh. 46, Appendix A, Items of Noncompliance 7 and 8).

294. At the time the Order to Show Cause was issued, HL&P was already in the midst of an extensive concrete verification program stemming from voids discovered in Lifts 8 and 15 in the RCB. *See* findings on Intervenor Contention 1.2, *infra*. Upon issuance of the Show-Cause Order, HL&P and B&R initiated a Task Force to perform an assessment of safety-related concrete structures at STP. It was determined that embedments such as supports and the fuel transfer tube involve issues of

traceability and the application of Section III of the ASME Code, and that accordingly those items would be addressed by the Welding Task Force in response to Item (3)(a) of the Show-Cause Order. Staff Exh. 48, at 3b-1. *See* Findings 327-337, *infra*, and Staff Exh. 88. The Task Force included over twenty full-time engineers from HL&P and B&R. This team received further assistance from outside consultants due to the same concerns that led to the Expert Committees in the backfill verification program. Staff Exh. 48, at 3b-2.

295. The Applicants presented a panel from the Task Force to testify on the efforts of the Concrete Verification Program. The panel consisted of Gerald R. Murphy, B&R's Assistant Discipline Project Engineer (Civil-Structural Discipline) for the STP; Ralph R. Hernandez, Supervising Engineer for the Civil Nuclear Support Section within the Civil Mechanical Engineering Division of HL&P's Power Plant Engineering Department; and Joseph F. Artuso, President of Construction Engineering Consultants, Inc., an engineering firm providing consulting services, quality control services and materials analysis for construction projects. *See* Murphy, *et al.* (Concrete Verification), ff. Tr. 6327, at 1-5. Mr. Murphy was the task force leader in response to the concrete verification request in the Show-Cause Order and Mr. Artuso was a member of the consultant panel. The Task Force was charged with determining whether the safety-related concrete work at STP, as of the time of the Show-Cause Order, had been properly performed, and with describing the extent of repairs, if any, that needed to be made in order to correct any deficiencies. *Id.* at 10-11.

296. The Task Force pursued this objective by identifying and examining samples of the safety-related concrete in several structures at STP selected by a conservative, statistically valid method. Its review covered 68 percent of all safety-related concrete placed to April 30, 1980. Omitted were such structures as the containment building shells, the essential cooling water (ECW) intake and discharge structure, and the electrical raceway system. (The containment shells and ECW structure had been subject to other additional reviews.) *Id.* at 11-12, 15; Tr. 6411-12 (Murphy). Once the placements were selected for review, a four-phase verification program was followed, consisting of: (1) a review of all documentation relating to each placement; (2) a comparison of the "as-built" configuration for each placement (as determined by a field survey) with the "as-designed" configuration reflected in the documentation; (3) a visual inspection of each placement to assess the general quality, and to determine potential structural defects as well as to identify areas requiring follow-up testing; and (4) random selection of three sample areas within each selected placement to perform a variety

of specialized tests to investigate the structural properties of the placement. Murphy, *et al.* (Concrete Verification), ff. Tr. 6327, at 12.

297. The placements were classified into five major generic types and were selected on the basis of accessibility for inspection and testing, and on the amount of information that testing would disclose with respect to the placement. Placements were selected from those determined to be more critical because the complexity of the placement was related to previously identified concerns. *Id.* at 14; Tr. 6364-65 (Murphy, Artuso).

298. After it was determined the documentation was substantially complete (Murphy, *et al.* (Concrete Verification), ff. Tr. 6327, at 17), the "as-built" configuration was checked against the "as-designed" condition. In the vast majority of cases (over 90 percent) the specified tolerance was met. *Id.* at 19; Tr. 6348 (Murphy). The deviations from tolerance that were identified were minor and in no instance resulted in the rejection of an item because it was out of tolerance to the point that "fit-up" could not be accomplished. The Applicants' witnesses justified the minor deviations from tolerance that occurred by stating that the design tolerances at STP were too restrictive. Murphy, *et al.* (Concrete Verification), ff. Tr. 6327, at 20; Tr. 6403-06 (Murphy, Hernandez).

299. Next a visual inspection was conducted by the consultant panel. The visual inspection addressed any prior items of noncompliance as well as the known characteristics and accompanying potential problems on each placement. The visual inspection indicated quality workmanship and satisfactory construction. In addition, selected destructive testing was performed. The break samples indicated well-consolidated concrete. In addition, selected cores were compression tested and all met the design requirements. All concrete subjected to a petrographic examination was found to be homogeneous and hard with little or no segregation. Selected Windsor Probe testing indicated that all concrete tested was in excess of design requirements. Ultrasonic testing indicated that the concrete, in addition to having a high strength, had excellent uniformity. Murphy, *et al.* (Concrete Verification), ff. Tr. 6327, at 21-26.

300. Based on the above verification program, the consulting panel concluded that there was reasonable assurance that the quality of safety-related concrete at STP is adequate and that the concrete structures will perform as designed (*id.* at 27). Accordingly, the panel concluded that based on its review, test, and inspections there is reasonable assurance that the safety-related concrete structures at STP, as constructed or repaired, are substantially in conformance with the construction specifications, and that in the few instances where deviations exist they are insignificant from the point of view of plant safety. This assurance

was reached after examining structures representative of 97 percent of all safety-related concrete at STP. *Id.* at 29-30; Tr. 6412 (Murphy).

301. The Staff concurred with the finding that there are no internal honeycomb or void areas which remain unrepaired in the structures (Staff Exh. 113, at 5). This concurrence was based upon the Applicant's four-phase investigation program, Windsor Probe readings, ultrasonic testing, and petrographic and compressive strength evaluations of drilled core samples. The Staff reviewed all phases of this program prior to its concurrence. *See* Staff Exhs. 82, 85, and 113.

*(3) The Welding Verification Program*

302. The third aspect of construction work addressed in the Show-Cause Order is the adequacy of the welding performed at STP. This subject was addressed by a panel of Applicants' witnesses consisting of Eugene A. Saltarelli, B&R Senior Vice President and Chief Engineer; Matthew D. Muscente, B&R Welding Program Manager for STP; Gordon R. Purdy, B&R QE Manager; Logan D. Wilson, HL&P's Mechanical/NDE Project QA Supervisor; J. Rodolfo Molleda, an HL&P Supervising Engineer; Michael D. Sullivan, a consultant on welding and metallurgy employed by NUTECH; and Dr. Daniel Hauser, a Senior Research Scientist at Battelle Memorial Institute, Columbus, Ohio (Battelle). Saltarelli, *et al.*, ff. Tr. 7536.

303. The Show-Cause Order directed HL&P to review safety-related welding, including civil, structural and piping. If, after this review, repairs were required, HL&P was to describe the extent of the repairs necessary and to provide a schedule for completion of that work. Staff Exh. 46, Show-Cause Order at 15. In addition, seven items of noncompliance were cited in Inspection Report 79-19 relative to the STP welding program. Specifically: (1) the B&R weld filler material specification did not contain the latest documentation change notice (Staff Exh. 46, Appendix A, Item of Noncompliance 9); (2) the STP construction procedures failed to incorporate requirements for welding protection against adverse environmental conditions (*id.*, Item of Noncompliance 10); (3) the quality of numerous radiographs was such that proper interpretation was not possible (*id.*, Item of Noncompliance 11a); (4) the linear indications contained in several radiographs were not recorded on interpretation sheets (*id.*, Item of Noncompliance 11b); (5) the evaluation of certain liquid penetrant indications was not in compliance with the ASME Code (*id.*, Item of Noncompliance 11c); (6) outdated procedures for liquid penetrant examinations were being used (*id.*, Item of

Noncompliance 12); and (7) radiograph evaluation of some welder qualification tests did not comply with the ASME Code in that the penetrameter (radiographic image quality indicator) was placed on the side of the test pipe close to the radiographic film (film side) rather than the preferred radiation source (source side) (*id.*, Item of Noncompliance B).

304. Upon issuance of the Show-Cause Order, HL&P and B&R formed a special Task Force review team to formulate a program to reassess and verify safety-related welding at STP and to determine whether the safety-related welding that was completed as of the date of the order was properly performed. The Task Force was also given the responsibility of identifying any repair work that might be required and to establish a schedule for completion of such work. Staff Exh. 48, at 3a-1. In addition, as was the case in both soils and concrete, early in the review process the Task Force established an Independent Review Committee both to review and to approve the Task Force programs and reports. The Independent Review Committee further was to assure that the Task Force was properly implementing the programs, provide technical and code advice, and to advise the Task Force in making recommendations for corrective action and additional review. *Id.* at 3a-2 and 3a-3.

305. The Task Force defined the scope of its review to encompass examination of randomly selected safety-related ASME piping welds and AWS structural welds made by B&R from the start of construction until the time safety-related welding was stopped on April 11, 1980. All STP welding procedures, specifications and a significant portion of documentation were also examined. The Task Force members developed a plan to evaluate four specific areas of the STP welding program: (1) the safety-related AWS welding program; (2) the ASME welding program including welder qualifications; (3) the nondestructive examination (NDE) program; and (4) code commitments as identified in the engineering specifications and implementing procedures. Saltarelli, *et al.*, ff. Tr. 7536, at 27.

306. With respect to the first of these four commitments, the Task Force visually examined a random sample of seventy-nine safety-related AWS welds selected from all areas of the plant in accordance with accepted sampling procedures. This examination revealed sixty-one welds with nonconformances. *Id.* at 29. The Task Force therefore recommended that all accessible safety-related structural AWS welds be reexamined and that all such welds not in compliance with the AWS Code be repaired and that the adequacy of all inaccessible AWS welds be determined based on the types of nonconformances found in the reexamination of the accessible welds. In addition, it was recommended that all

AWS welders and inspectors be retrained to the requirements of the AWS Code and applicable STP procedures. *Id.* at 30.

307. As a result of the Task Force conclusions with respect to weld deficiencies (both AWS and ASME), B&R and HL&P decided in September 1980, that all accessible safety-related AWS and ASME welds be reexamined and, where required, repaired. This reexamination and repair program encompassed radiography of 100 percent of the accessible ASME welds in the ECW system, requiring that those ECW welds buried under backfill be unearthed. This program was conducted pursuant to a detailed reexamination and repair plan submitted to the Staff on September 10, 1980. *Id.* at 44. In October 1980, the Staff authorized the reexamination and repair of AWS welds as well as limited restart of new AWS welding, based on new management systems and procedures, personnel retraining, the completion of commitments regarding safety-related welding in response to the Show-Cause Order and the completion of all corrective action for previously identified noncompliances related to AWS and ASME welding (*id.* at 45).

308. With respect to the second of the Task Force activities, all radiographs of completed and accepted ASME welds were reviewed by certified NDE Level III examiners in radiography. Twenty-five percent of the radiographed welds that previously had been accepted were considered unacceptable. In addition, the Task Force repeated Code-required visual examination and liquid penetrant testing on a random sample of ASME welds that originally were accepted on the basis of similar examinations. *Id.* at 31. Based upon this reevaluation, the Task Force recommended and HL&P agreed that: (a) all accessible ASME welds with known deficiencies should be repaired; (2) all other accessible ASME welds should be visually reexamined, liquid-penetrant tested and repaired if necessary; and (3) data from the reexamination should be used in the evaluation of the adequacy of the inaccessible ASME welds. The Task Force found that the STP ASME construction procedures and documentation were substantially in compliance with the applicable Code requirements. *Id.* at 32-33.

309. The evaluation of welder performance test records revealed two problems: (1) film-side penetrameter placement for some of the tests; (2) the use of ASME acceptance criteria for both ASME and AWS welder qualifications. The possible effects of the first problem were determined to be insufficient to require further investigation. *Id.* at 33-34. With respect to the second problem, the use of ASME acceptance criteria for AWS welder qualifications was found not to affect previous test results significantly (*id.* at 24).

310. In November 1980, the Staff authorized the reexamination and repair of ASME welds, and limited restart of ASME welding, based on the same factors (outlined in Finding 307, *supra*) which led to similar authorization with respect to AWS welds (*id.* at 45).

311. As of the time the Saltarelli panel testified, approximately half of the accessible AWS welds had been reexamined. Six percent of these welds contained deficiencies directly related to weld strength. All deficiencies found had been repaired, inspected, and accepted. Approximately half of the accessible nonessential cooling water (ECW) ASME welds made prior to the Stop-Work Order had been reexamined and 8 percent contained deficiencies. In addition, 15 percent of the accessible ECW pipe welds had been reexamined and, after finding deficiencies in 83 percent of such welds, these deficiencies were repaired, inspected, and accepted. HL&P committed to radiographing 100 percent of the ECW welds in repairing all deficiencies. *Id.* at 46-47. Finally, the Task Force found AWS construction procedures and weld documentation to be acceptable (*id.* at 30).

312. The Task Force next reviewed the NDE program. It compared the STP NDE procedures for radiography, magnetic particle, liquid penetrant, and visual testing with applicable Code requirements. All procedures were found to be substantially in compliance with the Code. However, the qualification files for NDE inspectors identified various types of irregularities in the qualifications of twenty-one of the seventy personnel, including uncertified personnel performing NDE, an inspector who signed at a higher level, and the expiration of an eye exam certification. In addition, the review determined that documentation regarding nine of the twenty-one inspectors showed insufficient training and/or experience in performing examinations. The Task Force concluded, however, that program improvements implemented since the Stop-Work Order of April 11, 1980 were sufficient to ensure proper control of the NDE inspector certification processes in the future. *Id.* at 34.

313. Finally, the Task Force reviewed the STP engineering specifications and implementing construction/QA procedures in order to determine whether the applicable codes and standards were adequately identified and whether the same commitments had been made in all documents. Although commitments and requirements were found to have been adequately identified in the procedures, it was recommended that procedures be simplified and clarified due to inconsistencies and ambiguities. *Id.* at 35. The recommendation was followed prior to welding restart (*id.* at 36-37).

314. The Staff continuously monitored the activity of the Task Force. *See* Staff Exhs. 72, 82, 88, 112 and 117. The Staff subsequently concluded that virtually all of the commitments made by HL&P relative to its safety-related welding program were completed and therefore closed out Show-Cause Item 3(a) in December 1981. *See* Staff Exh. 131, at 4.

315. Similarly, HL&P resolved all of the Items of Noncompliance relative to safety-related welding set forth in Inspection Report 79-19. Specifically, to assure that the latest document changes were incorporated into both weld filler material specifications and other controlled documents, HL&P revised and updated all control documents and further added an administrative technician to the site HL&P QA staff to be responsible for document control. Crossman, *et al.*, ff. Tr. 10,010, at 22. HL&P further committed to rewriting work procedures to require protection against contamination from rain, snow, and airborne particles during welding operations (*id.* at 23; Staff Exh. 40). These new welding procedures were reviewed and it was verified that adequate requirements had been implemented for maintaining cleanliness during the welding process (Staff Exh. 40, at 7). HL&P further committed to review all radiographic film to identify discrepancies, to revise radiograph film processing procedures to clarify film processing techniques, to retrain and recertify all NDE personnel, and to revise the requirements for recording film conditions (Crossman, *et al.*, ff. Tr. 10,010, at 23; Staff Exh. 82). With respect to inadequate liquid penetrant examinations, all NDE personnel had been retrained in the requirements of inspection procedures with an emphasis upon the importance of adhering to such requirements. Training was followed by a reexamination of all liquid penetrant personnel. Crossman, *et al.*, ff. Tr. 10,010, at 24-25; Staff Exh. 40, at 8.

*(4) Conclusions with Respect to Issue E*

316. We conclude the following with regard to each subpart of CLI-80-32 Issue E:

(1) Adequacy of Category I Structural Backfill

We conclude that there is reasonable assurance that the backfill now in place is in conformity with the construction permits and applicable regulations.

(2) The Concrete Verification Program

We conclude there is reasonable assurance that the concrete work now in place at the STP is in conformity with the construction permits and applicable NRC regulations or that such

work will be repaired or replaced as necessary to meet such requirements.

(3) The Welding Verification Program

We find that HL&P is conducting a thorough reevaluation of the STP welding program. This evaluation has resulted in the discovery of significant defects in existing welds and significant improvements in the welding program to prevent recurrence of those defects. The welding verification and repair program indicates that there is reasonable assurance that the welding work now in place at the STP is either in conformity with the construction permits and applicable NRC regulations or that such welded components or structures will be repaired or replaced as necessary to meet such requirements.

## C. Findings on Intervenor Contentions

317. Contention 1 alleges:

> There is no reasonable assurance that the activities authorized by the operating license[s] for the South Texas Nuclear Project can be conducted without endangering the health and safety of the public in that:
>
> 1. There has been a surveying error which has resulted in the eastern edge of the Unit 2 Mechanical-Electrical Auxiliary Building being constructed one (1) foot short (in the east-west direction) from its design location. This error violates 10 C.F.R. Part 50, Appendix B, Sections X and XI.
> 2. There has been a field construction error and as a result, extensive voids exist in the concrete wall enclosing the containment building, in violation of 10 C.F.R. Part 50, Appendix B, Sections IX and X.
> 3. In violation of Quality Assurance and Quality Control requirements applicable to the South Texas Nuclear Project with regard to document control (10 C.F.R. Part 50, Appendix B, Sections VI and XVII), a field document relating to cadweld inspections has been lost.
> 4. There are membrane seals in the containment structure which are damaged, indicating a violation of 10 C.F.R. Part 50, Appendix B, Sections X, XV and XVI.
> 5. There are steel reinforcement bars which are missing from the concrete around the equipment doors in the containment and such bars are missing from the containment structure as well, indicating violations of 10 C.F.R. Part 50, Appendix B, Sections X, XV and XVI.
> 6. There are cadwelds which have been integrated into parts of the plant structure which are not capable of being verified with regard to compliance with 10 C.F.R. Part 50, Appendix B, in violation of Sections IX and X of Appendix B.
> 7. Quality Control as per the requirements of 10 C.F.R. Part 50, Appendix B, in particular Sections III and IX, has not been complied with, because:
>    a. Efforts by quality control inspectors to verify that design changes were executed in accordance with the purposes of the original design were repeatedly and systematically thwarted.

b. There were personnel other than the original designer approving design changes with no first-hand knowledge of the purpose of the original design.

c. There were design changes approved by personnel unqualified in the type of design where the change was made.

d. There were numerous pour cards that were supposed to record the correct execution of concrete pours which were falsified by numerous persons.

e. There has been and continues to be assaults on the Applicant's quality control inspectors, continual threats of bodily harm to those inspectors, firing of inspectors, and other acts constituting a pattern of behavior designed to intimidate the inspectors. As a result of the intimidations, certain inspections were never done because the inspectors decided to play cards over a period of four months rather than risk their safety on the plant grounds.

8.a. As evidenced by the investigative results in Allegation 1 of I&E Report 81-28, Houston Lighting and Power management failed to assure prompt corrective action by Brown and Root in the area of access engineering in violation of Criterion XVI of 10 C.F.R. Part 50, Appendix B.

b. As evidenced by the investigative results in Allegation 1 of I&E Report 81-28, Houston Lighting and Power management does not have a consistent policy on the issuance of stop work orders in violation of Criterion I of 10 C.F.R. Part 50, Appendix B.

c. As evidenced by the investigative results in Allegation 2 of I&E Report 81-28, Houston Lighting and Power management personnel are not committed to respecting the mandates of NRC regulations, especially Criteria I and II of 10 C.F.R. Part 50, Appendix B.

d. As evidenced by the investigative results in Allegation 4 of I&E Report 81-28, HL&P management failed to effectively implement a quality assurance program in violation of Criterion I of 10 C.F.R. Part 50, Appendix B.

As a result of the foregoing, the Commission cannot make the findings required by 10 C.F.R. § 50.57(a)(1) and (2) necessary for issuance of [operating licenses] for the South Texas Nuclear Project.

***Contention 1.1***

318. With respect to this contention, the Applicants presented the testimony of Richard W. Peverley, the Assistant Engineering Project Manager-Special Services for B&R (Peverley (Contention 1.1), ff. Tr. 7826). The Staff presented testimony by the Seidle panel, identified in Finding 40 (Seidle, *et al.*, ff. Tr. 9205); and by the Crossman panel, identified in Finding 19 (Crossman, *et al.*, ff. Tr. 10,010).

319. There was a surveying error that resulted in the eastern edge of the Unit 2 Mechanical-Electrical Auxiliary Building (MEAB) basemat being 1 foot short. The error was discovered in September 1978 by B&R field engineers and was reported to NRC as a 10 C.F.R. § 50.55(e) item on October 4, 1978. Peverley (Contention 1.1), ff. Tr. 7826, at 3, 7; Seidle, *et al.*, ff. Tr. 9205, at 35; Crossman, *et al.*, ff. Tr. 10,010, Appendix C, Item 8; Staff Exh. 113 (I&E Rept. 81-16, at 2).

320. The error was apparently caused by the surveyors using the wrong reference line to lay out the MEAB (Peverley (Contention 1.1), ff. Tr. 7826, at 7). There was no formal QA/QC procedure to detect surveying errors (*id.* at 8; Tr. 7967-68 (Peverley)). The Staff attributed the error to the failure of the Field Engineering department to properly check survey calculations (Seidle, *et al.*, ff. Tr. 9205, at 36; Staff Exh. 113 (I&E Rept. 81-16, at 2)). Layout points should have been, but were not, traversed back to the original building location monuments, and this failure constituted a poor surveying practice (Tr. 7891-92 (Peverley)).

321. To correct for the surveying error, the equipment layout in the MEAB was redesigned (Peverley (Contention 1.1), ff. Tr. 7826, at 4-5). The redesign affected only the west one-fourth of the building and eliminated excess floor space (*id.* at 5 (Peverley); Seidle, *et al.*, ff. Tr. 9205, at 36; Staff Exh. 113 (I&E Rept. 81-16, at 2)).

322. The redesign was verified against the applicable provisions of the FSAR and the Security Plan (Peverley (Contention 1.1), ff. Tr. 7826, at 5-7). The Staff reviewed the Applicants' engineering evaluation of the redesign against the safety criteria in the FSAR for the layout of systems and components and concluded that the error was resolved and the 50.55(e) item should be closed (Staff Exh. 113 (I&E Rept. 81-16, at 2)).

323. The redesign does not result in any increased safety hazard (Tr. 7975 (Peverley)). Nor does it create any difficulty with operation, inspection, maintenance, or replacement of the equipment (Tr. 7973 (Peverley)).

324. The lack of a formal QA/QC procedure either to detect surveying errors or to assure that errors would not occur violated 10 C.F.R. Part 50, Appendix B, Criterion X (as well as Criterion II). Since surveying is not a test activity, there was no violation (as alleged) of Criterion XI (Peverley (Contention 1.1), ff. Tr. 7826, at 9).

325. To prevent surveying errors in the future, organizational and procedural changes were implemented (Peverley (Contention 1.1), ff. Tr. 7826, at 9). (They would be applicable, however, only during the period when B&R served as construction contractor.) In particular, all major layouts were to be double-checked, and all building layout points traversed back to the original survey points so that closure occurs. A different surveying crew was to survey back to the original building location monuments to assure that the original survey was correct. Peverley (Contention 1.1), ff. Tr. 7826, at 9 (Peverley); Tr. 7891 (Peverley). These changes resulted in a program which complied with 10 C.F.R. Part 50, Appendix B, Criteria II and X.

326. Based on the foregoing, uncontroverted findings, the Board concludes that the surveying error does not prevent the findings required by 10 C.F.R. § 50.57.

***Contention 1.2***

327. The Applicants addressed this contention by a panel of witnesses called to testify on concrete-related contentions, comprised of Gerald R. Murphy, Assistant Discipline Project Engineer (Civil Structural Discipline) for STP, B&R; Gerald L. Fisher, B&R Discipline Project Engineer for the STP Civil Structural Group; Charles M. Singleton, B&R's Civil Discipline QC Superintendent for STP; Joseph F. Artuso, President of Construction Engineering Consultants, Inc.; Ralph R. Hernandez, Supervising Engineer, Power Plant Engineering Dept. (Civil Nuclear Support Section), HL&P; and David G. Long, Senior Engineer and former Lead Engineer, QA, HL&P (Murphy, *et al.* (Contentions), ff. Tr. 6522). The Staff addressed this contention through the Seidle panel (*see* Finding 40, *supra*) (Seidle, *et al.*, ff. Tr. 9205).

328. The walls of each reactor containment building (RCB) are constructed in circumferential portions called "lifts." A lift is generally 10 feet high. The concrete forming a lift may be the result of one, or of more than one, pouring. Each such pouring and the portion of the lift it forms is called a placement. On the interior of the RCB walls is a 3/8-inch carbon steel liner that provides a leak-tight membrane for the containment. Construction of the corresponding portion of the liner precedes each placement. Murphy, *et al.* (Contentions), ff. Tr. 6522, at 8-9; Tr. 6536-43 (Murphy, Long, Hernandez).

329. There were voids in the shell walls of the RCBs. Voids were first detected in Lift 15 of the Unit 1 RCB, and then were detected in Lift 8 of that same RCB. Murphy, *et al.* (Contentions), ff. Tr. 6522, at 10-11, 13; Seidle, *et al.*, ff. Tr. 9205, at 36-37; Staff Exh. 113 (I&E Rept. 81-16, at 4); Staff Exh. 118 (I&E Rept. 81-22, at 4). Subsequently, an investigation of Lifts 1-17 of the Unit 1 RCB and Lifts 1-6 of the Unit 2 RCB (80 percent of the shell walls) identified eighty-nine void areas in Unit 1 and sixteen void areas in Unit 2 (Murphy, *et al.* (Contentions), ff. Tr. 6522, at 14, 18).

330. The investigation of the RCB lifts consisted of visual inspection of external surfaces, soundings (the systematic tapping of the containment liner to identify potential voids), mapping of hollow-sounding areas, and drilling (at all points at which soundings identified a potential void and at more than 160 additional test points). Where voids were

discovered, their size and shape were determined by use of a fiberscope. *Id.* at 11-15; Seidle, *et al.*, ff. Tr. 9205, at 37.

331. The investigation demonstrated that voids occurred only in areas of high rebar (reinforcing steel bar) concentration beneath penetrations and beneath the 8-inch channel which served as a plate stiffener (Murphy, *et al.* (Contentions), ff. Tr. 6522, at 12, 14; Staff Exh. 118 (I&E Rept. 81-22, at 4)). The main cause of the voids was the complex structural arrangement in those areas, where the existence of additional rebar and horizontal liner stiffeners or bracket anchorages interfered with concrete flow. In addition, access and visibility limitations, insufficient vibration of the poured concrete, and equipment malfunctions and associated delays were contributing factors. Murphy, *et al.* (Contentions), ff. Tr. 6522, at 12-13. Furthermore, procedures for stopping work when problems were encountered during an ongoing pour were not properly exercised by B&R construction or quality control personnel (Seidle, *et al.*, ff. Tr. 9205, at 36).

332. To particularize with respect to the Lift 15 voids, the particular pour began at 8:00 or 9:00 a.m. in the morning and lasted until around 6:00 a.m. the following morning — a duration of almost 20 hours. The extended duration of the pour was caused in part by repeated failures (as many as five) of pumps. By the end of the pour, the engineering and QC personnel involved had become quite fatigued. Moreover, there apparently was inadequate lighting to perform the pour after dark. The pour in the area around the crane — where voids were found — occurred between 3:00-6:00 a.m. of the second day. The voids were not detected by QC personnel but rather by construction personnel who were cleaning up after the pour. Tr. 7086, 7131, 7133-34, 7151 (Singleton); Tr. 7080-81 (Hernandez).

333. When confronted with repeated pump failures and an extended duration of the pour, QC personnel should have realized the potential for voids and should have advised construction personnel to take steps to prevent them. Two QC inspectors were disciplined for failing to grasp the seriousness of the situation and for reporting an absence of problems with the pour. Tr. 7087, 7129 (Singleton). Greater experience might have assisted the QC inspectors in detecting a situation where voids were likely and in taking steps in anticipation of a work stoppage (Tr. 7153-55 (Artuso); Tr. 7162-63 (Singleton)).

334. Permitting concrete pouring to have taken place under inappropriate circumstance such as attended the Lift 15 pour constituted a violation of 10 C.F.R. Part 50, Appendix B, Criterion IX (as well as Criterion II). The failure of QC personnel to have discovered the Lift 15 voids constituted a violation of Criterion X.

335. All voids were completely filled with grout which has a strength greater than or equal to the surrounding concrete (Murphy, *et al.* (Contentions), ff. Tr. 6522, at 15-17; Tr. 6723-24 (Murphy)). The Staff has reviewed these repairs and found them adequate (Staff Exh. 113 (I&E Rept. 81-16, at 4-5); Staff Exh. 118 (I&E Rept. 81-22, at 4-5)). In addition, prior to operation of STP, the RCB walls will be subject to further tests, including pressurizing the containment in excess of design basis events (Murphy, *et al.* (Contentions), ff. Tr. 6522, at 20; Tr. 6888-89, 7197-98 (Hernandez)).

336. While B&R remained as construction contractor, construction and QA/QC procedures were improved to prevent further voids. Visibility and access were improved by relocating the construction joint so that the 8-inch stiffeners are now near the top of the placement; this relocation makes it easier to vibrate and inspect the concrete during placement. The horizontal rebar was also repositioned in order to improve access to the placement for inspectors and vibrator operators. Furthermore, instead of a normal concrete mix, a fine aggregate concrete (grout) mix was to be used beneath penetrations and in congested areas. Murphy, *et al.* (Contentions), ff. Tr. 6522, at 19. Finally, post-placement meetings were established to identify and resolve any problems experienced during the placement (*id.* at 20).

337. Based on the foregoing findings, the Board finds that the voids in the RCB walls, now fully repaired, do not prevent the findings required by 10 C.F.R. § 50.57.

***Contention 1.3***

338. The Applicants addressed this contention through the Murphy panel of witnesses identified in Finding 327, *supra* (Murphy, *et al.* (Contentions), ff. Tr. 6522). The Staff addressed this contention through the panels of Seidle, *et al.*, and Crossman, *et al.* (*see* Findings 40 and 19, respectively)) (Seidle, *et al.*, ff. Tr. 9205; Crossman, *et al.*, ff. Tr. 10,010).

339. A cadweld is a connector used to join two pieces of reinforcing steel bar or to connect a piece of reinforcing steel to a structural member. *See* Murphy, *et al.* (Contentions), ff. Tr. 6522, at 24-26.

340. The Intervenors never identified which field document they claim was lost. However, on September 9, 1978, the NRC Staff received allegations that there were cadwelding irregularities at the STP; one of the allegations was that field sketch No. FSQ-030 had been lost (Staff Exh. 13 (I&E Rept. 78-15, at 2, 6-7); Murphy, *et al.* (Contentions), ff. Tr. 6522, at 34-35).

341. FSQ-030, which should have recorded the precise location of Cadwelds 28H31 through 28H44, was in fact never prepared (Staff Exh. 14 (I&E Rept. 78-18, at 2); Murphy, *et al.* (Contentions), ff. Tr. 6522, at 34).

342. The approximate location in the reactor containment building of Cadwelds 28H31 through 28H44 can be determined by a design drawing (Staff Exh. 14 (I&E Rept. 78-18, at 2)). If necessary, the cadwelds could be found, though with some difficulty (Tr. 6807-08 (Murphy); Tr. 6812 (Singleton)).

343. Knowing the precise location of cadwelds is only necessary if test splices indicate that a batch of cadwelds might be defective (Murphy, *et al.* (Contentions), ff. Tr. 6522, at 39; Tr. 6811-12 (Singleton)). There was no evidence, however, of test splice failure for the batch of cadwelds in question. Moreover, the cadweld inspection book showed that Cadwelds 28H31 through 28H44 had been inspected and approved. The Staff considered the matter as resolved. Staff Exh. 14 (I&E Rept. 78-18, at 2); Murphy, *et al.* (Contentions), ff. Tr. 6522, at 35.

344. The failure to prepare field sketch FSQ-030 violated 10 C.F.R. Part 50, Appendix B, Criterion VI. The failure to have a document like FSQ-30 among the project QA records violated Criterion XVII. For reasons previously stated, there was no safety significance to these violations.

345. Based on the foregoing findings, the Board finds that the absence of the field sketch and the resulting difficulty in determining the exact location of Cadwelds 28H31 through 28H44 in the RCB does not prevent the findings required by 10 C.F.R. § 50.57.

***Contention 1.4***

346. With respect to this contention, the Applicants presented the Murphy panel (*see* Finding 327) (Murphy, *et al.* (Contentions), ff. Tr. 6522). This contention was addressed for the Staff by the Seidle panel (*see* Finding 40) (Seidle, *et al.*, ff. Tr. 9205).

347. A waterproofing membrane is placed around the STP containment buildings to cover all exterior vertical and horizontal surfaces below grade. The membrane is a laminated sheet material consisting of rubberized asphalt bonded to a polyethylene sheet. Murphy, *et al.* (Contentions), ff. Tr. 6522, at 40.

348. During a site inspection, an NRC inspector received allegations that the membrane seals in the Unit 1 RCB had been installed at night,

without proper QC inspection prior to the placement of backfill, and apparently had been damaged. Seidle, *et al.*, ff. Tr. 9205, at 52-53.

349. An onsite investigation of these allegations was conducted, the results of which were detailed in I&E Rept. 79-14 (Staff Exh. 32). The investigation did not substantiate the allegations (Seidle, *et al.*, ff. Tr. 9205, at 53; Staff Exh. 32 (I&E Rept. 79-14, at 3)).

350. There were instances where the membrane seals were damaged during construction. Such damage was identified by the QA/QC program prior to backfilling and documented in nonconformance reports (NCRs). The damage was then repaired and the NCR closed out. Murphy, *et al.* (Contentions), ff. Tr. 6522, at 43.

351. In one instance, review of NCRs indicated that backfill had been placed over a membrane prior to inspection. However, the backfill was subsequently removed, and the membrane inspected. *Id.* at 92.

352. The membrane seal is a secondary means of protecting against groundwater seepage. It is not required by any code or standard applicable to STP. Primary waterproofing is provided by (1) the continuous steel liner and (2) the reinforced concrete containment structure (basemat and walls). *Id.* at 39-40; 63-64.

353. No violation of 10 C.F.R. Part 50, Appendix B, Criteria X, XV and XVII has been demonstrated with respect to the membrane seals.

354. Based on the foregoing, uncontroverted findings, the Board finds that any damage to the membranes surrounding the containment buildings' basemat and walls below grade has been repaired, and therefore, does not prevent the findings required by 10 C.F.R. § 50.57.

***Contention 1.5***

355. The Applicants addressed this contention through various members of the Murphy panel (*see* Finding 327) (Murphy, *et al.* (Contentions), ff. Tr. 6522). The Staff presented testimony through the Seidle panel (*see* Finding 40) (Seidle, *et al.*, ff. Tr. 9205).

356. In June 1979, the NRC Staff investigated allegations that rebar was missing from parts of the Unit 1 containment structure. The investigation revealed no irregularities. Seidle, *et al.*, ff. Tr. 9205, at 38.

357. A subsequent investigation was conducted by the NRC Staff in January and February 1981, in response to an article in the Houston Post and to CCANP's contention (Staff Exh. 54 (I&E Rept. 80-08, at 3)). This investigation revealed "no documented evidence that reinforcing bars were missing" (*id.* at 10).

358. HL&P also investigated the allegations of "missing rebar," including review of documents concerning the concrete pours identified

by CCANP in response to interrogatories. HL&P found no rebar to have been improperly omitted from the containment. Although rebar was omitted in instances (*e.g.*, where it could not be erected in accordance with design drawings), the omissions were documented through a nonconformance report (NCR) or field request for engineering action (FREA) and were subject to a corresponding design change and engineering review. Murphy, *et al.* (Contentions), ff. Tr. 6522, at 51-52, 68-72.

359. Based on the foregoing, uncontroverted findings, the Board finds that any omitted rebar was documented and subject to the appropriate design change; accordingly, no violation of Appendix B, Criteria X, XV and XVI has been demonstrated with respect to missing rebar in the containment structure, and the omissions do not prevent our findings pursuant to 10 C.F.R § 50.57.

***Contention 1 6***

360. The Applicants addressed this contention through the Murphy panel (*see* Finding 327) (Murphy, *et al.* (Contentions), ff. Tr. 6522). The Staff covered this contention through the Seidle and Crossman panels (*see* Findings 40 and 19, respectively) (Seidle, *et al.*, ff. Tr. 9205; Crossman, *et al.*, ff. Tr. 10,010).

361. In May 1978, the NRC Staff investigated allegations of irregularities in cadwelding procedures — in particular, claims that cadweld documents had been falsified. The investigation revealed no evidence of falsification. Staff Exh. 7 (I&E Rept. 78-09); Seidle, *et al.*, ff. Tr. 9205, at 21-23.

362. Subsequent investigations during 1978 and early 1979 revealed problems in cadwelding procedures and quality control. The problems were resolved by the institution of a reinspection program, by retraining cadwelders and inspectors, and by revising quality control procedures. The investigations did not reveal any falsified cadweld records. Staff Exhs. 13, 14, 15, 16, 17, 18 and 19; Seidle, *et al.*, ff. Tr. 9205, at 32-33.

363. In June and October of 1979, reports of two further NRC investigations substantiated discrepancies and omissions in cadweld documentation. The investigative reports indicated, however, that HL&P and B&R had already identified the problem and were actively pursuing its resolution. Staff Exh. 26 (I&E Rept. 79-09, at 3); Staff Exh. 32 (I&E Rept. 79-14, at 4). *See also* Murphy, *et al.* (Contentions), ff. Tr. 6522, at 87-88. Allegations that cadweld inspection reports had been falsified were not substantiated (Staff Exh. 32 (I&E Rept. 79-14, at 4)).

364. HL&P and B&R established a cadweld documentation task force to review all cadweld records. The task force reviewed the records for over 36,000 cadwelds. It determined that 190 cadwelds (about 0.5 percent) lacked in-process and visual inspection records. However, inspection of 150 of the undocumented cadwelds was verified by pour cards for the placements in which those cadwelds were located; therefore, only 40 cadwelds remain undocumented. Murphy, *et al.* (Contentions), ff. Tr. 6522, at 87-88.

365. The visual-inspection rejection rate for cadwelds is approximately 1 percent, and even a cadweld that has been rejected upon visual inspection rarely fails to meet tensile strength requirements. *Id.* at 30, 38. Therefore, the Board concludes that it is unlikely that even one of the forty unverified cadwelds fails to meet tensile strength requirements. *See id.* at 31. Furthermore, the STP design is sufficiently conservative to compensate for instances of cadwelds that were below strength. *Id.* at 61-62.

366. The various document deficiencies, including the absence of documentation for forty cadwelds, even though insignificant from a safety standpoint, constitute at least technical violations of 10 C.F.R. Part 50, Appendix B, Criteria IX and X (and Criterion VI as well).

367. Based on the foregoing, uncontroverted findings, the Board finds that cadweld documentation deficiencies do not prevent the findings required by 10 C.F.R. § 50.57.

***Contention 1.7(a)***

368. The Applicants addressed this contention through Mr. Peverley (identified in Finding 318) (Peverley (Contention 1.7), ff. Tr. 7835). The Staff presented its testimony through the Seidle panel (*see* Finding 40) (Seidle, *et al.*, ff. Tr. 9205).

369. During B&R's tenure at STP, changes to the requirements of a design document, or clarifications of those requirements, were effected through the use of Field Requests for Engineering Action (FREAs) (after the Show-Cause Order, known as Field Change Requests (FCRs)). These requests were transmitted to the Engineering Department, which had the authority to approve or disapprove the request. Any changes pursuant to a FREA or FCR were subject to the same review as was the original design document. In addition, all FREAs and FCRs written against safety-related or seismic Category I design documents required formal design verification. Peverley (Contention 1.7), ff. Tr. 7835, at 5-6; *see also* Crossman, *et al.*, ff. Tr. 10,010, at 47; Tr. 7895, 7898, 7903, 7908 (Peverley).

370. QC inspectors did not have the responsibility for verifying that design changes are executed in accordance with the purpose of the original design. Their responsibility is to provide documented verification that construction is performed in accordance with appropriate procedures and in conformance with the appropriate design documents, as amended. This function was accomplished using pre-planned checklists provided by Quality Engineering. Peverley (Contention 1.7), ff. Tr. 7835, at 4.

371. The Intervenors never specifically pointed to any example of a QC inspector who was thwarted in an effort to verify that design changes were executed in accordance with the purposes of the original design. The record establishes that the premise of this contention — *i.e.*, that QC inspectors had a role in assuring that design changes were properly executed — is without foundation. Therefore, Contention 1.7(a) is without merit. No violation of 10 C.F.R. Part 50, Appendix B, Criteria III and IX has been demonstrated.

***Contentions 1.7(b) and 1.7(c)***

372. The Applicants presented Mr. Peverley (*see* Finding 318) with respect to these contentions (Peverley (Contention 1.7), ff. Tr. 7835). The Staff addressed them through the Seidle panel (*see* Finding 40) (Seidle, *et al.*, ff. Tr. 9205).

373. The Intervenors provided no specific examples of design changes being approved by persons not qualified to do so. The Applicants believed that the concerns raised by Contentions 1.7(b) and 1.7(c) stemmed from the period around May 1978, when, at the direction of HL&P, B&R modified its design change procedures to permit the onsite processing of FREAs, when feasible. To accomplish the onsite processing of FREAs, it was necessary to assign Design Engineers to the site. During the transition to the new system, Mr. Douglas Robertson, a civil engineer already stationed at the site to assist in geotechnical activities, was given the authority to authorize civil/structural FREAs. However, prior to authorizing a civil/structural FREA, Mr. Robertson was required to familiarize himself with the situation and contact by telephone the responsible Design Engineer. If the responsible Design Engineer decided the request was significant and required calculational activities, the FREA would be sent to the Design Engineer for authorization; if the Design Engineer decided that the request was straightforward and did not involve calculational activities, he would authorize onsite approval. Onsite approval, however, did not obviate subsequent review by Design Engineering; all FREAs were forwarded to the

appropriate Design Engineer and were processed without regard to the advance onsite approval of the design change. This process did not violate any rules of the Commission and is consistent with the requirements of Regulatory Guide 1.64. Peverley (Contention 1.7), ff. Tr. 7835, at 6-11; Tr. 7893 (Peverley).

374. An NRC investigation of an allegation concerning the inability of construction engineers to assure that construction was performed in accordance with drawings and procedures did not uncover any evidence that unqualified persons were approving design changes. Seidle, *et al.*, ff. Tr. 9205, at 26.

375. As the Staff observes, although it may be correct to state that Mr. Robertson may have approved design changes with no firsthand knowledge of the purpose of the original design, it cannot be said that the verification against the original design never occurred (Staff FOF at 176). Furthermore, Mr. Robertson was an experienced civil engineer, with previous experience in earthwork construction, surveying, soils and concrete testing, construction project management where piping, steel erection and concrete structures were involved, foundation investigations and design analysis, and airport construction. Peverley (Contention 1.7), ff. Tr. 7835, at 10; Tr. 7901, 7904 (Peverley). For these reasons, to the extent Contentions 1.7(b) and (c) include allegations of safety significance, they are without merit. In addition, no violation of Appendix B, Criteria III and IX, has been demonstrated.

***Contention 1.7(d)***

376. With respect to Contentions 1.7(d) and 1.7(e), which include several related allegations, the Applicants presented the testimony of Dr. Knox M. Broom, Senior Vice President of the B&R Power Group (*see* Finding 39) (Broom/Vurpillat, *et al.*, ff. Tr. 3646); Charles M. Singleton, Civil Discipline QC Superintendent, B&R (Warnick, *et al.*, ff. Tr. 8032); and Stephen H. Grote, Senior Vice President of Operations, B&R Power Group (at Tr. 4341 *et seq.*). At the Board's request, the Applicants also recalled John B. Duke, a B&R QC Inspector at STP from February 1976 to June 1977, who had been presented by the Applicants on another subject (Buckalew/Duke, ff. Tr. 6265; Duke, recalled at Tr. 6463). The Staff presented the Seidle panel on these contentions (*see* Finding 40) (Seidle, *et al.*, ff. Tr. 9205).

377. Although the NRC Staff on several occasions investigated allegations that construction documents had been falsified (Staff Exhs. 1, 2, 3, 7, 60, and 67; CCANP Exh. 10), the investigations produced no evidence of pour-card falsification, the subject of this contention.

378. In late 1979, the NRC received an allegation that QC inspectors were signing inspection documents (presumably including pour cards) without having conducted the inspection. The QC inspectors allegedly played cards while they were supposed to have been performing inspections. In response to discovery requests, CCANP indicated that the alleged falsifications of pour cards were the result of the alleged card games. An NRC investigation did not substantiate the allegation. Staff. Exh. 32. (*See* Findings 389-391, *infra*, for a more detailed discussion of the alleged card games.)

379. Following the Show-Cause Order and I&E Report 79-19 (Staff Exh. 46, Appendix D), the Applicants established a Special Task Force on Concrete. The Task Force reviewed the accuracy of construction field documents relating to concrete, including pour cards, and found the documentation substantially complete (with minor exceptions) and of good quality. Murphy, *et al.* (Concrete Verification), ff. Tr. 6327, at 10, 16-18.

380. No violation of Appendix B, Criteria III and IX, arising from pour-card falsification has been demonstrated.

***Contention 1.7(e)***

381. During B&R's tenure at STP, there were repeated instances of friction between construction personnel and QC inspectors. The Notice of Violation issued by NRC on April 30, 1980 charged, *inter alia*, that some QC inspectors were harassed, intimidated and threatened. Several instances were cited. Staff Exh. 46, Appendix A, ¶ A.1. In their response to these charges, the Applicants stated that they could not affirm or deny particular statements but that "our own review suggests that such instances probably did occur" (Staff Exh. 47, Attachment, at 1). We here review the considerable testimony offered on this subject.

382. On July 1, 1977, the NRC received a telephone call, during which it was alleged that a B&R construction foreman had assaulted and injured a B&R Civil QC inspector, that the incident was just one of a series of threats and harassments against B&R QC inspectors, and that a B&R construction superintendent had advised his workers that any B&R Civil QC inspector who reported unacceptable items found during concrete placement inspections would be liable for a beating.

The NRC investigated these allegations and found an inordinate amount of friction existing between B&R Civil QC inspectors and B&R construction personnel, and the existence of various minor harassments. The investigation also substantiated two specific incidents: (1) an argument and threats between a B&R Civil QC inspector and a B&R con-

struction foreman on the morning of June 30, 1977; and (2) a physical altercation between a B&R construction foreman and a B&R Civil QC inspector on the afternoon of June 30, 1977. The QC inspector also stated that he was threatened by an unknown laborer as he was leaving the plant site after the incident.

The investigation, however, found no directed program of harassment and intimidation, and no evidence that a B&R construction superintendent had advised his workers that any B&R QC inspector who found and reported unacceptable items during concrete placement would be liable for a beating. None of the ten inspectors interviewed during the investigation stated that any harassment led to the overlooking of unacceptable items. I&E Rept. 77-08 (Staff Exh. 4); *see also* CCANP Exhs. 16 and 20; Staff Exh. 112.

383. HL&P project personnel had discussions with the B&R construction Project Manager and a policy aimed at minimizing friction and altercations was developed (Oprea, *et al.*, ff. Tr. 1505, at 12; *see* Warnick, *et al.*, ff. Tr. 8032, at 31-32). The policy was communicated to all B&R QA/QC personnel by memorandum dated July 27, 1977. It emphasized that confrontations were not tolerated and that disputes were to be referred to supervisors. CCANP Exh. 16; Tr. 3834-35 (Broom). The foreman involved in the physical altercation was subsequently discharged by B&R. Warnick, *et al.*, ff. Tr. 8032, at 13; Tr. 3821 (Broom).

384. On July 19, 1978, the NRC received a telephone call, wherein it was alleged, *inter alia*, that there was undue pressure from B&R construction personnel on B&R QC inspectors. The NRC investigated and concluded that this allegation "could be valid" because of inadequate in-process inspection practices (inadequate pre-pour inspections by craft foreman and field engineers); however, no items of noncompliance or deviations were identified. The investigation also indicated apparent low morale of some B&R Civil QA/QC inspectors. I&E Rept. 78-12 (Staff Exh. 8); Tr. 9269-71 (Seidle). These problems were discussed in a meeting between the NRC and HL&P on August 15, 1978 (I&E Rept. 78-13 (Staff Exh. 9)). *See* Staff Exh. 10 for Applicants' response.

385. On August 22-25, 1978, the NRC investigated the firing of a B&R QC inspector who had allegedly solicited a bribe from a construction person. The NRC also investigated the allegation that other QC inspectors would be intimidated by the firing. The investigation did not substantiate either that a bribe had been solicited or that QC inspectors would be intimidated by the firing. I&E Rept. 78-14 (Staff Exh. 12). After the B&R QC inspector had been discharged, HL&P increased its surveillance program of concrete placements for several months.

Through this surveillance, HL&P concluded that the firing had no adverse impact on the job performance of the remaining QC inspectors. Warnick, *et al.*, ff. Tr. 8032, at 37-38.

386. On August 24, 1978, B&R issued a memorandum to all B&R QA/QC personnel. The memorandum required those personnel to report any abuse to their supervisors, but not to retaliate. CCANP Exh. 54; Warnick, *et al.*, ff. Tr. 8032, at 38.

387. In March 1979, the NRC investigated an altercation between a QC inspector and a construction engineer (I&E Rept. 79-04, at 7 (Staff Exh. 20)). The Applicants testified that a QC inspector and a construction engineer had a dispute over pour cleanliness on a concrete pour, that the QC inspector made remarks which the construction engineer interpreted as calling him a liar, and that the construction engineer then swung at the QC inspector. The QC inspector was reprimanded for his unprofessional conduct and the construction engineer was transferred to another project. The inspector's supervisor, who was present throughout the incident, was given a three-day suspension for allowing the situation to deteriorate to a physical confrontation. Warnick, *et al.*, ff. Tr. 8032, at 13-14, 33-34; Tr. 8070-80 (Warnick).

The NRC investigation determined that the management response to this matter had been timely and effective in indicating support for the site QA program (Staff Exh. 20 (I&E Rept. 79-04, at 7)).

388. During a site inspection in August 1979, the NRC received allegations of intimidation of QC inspectors by B&R construction personnel (I&E Rept. 79-13, at 28-29 (Staff Exh. 27)). In September 1979, the NRC investigated these allegations, specifically that two B&R QC inspectors were intimidated by five B&R construction personnel. The intimidation could be neither substantiated nor refuted, owing to conflicting statements. I&E Rept. 79-14, at 3 (Staff Exh. 32).

389. Among the allegations investigated in the September 1979 inspection were charges, which initially had surfaced in March 1979, by a former B&R QC inspector (the one who had been discharged for allegedly accepting a bribe, *see* Finding 385, *supra*) to the effect that QC inspectors were involved in continuous card games during a several-month period in 1977 and while so involved, signed inspection forms without having performed the inspection. Staff Exh. 32 (I&E Rept. 79-14, at 3); Broom/Vurpillat, ff. Tr. 3646, at 31-33; Seidle, *et al.*, ff. Tr. 9205, at 54-55. NRC investigators interviewed nine QC inspectors, none of whom were aware of card games in 1977. Some of the inspectors admitted that there had been some card games in 1976, but stated that the games were not of the scope alleged and had no adverse impact on QC inspections. The investigation did not, therefore, substantiate the

allegations. Staff Exh. 32 (I&E Rept. 79-14, at 9-10); Seidle, *et al.*, ff. Tr. 9205, at 54-55.

390. B&R interviewed inspectors allegedly involved in the card games. The inspectors stated that there were some card games during lunch and during periods of low construction activity, but that the games did not interfere with any inspections. B&R also reviewed inspection records, found no decrease in deficiency reports during the period in question, and inferred therefrom that the inspections were being performed. Broom/Vurpillat, ff. Tr. 3646, at 32-33.

391. Two inspectors allegedly involved in the card games testified before the Board. One testified that there had been card playing during lunch and during periods of low construction activity from December 1976 to January 1977. The other inspector testified that there had been card games during lunch from the summer of 1976 to the winter of 1976. Both inspectors stated that the games did not interfere with inspections. Warnick, *et al.*, ff. Tr. 8032, at 26-27; Tr. 6461-62 (Duke).

392. On November 2, 1979, the NRC was contacted by a B&R QC inspector who alleged that Civil QC inspectors were being harassed and intimidated by B&R construction personnel and QA/QC management. As a result of these allegations and past allegations of a similar nature (described above), the NRC initiated a special investigation, conducted from November 10, 1979 to February 7, 1980. The investigation substantiated eight of ten allegations of harassment, intimidation, and lack of support for QC inspectors, with several others remaining unresolved as of that time.

The substantiated allegations included, *inter alia:* (1) that the site QA manager told QA/QC inspectors that he would know if they talked to the NRC (insinuating that action or trouble would follow) and that the NRC was tired of hearing complaints; (2) that on two occasions a general foreman (the same foreman on each occasion) threatened a QC inspector (not the same inspector on each occasion); (3) that Civil QC inspectors had lost the support of their supervisors when they were confronted by construction personnel; (4) that a construction superintendent threatened a QC inspector with bodily harm; (5) that a QC supervisor told inspectors that QC inspectors who talked to the NRC would be "hitting the gate" (*i.e.*, discharged); and (6) that QC inspectors are taught not to expect support from their supervisors. I&E Rept. 79-19 (Staff Exh. 46, Appendix D); *see* Findings 64, 66 and 74-75, *supra.*

393. In response to I&E Report 79-19, HL&P increased its involvement in the QA/QC program. Assessments by B&R and HL&P were conducted to identify sources of friction. QC supervisory personnel were upgraded to provide them stature equal to that of their construction

counterparts, QC salaries were revised to attract additional qualified personnel and to reduce attrition, and an extensive recruiting program was instituted.

In addition, written procedures and policies were revised to stress the proper means of dispute resolution and to ensure that any instances of harassment or intimidation were immediately reported. A formal written dispute resolution procedure (STP-PGM-02) was adopted on January 7, 1980 (prior to the formal release of I&E Report 79-19 but subsequent to preliminary notification by NRC to HL&P of some of the findings of that report). QA/QC and construction supervisors received additional training in employee motivation, human relations, and supervisory skills. QA/QC and construction personnel received refresher courses in project procedures. B&R QA management and HL&P site surveillance personnel increased their visits to the site, and access by QA/QC personnel to top level management was facilitated.

Finally, two B&R construction supervisory personnel against whom allegations of intimidation and harassment had been made were removed from the project.

Staff Exh. 47 (Applicants' Response to the Show-Cause Order). *See also* Broom/Vurpillat, ff. Tr. 3646, at 45-50; Warnick, *et al.*, ff. Tr. 8032, at 43.

394. In September 1980, the NRC held a routine announced inspection, including follow-up relative to I&E Report 79-19 items. The NRC inspectors conducted interviews with B&R QC inspectors and addressed the particular I&E Report 79-19 findings of harassment, intimidation, and lack of support. The interviews revealed only a few isolated negative comments, including what was termed an "idle threat" made to a QC inspector. *See* Tr. 8769 (Singleton); Tr. 8930, 8975 (Wilson). The NRC inspectors found the overall interview results to be very positive and considered the previously identified conditions, which had caused the noncompliances, to be corrected. I&E Rept. 80-25 (Staff Exh. 45).

395. At the hearing, the Applicants described further steps which HL&P might take if further instances of harassment, intimidation or threats against QC inspectors were to occur. Specified persons employed by HL&P would be assigned to determine the facts, what immediate corrective action was necessary, and what long-term corrective actions would be necessary to preclude recurrence. HL&P's Vice President, Nuclear Engineering and Construction, stated that he hoped to be able to organize a small team of people that would have a complement of skills (mechanical, civil, electrical) who could become a focal point for HL&P's reviews of such occurrences. Tr. 2537-39, 2740-41 (Goldberg).

396. The investigative results described above indicate excessive friction between QC inspectors and construction personnel, and poor management. This friction continued as late as the spring of 1980. It did not, however, reflect a pattern of intimidation. *See* Tr. 9370 (Seidle); Warnick, *et al.*, ff. Tr. 8032, at 17; Tr. 8129-30 (Warnick); Tr. 8421 (Singleton). Nor, though the question was posed in each investigation, did the investigations reveal QC inspectors failing to perform assigned inspections or overlooking nonconforming conditions as a result of attempted intimidation or harassment (except possibly in one instance). Warnick, *et al.*, ff. Tr. 8032, at 27, 44; *see* Finding 74 with respect to the one instance of possible intimidation).

397. As discussed in greater detail earlier (*e.g.*, Findings 96, 111, *supra*, relative to Issue A), the likely root cause of the widespread and continuing instances of harassment and threats was inexperienced management and an unusually long chain of command from the site to upper management (which resulted in the masking of critical information). Tr. 1739 (Amaral). HL&P has taken steps to alleviate these problems. The Staff judged the current written QA program to be excellent and the grievance procedure better than at most other sites. Tr. 9516, 9548, 10,098 (Phillips). Nonetheless, as of the close of the Phase I record, questions raised by incidents of harassment and intimidation were not entirely resolved (Finding 223, *supra*).

398. The proven incidents of harassment and intimidation do not constitute violations of 10 C.F.R. Part 50, Appendix B, Criterion III (Design Control) or IX (Control of Special Processes). They do constitute violations of the implementation requirements of Criterion II (Quality Assurance Program). Notwithstanding these violations, the Applicants have instituted measures to preclude future incidents of this type. The performance of the Applicants and their contractors in this regard is to be included in the Phase II review which we are directing (*see* p. 697, *supra*).

399. Based on the foregoing findings, the Board finds that the specific allegations of Contentions 1.7(a) through (d) have been rebutted; the allegations of Contention 1.7(e) have been addressed by HL&P and adequately remedied, subject to the review we are directing for Phase II. Therefore, these allegations do not at this time prevent our making findings pursuant to 10 C.F.R. § 50.57.

***Contentions 1.8(a)-(d) Introduction***

400. Contentions 1.8(a), (b), (c), and (d) each arose out of the Staff inspection described in I&E Report 81-28 (Staff Exh. 124). Each conten-

tion addresses activities which assertedly constitute QA/QC deficiencies and violate various criteria of 10 C.F.R. Part 50, Appendix B. The Applicants addressed all of these contentions through a panel consisting of R.A. Frazar, the STP QA Manager during the pertinent time period; J.L. Blau, the acting Project Engineering Manager at that time; and H.G. Overstreet, supervisor, of the QA group which had responsibility in the area covered by the inspection report (Frazar, *et al.*, ff. Tr. 10,123). The Staff testimony was presented through I&E Report 81-28 (Staff Exh. 124) and by H.S. Phillips, Resident Reactor Inspector for STP and R.K. Herr, Senior Investigator, Region IV (Tr. 10,011).

***Contentions 1.8(a) and 1.8(b)***

401. In November 1980, HL&P QA wrote an NCR. Two of the issues in the NCR were: (1) B&R did not appear to have procedures in place to implement access design, and (2) the PSI/ISI Manual containing the criteria for access design had not been updated every 6 months as required by its terms. In June 1981, a revised NCR was written by HL&P QA; it contained the two issues above and a third issue, that access design was being conducted using a draft Technical Reference Document. Frazar, *et al.*, ff. Tr. 10,123, at 3-5.

402. At the same time as the revised NCR was issued, HL&P QA drafted a stop-work letter. The purpose of the proposed stop-work letter was not to terminate an activity which might cause irreparable construction deficiencies but rather to obtain B&R's immediate attention and action to resolve the issued raised by the NCR. Staff Exh. 124 (I&E Rept. 81-28, at 4); Frazar, *et al.*, ff. Tr. 10,123, at 5-6; Tr. 10,201 (Overstreet).

403. Prior to issuing the stop-work letter, HL&P QA informed HL&P management of its intent. HL&P management requested an opportunity to discuss the issues with B&R in order to resolve them expeditiously. Because HL&P's QA motivation in drafting the stop-work notice was the prompt resolution of the issues, HL&P QA acceded to the request. Staff Exh. 124 (I&E Rept. 81-28, at 4-5); Frazar, *et al.*, ff. Tr. 10,123, at 6. The issues were subsequently and promptly resolved. Frazar, *et al.*, ff. Tr. 10,123, at 9.

404. In July-August 1981, the NRC Staff investigated an allegation, based on the aforementioned events, that HL&P management, in determining that a stop-work notice should not be issued, had failed to support HL&P QA. Staff Exh. 124 (I&E Rept. 81-28, at 4). The investigation revealed no instance where HL&P failed to meet an NRC requirement. Staff Exh. 124.

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other HL&P QA personnel requested that an NCR be written, these individuals would refer the requester to B&R. Staff Exh. 124 (I&E Rept. 81-28, at 8).

412. The NRC investigation concluded that HL&P QA procurement personnel were instructed properly by HL&P QA management in regard to initiating NCRs (*id.* (I&E Rept. 81-28, at 2)). The investigation determined that the individuals had sufficient experience (*id.* at 8-9). Although it was substantiated that on one occasion HL&P QA personnel had been referred to B&R by their supervisor when they sought an NCR, it was determined that the referral was not in violation of HL&P procedures (Staff Exh. 124).

***Contentions 1.8(a)-(d) Summary***

413. Based on the foregoing, uncontroverted findings, the Board finds that Allegations 1, 2, and 4 in I&E Rept. 81-28 (and Contentions 1.8(a)-(d)) have been satisfactorily rebutted and that no violation of Appendix B criteria has been demonstrated. Therefore, these allegations do not prevent our findings pursuant to 10 C.F.R. § 50.57.

***Contention 2***

414. Contention 2 alleges:

> NRC inspection records (Inspection and Enforcement Reports #77-03, 2/77; #77-03, 4/77, and #78-08, 5/78) indicate that South Texas Project construction records have been falsified by employees of Houston Lighting and Power Company and Brown and Root, in violation of 10 C.F.R. Part 50, Appendix B, Sections VI and XVII.
>
> As a result, the Commission cannot make the findings required by 10 C.F.R. §§ 50.57(a)(1) and (2).

415. With respect to the alleged record falsifications covered by this contention, the Applicants presented testimony by W. Stephen McKay, Corporate Manager for QA, Pittsburgh Testing Laboratory (PTL) and Timothy K. Logan, Senior QA Engineer and (since 1977) Lead Engineer for HL&P. (These witnesses comprised a portion of the Pettersson panel, ff. Tr. 5796.) The Applicants also addressed this contention through Richard Buckalew, a systems engineering technician for B&R, and John B. Duke, a former STP QC Inspector for B&R (Buckalew/Duke, ff. Tr. 6265). The Staff presented the Seidle and Crossman panels with respect to this contention (*see* Findings 40 and

19, respectively) (Seidle, *et al.*, ff. Tr. 9205; Crossman, *et al.*, ff. Tr. 10,010).

416. On February 1, 1977, HL&P reported to the NRC that an employee of PTL, a subcontractor, had falsified records to indicate that he had tested concrete sand for gradation, when in fact he had not. Staff Exh. 1 (I&E Rept. 77-03, at 2-3); Seidle, *et al.*, ff. Tr. 9205, at 11-12; Pettersson, *et al.*, ff. Tr. 6227, at 5.

417. In February 1977, the NRC investigated the reported falsification and substantiated it (Staff Exh. 1 (I&E Rept. 77-03)). The PTL employee admitted not performing the tests, and his employment was terminated (*id.* at 4; Pettersson, *et al.*, ff. Tr. 6227, at 5). The Staff investigation established that neither the Applicants' management nor their contractors knew of the falsification prior to its being reported by a PTL employee (Seidle, *et al.*, ff. Tr. 9205, at 12, 14). The Staff inspectors attributed the record falsification to production pressure (Staff Exh. 1 (I&E Rept. 77-03, at 6)).

418. Other tests had been performed that assured the adequacy of the concrete constituents (Staff Exh. 1 (I&E Rept. 77-03, at 2); Pettersson, *et al.*, ff. Tr. 6227, at 10-11; Seidle, *et al.*, ff. Tr. 9205, at 12-14). PTL also conducted a review to detect anomalies in its test results (I&E Rept. 77-05, at 1-1 (Staff Exh. 2); Seidle, *et al.*, ff. Tr. 9205, at 13-14). A follow-up investigation concluded that corrective action had been performed and that no further action was necessary (Staff Exh. 2 (I&E Rept. 77-05, at 4, 6)).

419. The falsification of construction records (Finding 417) reflects a violation of 10 C.F.R. Part 50, Appendix B, Criteria VI. There was no culpability of HL&P or B&R management although B&R might have taken steps to mitigate production pressures. As a result of the tests and investigations, it does not appear that the falsification in fact had safety significance.

420. I&E Report 78-08 (Staff Exh. 3), also cited in Contention 2, did not address any instances or allegations of falsified construction documents. I&E inspectors did review records related to placements of concrete, but no items of noncompliance or deviations were identified (*id.*).

421. An inspection in April 1978, I&E Report 78-07 (CCANP Exh. 10), found that a QC inspector had marked a record print to indicate that an inspection was complete, when in fact it was not; a bolted joint of four structural beams had only been partially inspected (and the joint was so marked), but the record print indicated that the inspection was complete. *Id.*, Appendix A (Notice of Violation), at 3-4; I&E Rept. 78-07, at 8.

422. The investigation determined that B&R QC Procedures did not contain a definition differentiating a connection from a joint (which might comprise several connections). As a result, inspectors used different methods for marking bolt inspections on record prints; some inspectors marked each connection of a joint, while others marked the whole joint. This definitional deficiency contributed to the QC inspector's misinterpretation of the inspection requirements. *Id.* at 8-9; Pettersson, *et al.*, ff. Tr. 6227, at 11-13. The investigation did not find that there had been a deliberate falsification (CCANP Exh. 10). The NRC closed out the incident in I&E Rept. 78-11 following a procedure revision by B&R (Pettersson, *et al.*, ff. Tr. 6227, at 12).

423. Although not explicitly covered by the allegations of Contention 2, the Staff presented evidence concerning instances of alleged falsification of documents. In May 1978, the NRC investigated alleged falsification of cadweld records. The investigation did not substantiate the allegations, and identified no items of noncompliance. Staff Exh. 7 (I&E Rept. 78-09); *see* Findings 56, 338-345, 360-367, *supra*.

424. Two other instances of substantiated document falsification appear in I&E Reports 80-14 and 80-21 (two documents, one admittedly falsified) (Staff Exhs. 60 and 67). The first, involving a falsified fabrication checklist, was done by a field inspector without the knowledge of either HL&P or B&R management. Shortly after the issuance of I&E Report 80-14, the individual was terminated. Crossman, *et al.*, ff. Tr. 10,010, at 15. The second, concerning falsification of two maintenance records, also did not involve management. The individuals involved in this incident were removed from safety-related work and in one instance terminated. *Id.* at 15-17; Tr. 3781, 4946 (Broom); Tr. 4946 (Grote); Tr. 4159 (Vurpillat). *See also* Findings 90-91, *supra*.

425. Based on the foregoing findings, the Board finds that the inspection reports to which CCANP alludes (and the allegations and conclusions therein) do not prevent our findings pursuant to 10 C.F.R. § 50.57.

## II. CONCLUSIONS OF LAW

Based upon the foregoing findings of fact and upon consideration of the entire evidentiary record in this proceeding, the Board makes the following conclusions of law, recognizing that such conclusions may be subject to change based on the record in the forthcoming phases of this hearing:

(1) There is no basis for concluding that at this time HL&P lacks managerial competence or character, as those terms are used in the Atomic Energy Act, as amended, and the Rules and Regulations of the

Commission, sufficient to preclude an eventual award of operating licenses for STP.

(2) There is reasonable assurance that safety-related construction work thus far completed at STP is adequate to perform its intended purpose or that such work will be repaired or replaced as necessary to make such construction work adequate to perform its intend .. purpose, in conformity with the construction permits, the Atomic Energy Act, as amended, and the Rules and Regulations of the Commission.

(3) No construction deficiencies have been identified which would preclude this Board from making the findings required by 10 C.F.R. § 50.57(a)(1) and (2).

(4) HL&P is presently managing, planning, and implementing its program for the balance of design and construction of STP, including its QA program, in a manner which provides reasonable assurance that future design and construction work at STP will be in conformity with the construction permits, the Atomic Energy Act, as amended, and the Rules and Regulations of the Commission.

(5) Based on HL&P's performance in the management of design, construction and planning and preparation for operation of the STP, there is now reasonable assurance that HL&P will have the necessary managerial competence and character (including commitment to safety) to operate the STP safely and in compliance with all applicable NRC requirements.

## Order

On the basis of the foregoing Findings of Fact, Conclusions of Law and Opinion, and the entire record, it is, this 14th day of March 1984,

ORDERED

1. CLI-80-32 Issues A-E, and Intervenors' Contentions 1 and 2, are *resolved* as set forth in this Decision and subject to the terms and conditions set forth herein.

2. The NRC Staff is *directed*, and other parties are *permitted*, to provide the Board during the Phase II evidentiary hearings with the report set forth under Issue B, p. 697, *supra*.

3. CCANP's August 8, 1983, motion to reopen the Phase I record is denied.

4. In accordance with 10 C.F.R. §§ 2.760, 2.762, 2.764, 2.785, and 2.786, this Partial Initial Decision shall become effective immediately and will constitute, with respect to the matters resolved herein, the final

decision of the Commission thirty (30) days after issuance hereof, subject to any review pursuant to the above-cited Rules of Practice. Any party may take an appeal from this decision by filing a Notice of Appeal within ten (10) days after service of this Partial Initial Decision. Each appellant must file a brief supporting its position on appeal within thirty (30) days after filing its Notice of Appeal (forty (40) days if the Staff is the appellant). Within thirty (30) days after the period has expired for the filing and service of the briefs of all appellants (forty (40) days in the case of the Staff), a party who is not an appellant may file a brief in support of, or in opposition to, any such appeal(s). A responding party shall file a single, responsive brief *only*, regardless of the number of appellants' briefs filed. [*See*, in particular, 10 C.F.R. § 2.762, as amended effective December 19, 1983, 48 Fed. Reg. 52,282, 52,283 (November 17, 1983).]

THE ATOMIC SAFETY AND
LICENSING BOARD

Charles Bechhoefer, Chairman
ADMINISTRATIVE JUDGE

Dr. James C. Lamb
ADMINISTRATIVE JUDGE

Ernest E. Hill
ADMINISTRATIVE JUDGE

[Appendices A, B, C, and D have been omitted from this publication, but may be found in the NRC Public Document Room, 1717 H Street, NW, Washington, DC 20555.]

Cite as 19 NRC 859 (1984) LBP-84-14

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**Dr. Robert M. Lazo**, Chairman
**Dr. Cadet H. Hand, Jr.**
**Dr. Peter A. Morris**

**In the Matter of**

**Docket No. 50-309-OLA**
**(ASLBP No. 80-437-02-LA)**

**MAINE YANKEE ATOMIC POWER COMPANY**
**(Maine Yankee Atomic Power Station)**

**March 9, 1984**

Upon review of an Agreement reached among the parties, the Licensing Board grants intervenors' motions to withdraw their contentions and requests for hearing, and authorizes the issuance of a license amendment.

# ORDER
## GRANTING MOTIONS TO WITHDRAW CONTENTIONS, GRANTING MOTION TO WITHDRAW A PORTION OF APPLICATION, AND AUTHORIZING ISSUANCE OF AMENDMENT TO OPERATING LICENSE

On October 24, 1979, the Nuclear Regulatory Commission published in the *Federal Register* a notice of proposed issuance of amendment to facility operating license, 44 Fed. Reg. 61,273, in connection with the application of Maine Yankee Atomic Power Company (Licensee) to

expand the storage capacity of the spent fuel pool at its nuclear electric power generation facility in Wiscasset, Maine. This increase in storage capacity was to be accomplished through a modified spent fuel pin storage concept involving the disassembly of spent fuel assemblies and reassembly into consolidated fuel bundles within the existing fuel racks. Thereafter, the Licensee supplemented its application to seek permission to increase the number of storage locations by "reracking" the spent fuel pool and to utilize the cask laydown area for short-term storage when necessary. In light of that supplementation, the Nuclear Regulatory Commission, on January 28, 1981, published a Supplemental Notice of Proposed Issuance of Amendment to Facility Operating License. 46 Fed. Reg. 9315.

As a result of the filing of appropriate petitions and contentions, a hearing was noticed, Sensible Maine Power ("SMP") and the State of Maine ("Maine") were admitted as intervenors and full parties to the proceeding, and certain contentions were admitted into litigation in the proceeding. Subsequently, the Licensee, the Staff and the intervenors reached agreement among themselves as to resolution of the proceeding as a result of which certain motions have been filed with the Board.

Two of the motions are filed by SMP and Maine, based on an Agreement with Maine Yankee dated January 30, 1984, and are conditional motions for leave to withdraw their requests for a hearing and all of their contentions already admitted into litigation in this proceeding. These motions are *granted* and the contentions of SMP and Maine are hereby deemed withdrawn.

Also before the Board is a conditional motion by the Licensee for leave to withdraw a portion of its application. As it currently stands, the Licensee's application as amended to and including Supplement 3 filed July 21, 1982 for an operating license amendment seeks an amendment which would permit the following spent fuel storage measures:

(a) Replacement of the existing spent fuel racks with new spent fuel racks in which the storage location center to center spacing is 10.25 inches. Reracking will increase the number of spent fuel permanent storage locations from the 953 now existing to 1476.

(b) Storage of spent fuel in the new racks described in (a) above in the form of consolidated fuel assemblies. This concept is also referred to as pin storage. Application of this concept at Maine Yankee will allow either up to the equivalent of 2038 spent fuel assemblies to be stored in consolidated form while at the same time reserve 217 permanent storage spaces for full core reserve, or up to the equivalent of 2390 spent fuel assemblies in consolidated form by completely filling all 1476 locations with stored pins.

(c) *Temporary* storage of up to 121 spent fuel assemblies in their as discharged form in an emergency rack located in the spent fuel cask laydown area. The temporary storage option reduces the number of permanent rack locations which should prudently be held in reserve for removal of the entire core for inspection of the vessel or other short term operations.

By its motion, the Licensee seeks to withdraw so much of its application as would allow it to consolidate more than twenty standard fuel assemblies.

This motion is *granted.*

Finally, there is before the Board a joint motion of all parties for entry of an order authorizing issuance of an amendment to the operating license in conformity with the application as modified by the above-described withdrawal. This motion reflects the Agreement reached by the parties. The Board having independently considered this matter, and having found nothing in the proposed order which would in any way compromise the public health and safety and in light of the policy expressed in 10 C.F.R. § 2.759 encouraging settlements of controversies, it is hereby, in accordance with the Atomic Energy Act, as amended, and the regulations of the Nuclear Regulatory Commission, ORDERED:

That the Director of Nuclear Reactor Regulation is authorized to make appropriate findings in accordance with the Commission's regulations and to issue an appropriate license amendment authorizing the applicant to rerack as requested to store 1476 standard fuel assemblies in the spent fuel pool, to permit no more than 20 standard fuel assemblies to be consolidated, and to temporarily store up to 121 standard spent fuel assemblies in the emergency rack in the cask laydown area.

Dr. Peter A. Morris and Dr. Cadet H. Hand, Jr., concur in this memorandum and order.

FOR THE ATOMIC SAFETY AND
LICENSING BOARD

Robert M. Lazo, Chairman
ADMINISTRATIVE JUDGE

Dated at Bethesda, Maryland,
this 9th day of March 1984.

Cite as 19 NRC 837 (1984) LBP-84-15

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**James L. Kelley,** Chairman
**Dr. James H. Carpenter**
**Glenn O. Bright**

**In the Matter of**

**Docket Nos. 50-400**
**50-401**
**(ASLBP No. 82-468-01-OL)**

**CAROLINA POWER & LIGHT COMPANY and NORTH CAROLINA EASTERN MUNICIPAL POWER AGENCY**
**(Shearon Harris Nuclear Plant, Units 1 and 2)**

**March 15, 1984**

On requests for reconsideration, the Licensing Board rejects certain health effects contentions relating to estimates of genetic damage and cancer caused by radiation because a previously expected Board witness had become unavailable and because it appeared that the Intervenors' proposed witnesses could not shed any additional light on the contentions. The Board also rules on several other contentions and procedural questions.

# MEMORANDUM AND ORDER

**(Ruling on Responses to the Memorandum and Order of January 27, 1984 Concerning Health Effects and Certain Other Matters)**

## INTRODUCTION

The Board's Memorandum and Order of January 27, 1984 (LBP-84-7, 19 NRC 432) has evoked a range of responses from the parties. As we stated in the telephone conference call of March 8, 1984, Dr. John Gofman will not be available as a voluntary Board witness in the late spring-early summer time frame we had envisioned. As we shall explain, this development renders the bulk of the pleadings before us moot.

## THE APPLICANTS' MOTIONS FOR RECONSIDERATION AND CLARIFICATION

The Applicants ask us to reconsider and grant their motions for summary disposition of Joint Contention II(a) and (c). Given Dr. Gofman's unavailability, we agree that the motion as to Contention II(a) should be granted, but not entirely for the reasons cited by the Applicants.

First of all, we reaffirm the rationale of our January 27 Order. Contrary to the Applicants' argument (Motion at 2) we do not think that we have "run afoul" of any NRC rules or decisions. It is apparent to us, however, that the Applicants did not fully understand our rulings on those contentions. *See,* in particular, Motion at 9, last paragraph. We restate our rationale in its essentials, as follows:

(1) There are material issues of fact concerning Dr. Gofman's cancer and genetic risk estimates which the Applicants and Staff have failed to negate.

(2) However, on basic health effects issues which challenge the BEIR estimates, the *Black Fox* decision (*Public Service Co. of Oklahoma* (Black Fox Station, Units 1 and 2), CLI-80-31, 12 NRC 264 (1980)) requires as a precondition to a hearing not only a material issue of fact, but also a showing by the Intervenor that he can make a substantial contribution to its resolution. Non-expert cross-examination is not sufficient.

(3) Here, the Intervenors' proposed case consisted of cross-examination and the testimony of Drs. Ernest Sternglass and Carl Johnson. We held that such a case does not meet the *Black Fox* substantiality test.

(4) It appeared, however, that Dr. Gofman would be available to testify, and his testimony would have satisfied the substantiality test. As long as that was the case, we indicated that Drs. Sternglass and Johnson could also testify on the admitted issues, subject to *voir dire* challenge.

Now that Dr. Gofman is no longer in the picture, the justification for a hearing on Joint Contention II(a) has been removed. As we stated in the January 27 Order:

> If Dr. Sternglass were the only person available as an opposing expert witness, we would grant the motions for summary disposition, notwithstanding the existence to some disputes over material facts.

19 NRC at 438. We also found that the proposed testimony of Dr. Johnson would not justify convening a hearing. Accordingly, the motion for summary disposition of Joint Contention II(a) is granted, notwithstanding the existence of disputes over genuine issues of fact. We recognize, of course, that our ruling represents a departure from a general principle of summary disposition law — that the remedy is not available where material issues of fact remain. But we think this departure is required by the *Black Fox* ruling. If we are wrong, it means that Boards and parties may be obliged to go to time-consuming and expensive hearings on generic issues having no particularized relationship to the facility in order to listen to a witness like Dr. Ernest Sternglass. We do not believe the Commission in writing the *Black Fox* decision could have had that in mind.

During the telephone conference call of March 8, Mr. Wells Eddleman suggested that he might seek to subpoena Dr. Gofman. We have considered whether the prospect of bringing Dr. Gofman to the witness stand involuntarily should be sufficient to satisfy the *Black Fox* substantiality test. We think not. Dr. Gofman made it clear to us that he has conflicting commitments and does not wish to appear. Our experience has shown that an unwilling witness is generally less helpful than a willing one. More importantly, a witness can be compelled to attend, but he cannot be compelled to prepare, much less to write advance testimony. Particularly in an area as arcane as cancer risk estimates, a witness would need to spend substantial time on preparation to be effective. It would also be important, in fairness to the opposing parties, for a witness like Dr. Gofman to prepare fairly detailed written testimony in advance.

The remaining points raised by the Applicants no longer require a response, other than consideration of Contention II(d) (see below).

## THE NRC STAFF'S RESPONSE

This response is rendered moot by Dr. Gofman's unavailability and our grant of summary judgment on Contention II(a).

## WELLS EDDLEMAN'S REQUESTS FOR CLARIFICATION AND OBJECTIONS

Mr. Eddleman asks whether, if health effects are shown to be "far larger" than the Staff's estimates, a new contention needs to be filed on pain and suffering? The answer would have been affirmative if Contention II(a) had remained in the case. Since that contention has now been excluded, there will be no occasion to consider pain and suffering in this case.

The discussion at pages 2-3 concerning Dr. Johnson and his qualifications is confusing. Mr. Eddleman complains that we granted summary judgment on 8F(2) "without reference to the planned testimony of Dr. Johnson." That is correct. We did not consider the question whether Dr. Johnson's testimony would meet the *Black Fox* test of substantiality on that contention. That question is not reached until one first concludes that a genuine issue of material fact exists. We answered that first question in the negative as to Contention 8F(2).

In that connection, we note our view that the *Black Fox* "substantiality" test is relatively narrow and probably applies only to estimates of radiation-induced cancers and genetic effects. These estimates are technically very complex and rest on rather sparse data and incompletely developed theory. Thus the possibility of an intervenor's making a contribution on such questions, unassisted by a highly qualified expert, is remote. To put it a different way, the *Black Fox* test should not apply broadly to all "health effects" issues, some of which can be effectively addressed by an intervenor without necessarily producing expert witnesses. Thus we are not applying a substantiality test to the remaining health effects issues in this case — II(c), II(e) (concerning fly ash), and 8F(1).

In Mr. Eddleman's February 6, 1984 filing, he states that

> I believe the Board is simply wrong to say that because the nuclides from the fuel cycle are dispersed over larger areas, they are therefore of less concern. Under the linear hypothesis used by BEIR, the number of cancers would be the same whether the nuclides deliver their dose to a few people or to many, as long as the dose is the same in total.

This response by Mr. Eddleman comes from the Board statement that "the concern we expressed there about the possibility of aggregate doses to people living near the [Harris] facility does not apply to fuel cycle effluents, which are dispersed over many different geographical areas." LBP-84-7, 19 NRC at 462.

Certainly dispersion over larger areas results in exposure of more people *but,* because the concentration of fuel cycle effluent is drastically reduced during the process of dispersion, the dose to individuals and individual risk are greatly reduced. However, in a statistical sense, one can still calculate a cancer risk estimate. As an example, the fuel cycle radon emissions were considered by the Appeal Board in *Philadelphia Electric Co.* (Peach Bottom Atomic Power Station, Units 2 and 3), ALAB-701, 16 NRC 1517 (1982) with the conclusion that the fuel cycle radon emissions from the operation of any particular reactor (nominal 1000 MW(e)) would increase the risk of cancer induction by radon exposure by one part in 100,000 above the unavoidable risk that the U.S. population experiences from natural sources. The Appeal Board considered this *incremental* health risk to the population to be "vanishingly small." This Board agrees that such effects are *de minimus* and this is the basis for our statement concerning the fuel cycle effluents.

Mr. Eddleman, in his request for clarification on Contention 8F(2), states that "I don't understand" why time periods corresponding to the half-lives of the longest-lived nuclides are not considered in health effects estimates. The Board, in our brief comments on this matter, stated that such an estimation would be a speculative exercise. We attempt to clarify our views by noting that to consider doses over millions of years would require some delineation of the following aspects:

1. The location of the materials would be extremely uncertain as a result of substantial geomorphic changes from erosional and depositional processes on such a time scale; *i.e.,* some of the materials could be transported to the deep-sea sediments through erosion and some of the material might be buried due to depositional processes that are important even on archaeological time scales.
2. The location on the surface of the earth of what is now called the State of North Carolina would be problematical due to the drift of the continents. If the present rate of drift (Durham is 0.5 inch further from London each year) were to persist for millions of years, Durham might be located where Fairbanks, Alaska is currently positioned or some other position with large climatic differences.

3. The human species, *Homo sapiens*, is thought to have existed for roughly one million years in the past. Even the existence of humans on a time scale of millions of years into the future is a matter of uncertain guesswork.

These are only a few of the considerations that lead us to conclude that estimates of radiation doses into a future of millions of years would be gross speculation. The Board cannot see that there is any chance that the witness proffered by Mr. Eddleman would be able to shed any light on such intractable questions.

Mr. Eddleman seeks clarification of footnote 1 on page 44 of the January 27 Order (19 NRC at 460 n.1). We find Mr. Eddleman's arguments unclear. We think footnote 1 is clear and we reaffirm it. There need not be, in our view, any explicit NRC rule authorizing an offset of coal particulates from plants to be displaced by Harris against the particulates postulated in Table S-3. Absent a rule barring such an offset (there is none) this approach is realistic and therefore appropriate.

## THE JOINT INTERVENORS' RESPONSE

The Joint Intervenors ask whether they will be required to employ health effects experts on the admitted contentions. As we indicated previously, the admitted contentions — II(c), II(e) (fly ash), and 8F(1) are not so complex that expert assistance is essential, as witnesses or cross-examiners. Thus the question is answered in the negative. However, the Joint Intervenors are certainly encouraged to obtain the services of health effects experts.

## EDDLEMAN MOTION TO DECLARE APPLICANTS' SUMMARY DISPOSITION MOTION ON CONTENTION 15-AA UNTIMELY

Mr. Eddleman moves to declare this summary disposition motion untimely or, in the alternative, for a 20-day extension of time to respond to it. We agree with the Applicants that the previously established schedule calling for summary disposition motions by September 1, 1983 did not contemplate a contention like 15-AA, which was admitted in late August. Under all the circumstances, including particularly the postponement of the January 1984 hearing, it is certainly appropriate that we entertain a summary disposition motion on that contention now. Much of Mr. Eddleman's argument concerning what the Applicants may have

proposed in the past on scheduling questions is not relevant. The motion for declaration of untimeliness is denied.

Mr. Eddleman's alternative motion for a 20-day extension is cast in general terms and normally would not justify the full extension requested. However, the Board is aware that Mr. Eddleman has been quite ill of late and this has undoubtedly created a backlog of work. Under the circumstances, including the need to move the case forward, Mr. Eddleman is granted a 15-day extension, until April 13, 1984, to answer the Applicants' summary disposition motion on Contention 15-AA.

## JOINT CONTENTION II(d)

This subpart of Contention II states:

> (d) Substantial increases in cancer mortality rates have been observed in the vicinity of nuclear facilities. Sternglass, "Cancer Mortality Changes Around Nuclear Facilities in Connecticut," February 1978.

The Board inadvertently failed to rule on this contention in our previous order. We do so now.

This contention rests solely on an unpublished manuscript of Ernest J. Sternglass. The manuscript has received substantial public attention and was reviewed, therefore, by representatives of the U.S. Department of Health, Education and Welfare and the U.S. Environmental Protection Agency (*see* Attachments A and B, *infra*). These reviewers found the document to be fallacious.

As a result of Sternglass' repeated allegations, misrepresentations of facts and distorted scientific perspective, the president-elect and all living past presidents of the Health Physics Society (including Karl Morgan) unanimously signed and issued in July 1971 the following statement at the 16th Annual Meeting of the Health Physics Society, thereby publicly rejecting Sternglass' allegations and criticizing his past papers:

> On the third such occasion since 1968, Dr. Ernest Sternglass has, at an annual meeting of the Health Physics Society, presented a paper in which he associates an increase in infant mortality with low levels of radiation exposure [from discharges from nuclear facilities]. The material contained in Dr. Sternglass' paper [Sternglass, 1971] has also been presented publicly at other occasions in various parts of the country. His allegations, made in several forums, have in each instance been analyzed by scientists, physicians and bio-statisticians in the Federal government, in individual States that have been involved in his reports, and by qualified scientists in other countries. Without exception, these agencies and scientists have concluded that Dr. Sternglass' arguments are not substantiated by the data he presents. The

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United States Public Health Service, the Environmental Protection Agency, the States of New York, Pennsylvania, Michigan and Illinois have issued formal reports in rebuttal of Dr. Sternglass' arguments. We, the President and Past Presidents of the Health Physics Society, do not agree with the claim of Dr. Sternglass that he has shown that radiation exposure from nuclear power operations has resulted in an increase in infant mortality.

With specific reference to the Sternglass manuscript cited in Contention II(d), the Applicants' affiant, Dr. Jacob Fabrikant, stated that:

> These studies are as good examples as any of the long standing problems with Sternglass' approach in his population studies. First, his Millstone conclusions are based on aggregations of vital studies crudely compiled by region. As I have indicated, this is an inappropriate procedure, even if done in good faith.
>
> Second, his conclusions are wrong and his procedure is unprofessional. In his Millstone population study (1978), Sternglass used polemics to push a particular point of view, selected only facts suggesting that view, was illogically inconsistent and failed to consider alternative explanations, including the possibility of random occurrences. Further, the 1978 Millstone report, referenced by Joint Intervenors, is based on an earlier Sternglass report concerning elevated levels of strontium-90 and cesium-137 around the Millstone Plant. This earlier report selectively picked data points and drew erroneous scientific conclusions from his misinterpretation of official, documented records of environmental strontium-90 and cesium-137 levels in the atmosphere and in milk.
>
> (For documentation of these rebuttals and criticisms, see letters and report critiques from Environmental Protection Agency Administrator, Douglas M. Costle, August 9, 1978; Nuclear Regulatory Commission Chairman Joseph M. Hendrie, January 18, 1978, incorporating the review of Professor Marvin Goldman, Director of Radiobiology Laboratory, University of California, Davis, May 31, 1978.)

Dr. Fabrikant's sworn statements, in light of his expert credentials and Dr. Sternglass' lack of same, effectively discredit the Sternglass manuscript. The intervenors filed nothing in opposition to the Fabrikant affidavit. Contention II(d) raises no issue of material fact and, therefore, summary disposition of it is granted.

## CONTENTIONS ON THE FINAL ENVIRONMENTAL STATEMENT

In a pleading dated December 16, 1983, Mr. Eddleman addressed his previously deferred Contentions 8F-3 and 85 in light of the FES. Our rulings follow.

Contention 8F-3 states that "the DEIS does not give sufficient information about how the NRC calculates the doses from Table S-3 radioactive effluents to enable these calculations to be verified as accurate." Mr. Eddleman's argument in support of the contention consists of two

parts. The first part discusses cancer deaths and risk of cancer, which the Board finds to be outside the scope of this contention. This material does not contribute to our evaluation of whether or not the contention should be admitted.

The other part of Mr. Eddleman's response leads us to his statement that "I can't figure out their modeling of dose commitments from Appendix C." The Board notes that the NRC Staff took notice of this contention in preparing the FES. In contrast to the DEIS that only referenced Volume 3 of NUREG-0002 for the estimation of the dose commitments for radon-222, the FES references GESMO (NUREG-0002), pages IV JA-20, -21 and -22 and several other parts of NUREG-0002 as being the basis for the dose calculations. Intervenor Eddleman fails to allege any deficiencies in the documents referenced in the FES.

The Board finds that adequate, detailed references for the dose computations are provided in the FES. There is no basis for this contention and admission is denied.

## EDDLEMAN CONTENTION 85

In the original May 14, 1982 filing by Mr. Eddleman, Contention 85 was stated as "CPL has failed to take appropriate measures to prevent or minimize fish kills from the causes discussed below. Contention 86 is incorporated herein by reference for its information."

Contention 86 stated that

> the ES's consideration of fish kills due to hot water discharge into SHNPP reservoir (lake) is inadequate as
>
> (1) the upper lethal temperature limits at which significant fish mortality occurs have not been established for important fish species (ER 5.1.3-2, amendment 1).
>
> (2) the time for which any of the ER 2.2.0 important fish species (or others found in the Harris reservoir (lake)) can tolerate the high temperatures in the discharge mixing zone is not established on the basis of experimental data, nor have periods such species of fish (individuals of those species) are likely to spend in the mixing zone been established by actual study or experiment of those same species in lakes like the SHNPP reservoir.
>
> (3) average, not peak, mixing zone temperatures have been used in the analysis of fish sensitivity to temperature in the mixing zone. Actually, the peak temperature that can be expected during the time and period established by research per (2) above should be used in projecting the probability and numerical occurrences of fish kills from Harris cooling tower blowdown by temperature. Further, the *addition* of heat by cooling tower blowdown above the maximum temperatures of over 31° recorded in the area (ER Ref. 5.1.3-5) or the actual highest temperature recorded in the reservoir without cooling tower blowdown, needs to be the basis in establishing the temperatures in the mixing

zone and the areas over which these maximum temperatures can be expected to extend for the time and periods as calculated above in this (3) and (2).

(4) the additional toxic synergistic effects of the presence of chlorine, hydrazine, ammonia, and other chemicals in addition to elevated temperatures per (3) above in cooling tower blowdown on fish kills in the mixing zone must be considered on a conservative basis. The sensitivity of important fish species per ER 2.2.0 and other fish species found in the reservoir must be established accurately to these combinations of chemical and temperature conditions to be expected.

(5) the original FES did not consider the above accurately because then SHNPP was going to be once-through cooling with no cooling towers, thus cooling tower blowdown chemicals and the mixing zone were very different from the current plan, and plant setup. These changes must be addressed (as set forth above, e.g.) in the striking of the environmental balance under NEPA for SHNPP operating license issuance.

The Board deferred ruling on Contentions 85 and 86 (LBP-82-119A, 16 NRC 2069, 2104 (1982)), pending the availability of the environmental statement. The DES was served on May 11, 1983 and Mr. Eddleman responded on June 20, 1983 with the principal point being that "the DEIS fails entirely to document or lay out Staff's analysis" with respect to fish kills.

The Board issued a Memorandum and Order on August 18, 1983 (unpublished) that further deferred our ruling on this contention until after the issuance of the FES. In that order (at 14), a typographical error in which the contention was numbered 85B was missed by the Board. We acknowledge that oversight and require that all parties use the correct designation of "85" or "85/86."

In our August 18, 1983 Order, the Board took the position that "the Staff's sole function is to factor the impacts previously determined by the EPA (and the State of North Carolina) into the NRC's cost/benefit analysis." However, we further took the position that the Staff analysis should be understandable and demonstrably accurate.

The FES for the Harris plant was issued in October 1983 and Mr Eddleman responded on December 16, 1983. He continues to raise a number of issues that may or may not be important in the cost/benefit analyses and states that he can't quite figure out how the Staff did the analysis.

The Board cannot resolve these issues with the materials before us and, therefore, the contention is admitted. However, we speculate that these issues can be resolved in an off-the-record meeting between the Applicants' technical staff and Mr. Eddleman. We also suggest that a working hypothesis that might be pursued is that:

TDI diesel generator contentions are not untimely — Mr. Eddleman's reply does not cause us to change any of our rulings, and those rulings are reaffirmed.

THE ATOMIC SAFETY AND
LICENSING BOARD

Glenn O. Bright
ADMINISTRATIVE JUDGE

Dr. James H. Carpenter
ADMINISTRATIVE JUDGE

James L. Kelley, Chairman
ADMINISTRATIVE JUDGE

Bethesda, Maryland
March 15, 1984

## APPENDIX A

The Honorable James C. Cleveland
House of Representatives
Washington, D.C. 20515

Dear Mr. Cleveland:

At Dr. Upton's request I have reviewed the manuscript by Dr. Ernest J. Sternglass, entitled "Cancer mortality changes around nuclear facilities in Connecticut," and presented at a Congressional Seminar on Low-Level Radiation, February 10, 1978. In my judgment, this paper is of no value as a guide to the possible carcinogenic risks from radioactive isotopes emitted by nuclear power plants. The paper is logically incoherent and lacking in the balance and scrupulous consideration of alternative explanations that are required of a serious scientific work. The paper is

1. Construction of cooling towers is a major thermal impact mitigation measure that denies part of this contention, *i.e.*, that CPL has failed to take appropriate measures.
2. The exact area that will be warmer than the North Carolina regulatory standards is not known for certain but both Staff's and Applicants' analyses indicate that it will be smaller than the 200 acres specified in the NPDES permit.
3. While the NRC Staff has yet to make an explicit statement, it is not unreasonable to consider that the Staff view is that 200 acres in a 4000-acre reservoir is 5% of the surface area and the "off-standard" waters will be found approximately in the upper 5 feet of the reservoir, so that the volume in question is 1 to 2% of the total volume. Such numbers may be the basis for the Staff conclusion at 6-2 of the DES that damage to aquatic resources will be "small."
4. The existence of a limited area of "off-standard" waters would have the impact of denying a small part of the potential habitat to the fish populations of the reservoir. Consideration of the above magnitude of such an effect may suggest that an undiscernable effect on the fish production of the reservoir may be anticipated.
5. Based on observations in other reservoirs in North Carolina that receive heated water discharges, it may be demonstrable that the effect of the limited "off-standard" waters will be avoidance of such areas by fishes, rather than fish kills as postulated in this contention.

Following the specified conference, the Board would expect that if specific, focused issues remain, such issues would be identified and the present broad statements would be replaced with litigable issues. The above suggestions by the Board are made in conformance with 10 C.F.R. § 2.759.

## RULINGS ON SER CONTENTIONS

In the telephone conference of March 8, 1984, the Board ruled on Mr. Eddleman's contentions on the SER on the bases of his January 17, 1984 filing and the Applicants' and Staff's responses to it. At that point, we had forgotten that we had granted Mr. Eddleman extensions of time to reply to the responses. We received Mr. Eddleman's reply shortly after the conference call. We have reconsidered each of our rulings on the SER proposed contentions in light of Mr. Eddleman's reply. While we agree with some of the points Mr. Eddleman makes – *e.g.*, that his

heavily laden with polemics in which selected facts and analogies have been presented in a way designed to push a particular point of view, namely, that increased cancer mortality has been caused by radioactive emissions from nuclear power plants in Connecticut and elsewhere.

Cancer mortality data are subject to a number of influences, e.g., changes in the age and racial makeup of populations, differences in socio-economic class, urbanization, and industrialization which may increase or decrease rates. Random variation is an even more important factor, particularly when small populations are involved. By ignoring these other important factors, it is not difficult to select rates to show an increasing cancer trend associated with almost any environmental factor. Dr. Sternglass's presentation, and his past work on similar subjects, indicate that the necessary care to control for these other factors has not been taken.

Another of the logical inconsistencies in this paper concerns the types of cancer investigated. In the first few pages, the discussion centers around levels of strontium-90, a bone-seeker, and the estimated radiation dose to the bone marrow for children drinking milk from certain dairies. Reference is made to studies linking childhood leukemia with fetal x-ray, and childhood and adult leukemia with the radiation exposures received by the Japanese A-bomb survivors. It is curious, then, that the discussion of death rates does not mention childhood cancer, nor leukemia at any age, but is confined to mortality at ages 50 or older from cancers of the lung, female breast, and pancreas. That is, the case for there being unusually heavy exposures to sensitive tissues is made in such a way as to suggest an increased hazard in terms of childhood leukemia, and perhaps other childhood cancers and adult leukemias, but apparently there is no evidence of such increased risk. Instead, we are told that other radiogenic cancers, whose causal relationship to the discussed exposures seems tenuous at best, have increased due to these exposures. In fact, adult mortality from cancers of the lung, breast, and pancreas has been increasing steadily for a number of years; smoking, dietary factors, drug use, and changing patterns of diagnosis have all had something to do with this.

One of the difficulties in reviewing this paper is that the violations of good scientific practice in it are so many and so varied that it would be a vast undertaking to explicate each one. I have highlighted what I consider to be a few of the major problems, but there are numerous others also.

I am a statistician, professionally concerned with the logic of scientific inference. For the past 5 years or so I have worked principally on epidemiologic investigations of the relationships between radiation dose and cancer incidence and mortality in populations exposed to ionizing radiation, mainly the Japanese A-bomb survivors but also other irradiated populations. I am deeply concerned about radiation-induced cancer and other hazards of radiation exposures, and feel that the use of nuclear and radiological technology should be based on a careful assessment of risks. Papers such as the reviewed one by Sternglass contribute only confusion to this process, and in fact, impede it by deflecting investigative resources from the work at hand. We trust this information will be helpful in your response to Ms. Juliette Zivic.

Yours sincerely,

Charles E. Land, Ph.D.
Environmental Epidemiology Branch
3C07 Landow Building
Bethesda, MD 20014

## APPENDIX B

Honorable James C. Cleveland
House of Representatives
Washington, D.C. 20515

Dear Mr. Cleveland:

This is in response to your letter of July 11, 1978. The Office of Radiation Programs has informally reviewed the report by Dr. E.J. Sternglass entitled "Mortality Changes Around Nuclear Facilities in Connecticut." It is unfortunate that a report of this kind, which was presented to a lay audience without any scientific review, has received the widespread discussion in newspaper articles to which you referred.

Dr. Sternglass has been presenting similar reports for the last 10 years which, on careful analyses, have been shown by a number of reputable scientists to be based on a highly selective and very biased use of mortality data. In every case we have found that Dr. Sternglass only uses

data which support his pronounced views which are usually directed against nuclear power.

We believe the public health questions surrounding nuclear power and other sources of population exposure to radiation are too important to be treated irresponsibly. Because of this importance, we asked the National Academy of Sciences to review all recent findings concerning radiation health effects. Their report, which is due this fall, will include a discussion of Dr. Sternglass' reports. While I have no advance knowledge of Academy findings, I would be surprised if they placed much credence in his allegations. Certainly, to date, no reputable scientists have published any reports verifying his analyses.

Sincerely yours,

W.D. Rowe, Ph.D.
Deputy Assistant Administrator
for Radiation Programs (AW-458)

Cite as 19 NRC 852 (1984) LBP-84-15A

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**Helen F. Hoyt**, Chairperson
**Ernest E. Hill**
**David R. Schink**

**In the Matter of**

**ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE**

**(TRIGA-Type Research Reactor)** **Docket No. 50-170**
**(ASLBP No. 81-451-01-LA)**
**(Renewal of Facility License No. R-84)**

**(Cobalt-60 Storage Facility)** **Docket No. 30-6931**
**(ASLBP No. 82-469-01-SP)**
**(Renewal of Byproducts Material License No. 19-08330-03)**

**March 15, 1984**

In this Order, the Licensing Board grants the joint motions of Licensee, NRC Staff and Intervenor resolving all remaining issues and dismisses the proceeding.

## ORDER
(Dismissing Proceeding)

1. By a *Joint Motion for Approval of Stipulation and Withdrawal of Intervenor* served by counsel for Licensee on February 23, 1984 and

signed by counsel for Citizens for Nuclear Reactor Safety (Intervenor), Armed Forces Radiobiology Research Institute (Licensee) and the Nuclear Regulatory Commission Staff, approval by this Board is urged for withdrawal by the Intervenor of all of its contentions. The motion further asserts that upon approval there are no remaining issues in controversy with respect to the renewal of Facility License No. R-84 in Docket No. 50-170 or renewal of Byproducts Material License No. 19-08330-03 in Docket No. 30-6931.

2. In *Joint Stipulation Resolving Intervention by the Citizens for Nuclear Reactor Safety* signed by counsel for each of the parties to these proceedings, the parties assert that based on the Memorandum of Agreement[1] entered into between the Licensee and the Montgomery County (Maryland) Government, the matters raised by the Intervenor are ready for disposition. In addition, the Intervenor stipulates it will not submit any reply to Motions for Summary Disposition filed by Licensee and NRC Staff with this Board on February 25, 1983 and upon entry of the Memorandum of Agreement into force, the intervention on all contentions (including emergency planning) may be deemed terminated.

3. The Board accepts the Joint Stipulation Resolving Intervention by Citizens for Nuclear Reactor Safety with its Exhibit A, grants the Joint Motion for Approval of Stipulation and Withdrawal of Intervenor and grants the Licensee and Staff Motions for Summary Disposition. The Board finds that there are no undisputed facts before it and that all issues have been resolved. Accordingly, there is no need for further proceedings before the Board and these adjudicatory proceedings are dismissed.

FOR THE ATOMIC SAFETY AND
LICENSING BOARD

Helen F. Hoyt, Chairperson
ADMINISTRATIVE JUDGE

Dated at Bethesda, Maryland,
this 15th day of March 1984

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[1] Copy attached to this Order with transmittal letter signed by Montgomery County Council President.

## ATTACHMENT TO LBP-84-15A

### Exhibit A

December 2, 1983

Col. Bobby R. Adcock, MS, USA
Director, AFRRI
Building 42, NMC, NCR
Bethesda, Maryland 20814

Dear Col. Adcock:

The Montgomery County Council and the County Executive have endorsed and signed the Memorandum of Agreement on the research nuclear reactor at the Armed Forces Radiobiology Research Institute. I am enclosing one copy of the signed agreement for your files.

As stated in the Memorandum of Agreement, the County Government is now in a position to support the application by the Defense Nuclear Agency to the Nuclear Regulatory Commission for the relicensing of this facility and is forwarding copies of this letter and the Memorandum of Agreement to the Nuclear Regulatory Commission to record this support.

I am delighted that this negotiation between the Defense Nuclear Agency, the County Government, and the Citizens for Nuclear Reactor Safety has come to such an agreeable solution and look forward to continued working relationships between DNA and the County Government through the procedures set out in the Memorandum of Agreement.

Sincerely,

David L. Scull
Council President

SMcK/jm

Attachment

cc: Nuclear Regulatory Commission

## MEMORANDUM OF AGREEMENT

The Armed Forces Radiobiology Research Institute (AFRRI) and the Montgomery County Government (MCG), recognizing that concerns have been expressed regarding the relicensing and operations of the TRIGA research reactor and the cobalt-60 facility at AFRRI, hereby agree that the following actions shall be taken by the respective parties:

1. AFRRI shall provide the results of its quarterly environmental monitoring for both air and water to the Montgomery County Government by U.S. mail to:

   Montgomery County Department of
   Environmental Protection
   Executive Office Building, 6th Floor
   101 Monroe Street
   Rockville, MD 20850

   Furthermore, AFRRI shall cooperate with and provide technical advice and information to the Montgomery County Government if it decides to engage in independent radionuclide monitoring of the environment near AFRRI.
2. AFRRI shall, through Headquarters, Defense Nuclear Agency (DNA), immediately notify the Montgomery County Government, through its Department of Environmental Protection (at 251-2400 or number to be designated for after hours), of any Class 1 or higher reactor emergency condition or of any NRC reportable event involving the cobalt-60 facility.
3. AFRRI shall permit Mr. John Menke, Director of MCDEP, to be present and observe at the meetings of the AFRRI Reactor and Radiation Facility Safety Committee (RRFSC). If the Montgomery County Government desires to replace Mr. Menke, the replacement shall be a senior technical professional with some knowledge of reactor physics, employed full-time by MCG. The person shall be approved by both AFRRI and MCG. Notification of meetings shall be at least 5 working days in advance. This is to take effect upon the completion of USNRC licensing renewal action. The MCG observer will be able to ask questions and to enter into conversations relevant to the AFRRI facility at the meetings of the RRFSC.
4. The MCG shall provide AFRRI with copies of the results of any air and water environmental sampling for radionuclides taken by MCG with respect to AFRRI. These shall be sent to:

Director, AFRRI
Building 42, NMC, NCR
ATTN: SAF
Bethesda, MD 20814

5. Upon completion of this agreement the MCG shall promptly inform the Nuclear Regulatory Commission Atomic Safety and Licensing Board that its concerns regarding the relicensing of AFRRI have been satisfied, and that MCG supports renewal of the license and completion of the licensing action.
6. This Memorandum of Agreement shall remain in effect during the term of the license granted by the USNRC in the currently pending actions.

BOBBY R. ADCOCK 18 Oct. 83
Colonel, MS, USA
Director, AFRRI

CHARLES W. GILCHRIST 12/6/83
County Executive
Montgomery County Government

DAVID L. SCULL 12/2/83
Council President
Montgomery County Government

Cite as 19 NRC 857 (1984) LBP-84-16

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**Lawrence Brenner**, Chairman
**Dr. Richard F. Cole**
**Dr. Peter A. Morris**

**In the Matter of**

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

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

**March 16, 1984**
***As corrected:*** **Tr. 8511-13**

In a written confirmation of an oral ruling, the Board, exercising jurisdiction over a proposed Part 70 license, denies a motion to admit contentions, a motion to stay receipt of new fuel at the Limerick site, and a petition to intervene and request for hearing addressed to the Director of Nuclear Material Safety and Safeguards.

## LICENSING BOARDS: JURISDICTION OVER PART 70 LICENSES

Licensing boards established to conduct hearings on operating licenses also have jurisdiction over issues arising under applications for Part 70 licenses to receive and store unirradiated fuel at the nuclear power plant. This jurisdiction can be asserted on the grounds of 10 C.F.R. § 2.717(b), which grants the presiding officer in an operating license proceeding the power to modify "as appropriate for the purpose of the proceeding" any Staff order "related to the subject matter of the pending proceeding." *Cincinnati Gas and Electric Co.* (William H. Zimmer Nuclear Station), LBP-79-24, 10 NRC 226 (1979). In affirming

the *Diablo Canyon* Licensing Board's assertion of jurisdiction over a materials license proceeding, the Commission said, "that license is integral to the Diablo Canyon project . . . . Given that Board's familiarity with the Diablo Canyon project, it made good practical sense for it to hear and decide the related issues raised by the Part 70 materials license application." *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-76-1, 3 NRC 73, 74 n.1 (1976).

## LICENSING BOARDS: JURISDICTION OVER STAFF ORDERS

Section 2.717(b), which grants the presiding officer in an operating license proceeding the power to modify "as appropriate for the purpose of the proceeding" any Staff order "related to the subject matter of the pending proceeding," does not postpone the board's jurisdiction over the related order until the Staff has actually issued the order. The purpose of Section 2.717(b) clearly is to permit integration of an operating license proceeding with Staff orders on matters related to that proceeding. Common sense says that this integration can take place, indeed is often more efficient if it takes place, before the Staff issues an order on a related matter. *See Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2), LBP-83-38, 18 NRC 61, 63 (1983).

## LICENSING BOARDS: JURISDICTION OVER PART 70 LICENSES

Though it is unusual for a judicial body to exercise jurisdiction where it is not sought by the petitioner, a board's exercise of jurisdiction over a petition addressed to the Director of Nuclear Material Safety and Safeguards to intervene on a proposed Part 70 license is not an act of Constitutional dimensions. It makes sense for the board to rule on the petition, for it knows the parties and the circumstances of the case. If the board were to decline jurisdiction now and let the petition follow the path the intervenor intended it to, it would, given past practice, likely be the licensing board delegated the responsibility of conducting a hearing on the subject of the petition.

## RULES OF PRACTICE: ADMISSIBILITY OF LATE-FILED CONTENTIONS

The admissibility of the Intervenors' Part 70 motions, though filed several months after the Applicant filed for a Part 70 license, and years

after the start of the operating license hearings, is not to be measured by the criteria for late-filed contentions in 10 C.F.R. § 2.714(a)(1) and *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041 (1983), for the Applicant did not comply with a standing order in this proceeding to serve all relevant papers on the Board and parties. An intervenor should be expected to foresee that an Applicant would have to receive unirradiated fuel before low-power testing and that such fuel would have to be outside at the site for a finite time, but not that the Applicant would request that a fuel license be issued before a low-power operating license, or that the fuel might be stored outside for months, or that there would have to be a security plan tailored to such storage because the normal facility security plan would not be implemented as a prerequisite.

## RULES OF PRACTICE: ADMISSIBILITY OF LATE-FILED CONTENTIONS

Despite a standing Board order to serve on the Board and parties papers related to the operating license hearing, the Applicant did not serve its new fuel license application and amendments thereto, thus delaying the Intervenors' responses to the application. The delay has enabled the Applicant to argue that the Intervenors' responses were late-filed. Had the Applicant's argument been accepted, the Applicant, by merely delaying the service of relevant information, would in effect have tightened the standards for admitting contentions. Thus the circumstance here is an exception to the Commission's general belief that manipulation of the availability of licensing documents (here the device of limited service contrary to expectations) was unlikely to occur. *See Catawba, supra*, 17 NRC at 1047.

## ADJUDICATORY HEARINGS: STAFF OBLIGATION TO INFORM BOARD AND PARTIES OF STAFF ACTION

Staff counsel did not learn of the Applicant's application for a Part 70 license until an amended application was filed months later. Staff counsel then informed the Board and the Intervenors of the amended application, thus giving the Intervenors their first information about the original application, but by then the Applicant was already in a position to argue that the Intervenors' filings in response to the original application were late. It may sometimes be difficult for Staff counsel to be relevantly informed. However, the Staff appears before us in these proceedings as one body. Counsel should be informed when its client is consid-

ering a Part 70 application. Indeed, the Staff should assure that the Board and all parties in a nuclear facility proceeding, as well as its own counsel, are given prompt notice that a Part 70 license related to the facility is being considered.

## RULES OF PRACTICE: STAY OF AGENCY ACTION

Section 50.91(a)(4), which makes the issuance of an operating license amendment effective before any required hearing only if no significant hazards considerations are involved, does not imply that an intervenor's petition for a hearing on a proposed amendment to a new fuel license could, by virtue of its being filed, stay the effectiveness of any Staff issuance of the amendment.

## RULES OF PRACTICE: APPELLATE REVIEW; JURISDICTION OF APPEAL BOARD

Final orders on motions related to Part 70 licenses to receive and store unirradiated fuel issued during an operating license hearing are appealable upon issuance. *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-76-1, 3 NRC 73, 74 (1976). Appeals should be directed to the Commission, unless the Commission specifically delegates appellate jurisdiction to the Appeal Board. *Id.* at 74 n.1; 10 C.F.R. § 2.785.

## TECHNICAL ISSUES DISCUSSED

New Fuel Stored Outside:
Criticality Accidents
Criticality Monitoring
Non-Criticality Accidents
Security Plan.

# MEMORANDUM AND ORDER
## ON FOE'S CONTENTIONS AND LEA'S PETITION BASED ON A PART 70 APPLICATION TO STORE NEW FUEL

### INTRODUCTION

Before us are two pleadings from intervenors in this operating license proceeding, both related to Philadelphia Electric's application for a Part

70 license to receive and store unirradiated new fuel outside at the Limerick site.[1] The first of the pleadings, dated February 23, 1984, is styled an "Application by Anthony/FOE to File a Contention Based on New Matter, *i.e.*, PECo's Application Part 70 to Store Fuel at the Limerick Plant, Served 2/21/84." The "Application Part 70" to which the title of the pleading refers is an amended application the Applicant submitted on January 24, 1984. The "Application by Anthony/FOE" is a filing of contentions alleging certain dangers from the presence of new fuel at the site. On February 28, 1984, Mr. Anthony filed "additions" to his "Application." The second pleading, dated February 28, 1984, is Limerick Ecology Action's (LEA) "Petition to Intervene and Request for Hearing Pursuant to the Atomic Energy Act, as Amended January 4, 1983, P.L. 97-415, Section 12(a)." The Petition is in response to the Applicant's February 6, 1984 revision of the amended application it had submitted on January 24. The Petition does not present contentions; it claims that the Applicant's February 6 revision "fails to comply with applicable statutes and Commission rules and regulations" as to general categories which LEA recites. LEA filed its Petition not with this Board, but with the Commission, through the Director of the Office of Nuclear Material Safety and Safeguards. In September 1983, the Staff granted the Applicant a license to receive milligram quantities of sealed source material for instrumentation, but it has not yet granted the Applicant a license to receive and store fuel.

In an order dated February 27, 1984, we set a schedule for the Staff's and the Applicant's responses to FOE Part 70 contentions, and we heard argument on those contentions and on LEA's Petition during prehearing conferences and hearings the week of March 5. On March 6, we made an oral ruling not admitting FOE's contentions and denying LEA's Petition. Tr. 7909-39. We are now confirming in writing that oral ruling.

We made our ruling subject to certain affidavits we ordered the Staff and the Applicant to submit. The requirements for those affidavits and the schedule related to them are discussed below at pp. 870-71. We expect those affidavits, and the responses we have invited FOE and LEA to make to them, to confirm our ruling, and if they do, we shall issue an order making final what we ruled on March 6. The grounds of our ruling were substantive: Most of the concerns[2] raised by the contentions and the Petition are about the health and safety of the public

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[1] The application says that storage outside would be for an interim period of a few months. Sec. 1.2.1. The Applicant is now predicting a shorter period of time. Tr. 7869. Apparently, storage outside is made expedient by a combination of economic and scheduling factors. *Id.*

[2] An exception, which we discuss later, is LEA's concern about security plans for the new fuel.

due to accidents damaging the fuel, but the presence of unirradiated fuel at Limerick does not threaten the health and safety of the public.

However, before we can set out here in some detail the substantive basis for our ruling, we must deal with certain procedural questions made somewhat complicated by the Commission's rules and the procedural implementation of them by the technical Staff, and by the way in which the parties, especially the Applicant, have dealt with this Part 70 matter.

The Applicant filed back on June 1, 1983, its original application to receive and store fuel at the site (outside for an interim period of some months), but, despite a long-standing Board order on service of papers related to the operating license proceeding, the Applicant informed neither the Board nor the Intervenors of this original application, or the January 24 amendment, or the February 6 revised amendment. Indeed, not even Staff counsel were aware of the June application until they learned of the January 24 amendment. The Board and the other parties learned of the application amendments through Staff counsel by letters dated February 13 and 15, 1984. Now we must consider whether filings essentially responding to a license application made last June, and concerning an event arguably foreseeable when this hearing began years ago, are not late-filed. We find that they are not. But we must also consider whether this Board, established to conduct a hearing on an application for an operating license, has jurisdiction over filings responding to a not-yet-granted application for a fuel license — and more, whether we have jurisdiction over one such filing even when it is not directed to us. We find that we do. We consider the question of jurisdiction first.

## THE BOARD'S JURISDICTION OVER PART 70 MATTERS

In our February 27, 1984 order setting a schedule for answers to FOE's Part 70 contentions, we directed the parties' attention to two cases which argued the legality and good sense of giving licensing boards established to conduct operating license hearings jurisdiction over proceedings for nuclear fuel materials licenses for the same plant: *Cincinnati Gas and Electric Co.* (William H. Zimmer Nuclear Station), LBP-79-24, 10 NRC 226 (1979), and *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-76-1, 3 NRC 73, 74 n.1 (1976). This jurisdiction can be asserted on the grounds of 10 C.F.R. § 2.717(b), which grants the presiding officer in an operating license proceeding the power to modify "as appropriate for the purpose of the proceeding" any Staff order "related to the subject matter of the

before us. [*citing Diablo Canyon* and *Zimmer*]." *Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units 1 and 2), LBP-83-38, 18 NRC 61, 63 (1983).

The *Susquehanna* case the Staff cites is no authority against our ruling. Either the case involves circumstances crucially different from those which face us, or the *Susquehanna* Board's decision not to take jurisdiction over a pending application for a fuel license is not logical. We quote from the case:

> There is precedent in the Commission's proceedings for Licensing Boards to assume jurisdiction over this application once it is filed, and there seems to be ample justification where the receipt of these unirradiated fuel bundle assemblies and their storage on the refueling floor of the Reactor Building relates closely with one or more contentions. However, inasmuch as the grant of an operating license negates the necessity for [a] Part 70 license, the Board declines to assume jurisdiction of this proceeding at the present time. At present, the Board intends to concentrate on expediting the hearing process on the operating license application.

Slip op. at 29. The first sentence of the quotation affirms our account of the law. From the second sentence it would appear that the Part 70 license was not likely to issue before the operating license. Since an operating license includes the authority to receive and store fuel, the Board sensibly declined to delay the operating license proceeding by a Part 70 proceeding. Our circumstances are not the same. It is clear that the Staff is likely to issue a Part 70 license before we are through with the operating license proceeding; indeed such issuance appears imminent. Moreover, given our ruling on the substance of FOE's contentions and LEA's Petition, our assumption of jurisdiction will not delay the operating license proceedings. Finally, if in *Susquehanna* the issuance of a Part 70 license was imminent, then the second sentence of the quotation from the case would make no sense and we would therefore decline to follow it.

To exercise jurisdiction over LEA's Petition, we must make a somewhat different argument, for LEA did not direct its Petition to us. Though it is unusual for a judicial body to exercise jurisdiction where it is not sought by the petitioner, our exercise here is not an act of Constitutional dimensions. *Cf. Philadelphia Electric Co.* (Limerick Generating Station, Units 1 and 2), ALAB-726, 17 NRC 755, 757 (1983) (no constitutional dimensions to, and therefore no valid purpose served by, a metaphysical discussion of when jurisdiction passes from a licensing to an appeal board when the important consideration is that a ruling on the substantive issues be made without delay). We simply think it makes sense for us to rule on LEA's Petition, for we know the parties and the circumstances of the case. For this very reason, we would fully expect

that were we to decline jurisdiction now and let the Petition follow the path LEA intended it to, we would eventually be the licensing board delegated the responsibility of conducting a hearing on the subject of the Petition. Such has been the common practice, a practice which tends to moot any controversy over our jurisdiction.

Were a separate board delegated responsibility over LEA's Petition, that board would have to duplicate some of the effort we are making here, for some of the findings we shall make against the admissibility of FOE's contentions apply to LEA's Petition. If LEA does not appeal our assertion of jurisdiction, or if it does and we are upheld, then we shall have avoided duplication of effort or an unnecessarily circuitous route to our gaining jurisdiction over LEA's Petition. If LEA appeals but we are not upheld, then either we or another board will be given jurisdiction over the Petition. If we are, then we shall treat LEA's Petition as we do in the remaining sections of this order. If another board is named, it will have the benefit of what we say in those sections. Whatever may happen with any appeal LEA may file from our order here, LEA's interests will have been dealt with fairly.

## WHETHER THE CONTENTIONS AND THE PETITION ARE LATE-FILED

Both the Staff and the Applicant argue that FOE's contentions and LEA's Petition are late-filed. They, therefore, apply the criteria set out in 10 C.F.R. § 2.714(a)(1) for entertaining late filings and find that on balance, the criteria weigh against FOE and LEA. It matters little to either the Staff or the Applicant that the Intervenors did not learn of the fuel license application until just a few weeks ago because the Applicant did not serve any of its fuel license filings on the parties. The Staff is willing to take this fact into account only in relation to one of the five criteria in 2.714(a)(1), namely whether the intervenor has good cause for failure to file on time. The Applicant, however, is inclined to go not even that little distance: "Under the Licensing Board's decision in *Perry*, [which we cite for support above at pp. 863-64], no 'good cause' exists for FOE's lateness inasmuch as 'it has been apparent that [Applicant] would have to receive unirradiated fuel some time prior to low power testing.' [*Perry*, 18 NRC at 63]." Applicant's Answer at 2. The Applicant claims that the Intervenors should have foreseen even that the Applicant might want to store new fuel outside, since there have been other applicants who have stored fuel outside before operation. Tr. 7813. Therefore, the Applicant argues, FOE should have filed its new fuel contentions and LEA its Petition soon after the August

1981 notice of hearing on the application for an operating license. *Id.* The Applicant goes on to argue that at the very least these filings by the Intervenors should have been made right after the June 1983 application for a fuel license was filed. This is based on the Applicant's view that Part 70 proceedings are not related to Part 50 proceedings, and that therefore the Applicant had no duty to inform the parties of its June application, but the Intervenors did have an affirmative duty to use a nearby Public Document Room (PDR) to keep abreast of the public record. *Id.*[3] "In order to admit the late contentions proposed by FOE [and the Petition filed by LEA], the Licensing Board must find, on balance, that the five factors enumerated in 10 C.F.R. § 2.714(a)(1)(i)-(v) weigh in FOE's [and LEA's] favor. *Duke Power Company* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041 (1983)." Applicant's Answer at 3.

We do not think that the Intervenors' Part 70 filings are late. We agree with *Perry* that an intervenor could foresee that an Applicant would have to receive unirradiated fuel some time before low-power testing, and perhaps even that such fuel would have to be outside at the site for some finite time. But we do not think that an intervenor should be expected to foresee that an applicant would request that a fuel license be issued before a low-power operating license, or that the fuel might be stored outside for months, or that there would have to be a security plan tailored to such storage because the normal facility security plan would not be implemented as a prerequisite. We can readily imagine that had any intervenor raised fuel license contentions shortly after the notice of hearing on the operating license, the Applicant would have opposed the admission of those contentions on the grounds that they were premature and speculative. The clock did not start running against the Intervenors when the notice of the hearing for the operating license was issued.

But more important, the clock did not start with the June 1983 fuel license application either. There has been since late 1981 a standing order in this proceeding whose language, unless read in the crabbed way in which the Applicant appears to have read it, requires service on the Board and parties of all filings and correspondence among the parties, particularly between the Applicant and the Staff, on matters related to the operating license proceeding. *See* our Memorandum and Order,

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[3] The Board did not ask, and does not know, whether the June 1983 Part 70 application was in fact filed in the local PDR. Give the Applicant's and technical Staff's lack of notice to the Board and parties it would be logically consistent with such lack of appreciation (at best) of the connection of the Part 70 application to this proceeding for the Applicant and Staff not to have assured filing it in the local PDR. If not, this would negate Applicant's argument that Intervenors should have been aware of the application because of their obligation to periodically search the local PDR. In any event, given the result we reach, it is not necessary to determine whether the Part 70 application was timely filed in the local PDR.

October 14, 1981 (unpublished), at 15-16, and the clarification at Tr. 63-64.

Of course, reasonable persons can disagree about what matters are related to this proceeding, but a fuel license application is surely arguably related. Indeed, we understand *Diablo Canyon* to have settled the argument. We do not have to cite Commission case law to the Applicant to support the well-established basic proposition that correspondence and filings on matters which are at least arguably related to this licensing proceeding should be served on the Board and the other parties. Moreover, Applicant's counsel knew, from his participation in *Zimmer*, that licensing boards would consider a fuel license application to be related to an operating license proceeding.

Our standing order on service of papers on related matters was designed to avoid the very situation we now find ourselves in. Not serving the June 1983 application and its amendment and revised amendment has delayed the Intervenors' response to the application and thus has strengthened, or rather, appeared to strengthen, the Applicant's argument that the Intervenors' responses were late-filed. Had we accepted the Applicant's argument, the Applicant, by merely delaying the service of relevant information, would in effect have tightened the standards for admitting contentions. Thus the circumstance before us is an exception to the Commission's general belief that manipulation of the availability of licensing documents (here the device of limited service contrary to expectations) was unlikely to occur. *See Catawba, supra,* 17 NRC at 1047.

The Staff too, of course, was under an obligation to inform us of the fuel license application. It is true that Staff counsel informed the Board and the Intervenors of the amended application, but by then the Applicant was already in a position to argue that the Intervenors' filings were late. We recognize that the Staff is a large organization and that it is therefore sometimes difficult for Staff counsel to be relevantly informed. However, the Staff appears before us in these proceedings as one body. Counsel should know when its client is considering a Part 70 application. It is long past the time for the Staff to implement elementary procedures to assure that its counsel in a hearing is informed of apparently relevant actions being considered by other elements of the Staff. Indeed, this same problem involving lack of notice to Staff counsel and the Board and other parties of a Part 70 new fuel application being considered by the technical staff arose years ago in *Zimmer, supra.* It is regrettable the Staff has not improved its internal procedures in this simple regard.

In the circumstances of this case, namely, where there was a standing order to serve relevant papers, and particularly where the relevance of the papers at issue had already been determined in Commission case law, we think that the criteria of 2.714(a)(1) and *Catawba* do not apply. Because of the standing order, the Intervenors had a right to expect that relevant papers would be served upon them. Therefore, they were under no obligation to visit a Public Document Room regularly to find out whether the Applicant had filed an application for a fuel license. Our ruling in no way requires us first to find that the Applicant has willfully ignored our standing order. The ruling depends on the mere fact that the June 1983 application was not served on the Board and parties. Because it is unnecessary to the matter before us, and would be digressive, we do not go so far as to investigate whether the Applicant has behaved willfully in an attempt to shield its Part 70 application from challenge by Intervenors and scrutiny in a hearing. We do find that Applicant has given our standing order a crabbed interpretation which we find to be incorrect.

## WHETHER THE CONTENTIONS AND THE PETITION HAVE BASES

Our desire in dealing with these Part 70 filings has been above all to rule on their substance — to deal with the safety concerns they embody. But because of the way in which these Part 70 issues have come before us, we have had to consider procedural questions at some length. FOE's lay representative, Mr. Anthony, allowing himself to be misled by the mere length of the procedural part of our oral ruling, rather than informed by its content, amazed us by claiming that we had based our decision on legal technicalities as to whether we had received certain documents or not, rather than on the safety issues, and that we were "shirking" our duty by not dealing with those issues. Tr. 8028-29.

We hope that Mr. Anthony will make a modest effort to understand what should be obvious in this written confirmation: that we have decided all the procedural issues in his favor. Had the Applicant and the Staff prevailed on the procedural issues, had we ruled that we had no jurisdiction over Part 70 matters, or that the Intervenors' filings were late and did not pass muster under 2.714(a)(1) and *Catawba*, FOE's contentions would have been ruled inadmissible with hardly a mention of the substance of those contentions. To reach that substance, we first have had to surmount procedural roadblocks. True, we ultimately rule against FOE and LEA, but not because we haven't faced the safety issues. Rather, it is precisely because we have faced those issues —

more thoroughly than Mr. Anthony has — that we rule as we do. We now turn to the substance of FOE's contentions and LEA's Petition. We discuss the contentions first.

## FOE'S CONTENTIONS

FOE's contentions as they appear in Mr. Anthony's February 23 and 28 filings may be put thus: The presence of unirradiated fuel at the Limerick site would endanger the health and safety of the public because: the Board has yet to determine in litigation over FOE's contentions V-3a and V-3b whether the safety-related buildings at the site can withstand overpressures and impacts from offsite pipeline accidents; the Independent Design Verification Program the Staff has requested the Applicant to make (*see* January 10, 1984 letter from Eisenhut to Bauer) is not yet complete and so it is not known yet that the buildings at the site are safe to store fuel in; the Staff has recently "raised questions about the qualification of the Limerick overhead cranes for handling nuclear fuel since they do not have the required load safety factor" (*see* February 6, 1984 letter from Schwencer to Bauer); offsite emergency plans are not complete and so cannot provide for the safety of the public "in the event of an accident which could set off a fission process while fuel is being transported to or brought into the plant;" stored outside the fuel will be subject to natural hazards such as tornadoes and electrical storms and to the man-made hazards of theft and sabotage, since PECo does not have adequate safeguards for the new fuel; and the fuel is to be stored in a place which is only 350 to 400 feet from the hypothesized site of the design-basis TNT railway car explosion, and which exposes the fuel to possible "activation" by an accident involving the electrical lines running both over and under the storage site.

In responding to these contentions, the Staff and the Applicant have focused primarily on Mr. Anthony's occasional lack of either clarity, specificity, or understanding of the Commission's regulations, and on the absence in the filings of any explanations as to how unirradiated fuel stored as the application says it will be stored could become critical or otherwise endanger the health and safety of the public. For example, Mr. Anthony tends to rely on all the talk of criticality in the fuel license application as evidence that the stored new fuel is dangerous, but we fail to see how the application's explanations of why the fuel will not go critical add up to evidence of danger. *See, e.g.*, FOE's February 23 filing, item 2, and Tr. 7880.

But rather than emphasize that Mr. Anthony has not given us any credible explanation of how unirradiated fuel can cause the public harm,

we would emphasize that there exists no such explanation. First, simply on the basis of our own collective knowledge, we are willing here to rule that it is not credible to claim that unirradiated fuel stored as the Limerick fuel will be stored can go critical. The Applicant is right that we are not here to litigate the laws of physics (Tr. 7875), and so we shall not explain why the stored unirradiated fuel at Limerick will not go critical. But the Staff has been helpful by pointing to a few pages in an Appeal Board decision in the *Diablo Canyon* proceeding, *Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), ALAB-334, 3 NRC 809, 817-20 (1976), a few pages which, with brevity and clarity, set out the several conditions which must be met before unirradiated fuel can go critical. We have asked the Staff to provide Mr. Anthony with that Appeal Board decision, not as something to which Mr. Anthony is invited to reply but simply as something through which he can enlighten himself.

As to whether stored new fuel at Limerick can endanger the health and safety of the public through some means not involving criticality: Mr. Anthony has suggested that if a plane crashed into the fuel, or a tower collapsed on it, or the non-conforming crane dropped it, or dropped a heavy object on it, uranium oxide dust could be released to the community and present a "really live public hazard," Tr. 7908-09. Mr. Anthony cites the Supreme Court's recent decision in the Karen Silkwood litigation, *Silkwood v. Kerr-McGee Corp.*, 104 S. Ct. 615 (1984), as one piece of evidence of the harm nuclear fuel can cause. Tr. 7879. But the *Silkwood* decision is no support for Mr. Anthony's contentions: Karen Silkwood was apparently contaminated as a result of handling plutonium, a known alpha-radioactive toxic substance. But unirradiated uranium oxide pellets do not contain any plutonium. Dose rates one foot away from such pellets are negligible. Further, uranium oxide pellets are made of ceramic material that would not become dust under severe impacts. Again we rule on the basis of what we as a Board know: We do not find it credible that non-criticality accidents involving low-enriched, unirradiated uranium oxide fuel could threaten the health and safety of the public.

However, to make sure that this aspect of our ruling that FOE's contentions lack reasonable bases is well-founded, we have ordered the Staff and the Applicant to submit by March 14 affidavits which address whether there is a credible potential that some non-criticality accident involving the low-enriched uranium oxide fuel pellets in the unirradiated new fuel rods for Limerick could cause a violation of the regulations concerning onsite and offsite releases of radiation. Tr. 7920-21. FOE was invited to reply to the affidavits if it wishes to, and LEA too, though the

affidavits will concern FOE's contentions more than they will LEA's Petition. Any reply the Intervenors choose to make must be in our hands in Philadelphia by March 21. Of course, the best, but not the required, form of a reply would be an affidavit from an expert. We have received the affidavits from the Staff and the Applicant, and Mr. Anthony informed us yesterday that he intends to reply.

Mr. Anthony often returned to the question of the non-conforming cranes during the prehearing conference. *See, e.g.*, Tr. 7859, 8029, 8033, and 8180. Our ruling on Mr. Anthony's contentions in no way depends on whether the non-conforming crane could somehow crush new fuel. Even if it could, the health and safety of the public would not be endangered. But we shall devote a paragraph to the crane, in part because of Mr. Anthony's insistent concern about the crane, and in part to clarify the discussions of the crane in the February 6, 1984 Staff letter from Schwencer to Bauer and in Section 9.1.5 of the Limerick SER.

It appears to be highly unlikely that the non-conforming crane could cause any damage to the unirradiated new fuel. The crane is non-conforming in a very particular respect: It is not the crane itself which the Staff finds to be non-conforming; rather certain lifting devices which are attached to the crane when certain loads are lifted are non-conforming — and not generally so, but only in relation to the heavy weights of the refueling shield (100,000 lbs.) and fuel pool stop logs (120,000 lbs.). NRC regulations require that these lifting devices be able to lift 10 times the weight either of the refueling shield or the stop logs, but the particular devices in question have been found to be able to lift only 4.8 times the weight of the refueling shield and 9.3 times the weight of the stop logs. The Staff is requiring that this non-conformance be resolved before the second refueling outage is over. The Staff does not question that the crane is fit to lift the much lighter new fuel shipping containers (1900 lbs.), or even a number of the containers together. Tr. 8034-35. Moreover, the Applicant says that a combination of physical interlocks on the crane and administrative controls on its use will prevent the crane from lifting heavy loads over places where new fuel will be stored. Tr. 7886.

Between our ruling here on criticality and our tentative ruling on non-criticality accidents with the new fuel, we have addressed and found inadmissible all of FOE's contentions except the one on theft and sabotage. We address it below at p. 874. We shall make a final ruling on FOE's contentions promptly after March 21, the day the replies to the affidavits are due. We think it likely that our ruling will issue before new fuel is received at Limerick; therefore we shall not now issue a stay of fuel receipt at Limerick. Immediately after we had made the oral ruling

this order is confirming, Mr. Anthony orally requested a stay. Tr. 7922. We denied the request, on the grounds that stays are not to be issued unless they are necessary. But we will entertain motions for a stay if it is clear that the Applicant will receive fuel before we rule on the affidavits and the replies. We orally ruled, and hereby confirm, that the Applicant must inform the Board and the parties three business days in advance of the time it begins to receive fuel that it plans to do so. Tr. 8045-46. We add now that the notification requirement is extended to include the *Limerick* Appeal Board and the Commission due to the pendency of FOE's appeal and the possibility of appeal by LEA.

If, as expected, our final ruling on the affidavits is consistent with our ruling at this time, there will then be nothing pending before us which would prevent receipt of the fuel pursuant to any license which the Staff may issue. (As of this writing, the Staff has not issued the requested Part 70 license amendment.) Upon our final ruling, which may be made orally on the record, the requirement of three business days' advance notice will remain in effect, unless and until removed by an appellate tribunal.

It would not be easy for us to say that by late March Mr. Anthony will be satisfied that our account of the health and safety impact of new fuel at Limerick is sound. During the prehearing conference in which we made the oral ruling we are now confirming, shortly after we made the ruling, Mr. Anthony asserted that we were going "to hide behind a technical affidavit" (Tr. 8028), that "there will be eventual operation of this plant. It is an inexorable process that appears to me to start with your decision" (Tr. 8030), and that he could not understand how the Applicant would be permitted to use a crane the Staff had judged to be non-conforming. Tr. 8033.

As to the crane, we simply point out what we think was clearly enough said during the Part 70 discussions the week of March 5: The crane in question is non-conforming in a very particular respect: It may not be used with certain lifting devices to lift certain loads. It is not in some vague sense generally non-conforming. Some drivers are licensed to drive only during the day. They are not thereby to be declared non-conforming when driving during the day. We fail to comprehend why Mr. Anthony continues to press his misunderstanding on us, especially when whether the crane is conforming has no logical relation to our decision.

As to whether we plan to hide behind the affidavits, we do not. Neither do we plan to hide behind the replies, should they reveal that what we rule here is wrong. We plan to read the affidavits and the replies, think about them, and rule. As to whether this ruling we confirm today

begins an inexorable process which leads to the operation of the Limerick plant, we note that other boards have heard and thoughtfully rejected similar arguments. *See, e.g., Perry, supra,* 18 NRC at 65-66 (no logical relationship of Part 70 ruling to grant or denial of operating license). We plan to continue to hear the litigation of FOE's admitted contentions in this operating license proceeding and then rule according to the merit the record accords them.

## LEA'S PETITION

Some of the analysis which we made concerning the technical bases of FOE's contentions will apply to the technical bases of LEA's Petition, but before we can apply that analysis we must clear yet another procedural hurdle. This hurdle is one more appropriately dealt with now than earlier, for where the earlier hurdles concerning jurisdiction and criteria for admitting late-filed contentions threatened to keep us from considering the substance of the Intervenors' Part 70 filings, the remaining hurdle is that LEA's Petition appears to have no substance to consider: It is not a set of contentions; it is only a request for a hearing, and that is all LEA intended it to be. As the heading of the Petition shows, LEA requested the hearing under the Atomic Energy Act, as amended January 4, 1983, Pub. L. 97-415, Section 12(a). The relevant part of that section is paraphrased in 10 C.F.R. § 50.91(a)(4), which implements Section 12(a). We quote 50.91(a)(4):

> Where the Commission makes a final determination that no significant hazards consideration is involved and that the amendment should be issued, the amendment will be effective upon issuance, even if adverse public comments have been received and even if an interested person meeting the provisions for intervention called for in § 2.714 has filed a request for a hearing. The Commission need hold any required hearing only after it issues an amendment, unless it determines that a significant hazards consideration is involved.

The Board and LEA agree that, as the first paragraph of 50.91 shows, the amendment 50.91(a)(4) refers to is an amendment to an operating license. But the Board and LEA do not agree about how 50.91(a)(4) applies to amendments to Part 70 licenses; therefore, the Board and LEA do not agree about how 50.91(a)(4) applies to the Applicants' revised amended fuel license application, which, in effect, is an application for an amendment to the Part 70 license the Applicant has had since last September to receive milligram quantities of sealed source material. LEA reads the quoted section to deny the Commission the power to make amendments effective upon issuance before hearings are held.

except when the amendment is both to an operating license and involves no significant hazards consideration. LEA, therefore, regards its Petition as having stayed the effectiveness of any amendment to the Applicant's existing Part 70 license until either the request for a hearing is denied or the hearing is held. *See, e.g.*, Tr. 7840-41, and Tr. 7894-95. Therefore, under LEA's reading of 50.91(a)(4), LEA has no obligation to file contentions on the new fuel license until well after the Petition has been granted, and we have no substance to consider in supporting a ruling on the Petition.

The advantages from LEA's perspective of its way of proceeding on the fuel license application are clear: By requesting a separate hearing LEA hopes both to gain time to draft admissible contentions and to keep fuel away from Limerick at least until the separate hearing is over. Had LEA brought its concerns before us in the form of a motion to stay receipt of fuel, it would have had to argue a great deal more than it has to argue when petitioning for a hearing.

Treated as a motion to stay receipt of fuel, LEA's Petition must be denied, for it offers neither contentions with some chance of being admitted, nor any strong indication that such contentions are forthcoming. During the prehearing conference the week of March 5, we asked LEA to indicate what matters it could foresee filing contentions on and it mentioned only two: the physical security plan for the new fuel, and the Applicant's request under 10 C.F.R. § 70.24(d) for an exemption from the requirement of § 70.24 for a criticality monitoring system. Tr. 7895. *See* Sec. 2.2.6.1 in June 1983 fuel license application (repeated in the February 6, 1984 amended application).

We assume that the contention on criticality monitoring would allege that such monitoring was to be required of the Applicant. Given the rulings we have made on FOE's contentions related to criticality, we cannot imagine that we would admit such a contention. Moreover, exemptions from the requirements of 70.24 for low-enrichment new fuel stored at a nuclear power plant site are commonly granted.

Neither can we easily imagine admitting a contention on the physical security plan for the new fuel. Such a security plan is not a complex affair, and, therefore, there is no general cause to be concerned about its adequacy. Since FOE's contention alleges no particular cause to be concerned about the adequacy of the plan, we rule that contention inadmissible for lack of basis and specificity. As LEA firmly points out, any admissible contention concerning the plan would have to be based on a knowledge of the plan, and LEA has not had an opportunity to see it. Tr. 7927-28.

We are not opposed to any sensible arrangement LEA and the Applicant can fashion to give LEA access to the plan, and we will entertain filings of contentions based on knowledge of the plan; but we will not hold up Staff action on the fuel license application while LEA examines the plan seeking bases and specificity for contentions. Our ruling would probably be different if a security plan for unirradiated fuel were as complex as an emergency plan for operating licenses and thus presented as great a possibility of inadequacy, and if LEA had given us a reasonable indication of the specific aspects of the plan with which it is concerned, as LEA did with the emergency plans even before it had seen the plans.

If, after what we think would be an unnecessarily circuitous route, we were delegated jurisdiction over LEA's Petition, we would be faced with LEA's argument that under 50.91(a)(4), its request for a hearing stays the effectiveness of any Staff order granting the Applicant a fuel license. Again, we would consider any contentions LEA wished to file, but we would not regard the effectiveness of a granted fuel license as stayed, for we do not interpret 50.91(a)(4)'s silence about licenses other than operating licenses the way LEA does. LEA reads the section to imply a limitation on the power of the Commission to make amendments effective upon issuance: that the Commission has a right to make immediately effective amendments only to operating licenses and only on a showing of no significant hazards considerations. We, however, read the section to imply a limitation on the right of an intervenor to have the effectiveness of an amendment stayed until the completion of the requested hearing. We think it is the purpose of that regulation, and the statutory section behind it, to say that only in relation to operating licenses will amendments ever raise safety issues significant enough to require that the effectiveness of the amendment be stayed pending a hearing. Thus, on our reading of the regulation, amendments to Part 70 licenses normally do not raise safety issues significant enough to require that the effectiveness of the amendment be stayed pending a hearing.

We can imagine coming a step closer to LEA's reading of § 50.91 (which is applicable to operating license amendments) by considering, *arguendo*, that it permits an analogous treatment of amendments to fuel licenses. Read thus, the regulation would permit immediately effective amendments to Part 70 licenses even where a hearing has been requested, where there is a no significant hazards considerations finding. 10 C.F.R. §§ 50.19(a)(4) and 50.92(c). Therefore, even under this analogous application of 50.91(a)(4) for the sake of argument, our ruling would stand, for LEA has hardly begun to argue that this amendment involves any significant hazards considerations. Given our discussion above, we conclude there are none as to concerns raised by LEA, and

that, subject to the expected confirmation by affidavits, there are none as to FOE's contentions.

## APPEALABILITY

If confirmed by our ruling on the affidavits, this will become a final order with respect to all the Part 70 matters raised by FOE. As such, under the Commission's ruling in *Diablo Canyon, supra,* this order will become appealable upon confirmation, after our consideration of the affidavits and any replies. 3 NRC at 74. It is arguably appealable now. FOE has already filed appeals with both the Appeal Board and the Commission.

With respect to LEA's filing, we consider this order to be final now, for LEA has not specified any concern to which a ruling on the affidavits and replies might speak. As we said in our oral ruling, with respect to LEA the ruling became appealable when it was delivered orally, but the deadline for LEA's filing an appeal is to be calculated from the date of service of this written confirmation. By letter of March 9, 1984, LEA informed us that it has not yet decided whether to appeal, and that its decision will depend, in part, on whether it and the Applicant succeed in their present efforts to come to a mutually satisfactory arrangement for giving LEA access to the security plan.

Appeals should be directed to the Commission rather than the Appeal Board, for under the Commission's reading of 10 C.F.R. § 2.785, the Appeal Board does not have jurisdiction over Part 70 matters without a specific delegation from the Commission. *Diablo Canyon, supra,* 3 NRC at 74 n.1. There has, as yet, been no such delegation. As a courtesy, copies of appellate papers should also be served on the *Limerick* Appeal Board and this Board.

The Commission's Office of General Counsel and the Appeal Board have been advised of this ruling.

IT IS SO ORDERED.

FOR THE ATOMIC SAFETY AND
LICENSING BOARD

Lawrence Brenner, Chairman
ADMINISTRATIVE JUDGE

Dr. Peter A. Morris (By LB)
ADMINISTRATIVE JUDGE

Bethesda, Maryland
March 16, 1984

Judge Cole was unavailable to review this written order, but he participated and concurred in the oral rulings which this order confirms.

Cite as 19 NRC 878 (1984) LBP-84-17

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**ATOMIC SAFETY AND LICENSING BOARD**

**Before Administrative Judges:**

**Sheldon J. Wolfe,** Chairman
**Dr. George C. Anderson**
**Dr. Hugh C. Paxton**

**In the Matter of**

**Docket No. 50-482**
**(ASLBP No. 81-453-03-OL)**

**KANSAS GAS & ELECTRIC COMPANY, *et al.***
**(Wolf Creek Generating Station, Unit No. 1)**

**March 26, 1984**

The Licensing Board denies an admittedly untimely petition for leave to intervene filed during the course of a hearing which was being held to consider the sole controverted issue of emergency planning. After balancing the factors set forth in 10 C.F.R. § 2.714(a)(1), the Board concluded that the petition, seeking to raise quality assurance/quality control matters, should not be granted.

## RULES OF PRACTICE: NONTIMELY PETITION TO INTERVENE

In order to determine whether an untimely petition for leave to intervene should be allowed, the Board must balance the five factors set forth in 10 C.F.R. § 2.714(a)(1).

**RULES OF PRACTICE: NONTIMELY PETITION TO INTERVENE**

Where no good excuse is tendered for the tardy filing, the petitioner's demonstration on the four other factors in 10 C.F.R. § 2.714(a)(1) must be particularly strong. *Mississippi Power & Light Co.* (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-704, 16 NRC 1725, 1730 (1982); *Duke Power Co.* (Perkins Nuclear Station, Units 1, 2 and 3), ALAB-431, 6 NRC 460, 462 (1977).

**RULES OF PRACTICE: NONTIMELY PETITION TO INTERVENE**

The second and fourth factors in 10 C.F.R. § 2.714(a)(1) are of relatively minor importance in the weighing process. *Detroit Edison Co.* (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-707, 16 NRC 1760, 1767 (1982).

**RULES OF PRACTICE: NONTIMELY PETITION TO INTERVENE**

It is the petitioner's ability to contribute sound evidence — rather than asserted legal skills — that is of significance in considering a late-filed petition to intervene. *Houston Lighting and Power Co.* (Allens Creek Nuclear Generating Station, Unit 1), ALAB-671, 15 NRC 508, 513 n.14 (1982).

**RULES OF PRACTICE: NONTIMELY PETITION TO INTERVENE**

Even though we are told that four of its co-counsel actively participated in the construction hearings, we cannot conclude that the petitioner's participation could reasonably be expected to assist in developing a sound record since the issue that it would litigate here bears no resemblance to any contested issue that confronted the Licensing Board in the construction permit proceeding. *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), ALAB-743, 18 NRC 387, 401 (1983).

# MEMORANDUM AND ORDER
**(Denying NAN's Petition for Leave to Intervene)**

## Memorandum

### I. BACKGROUND

On December 18, 1980, the Nuclear Regulatory Commission published a Notice of Opportunity for Hearing with respect to Applicants' application for the issuance of an operating license (45 Fed. Reg. 83,360). This Notice provided tnat, by January 19, 1981, "any person whose interest may be affected by this proceeding may file a petition for leave to intervene." The § 2.751a special prehearing conference was held on April 15, 1981. Ultimately, after the completion of discovery, hearings were held January 17-21, January 23-26, and February 14-16, 1984. During these hearings evidence was adduced upon the Intervenors' (Ms. Wanda Christy and Ms. Mary Ellen Salava) emergency planning contentions. There were no other contested matters.

Meantime, in a letter to the Board of January 5, 1984, Ms. Mary Stephens, director of an organization known as Nuclear Awareness Network of Lawrence, Kansas, advised that they intended to submit a late-filed petition to intervene as quickly as possible with respect to quality control/quality assurance. On January 19, 1984, Ms. Stephens, asserting that she had been authorized to represent the members of Nuclear Awareness Network, Inc. (NAN), filed an admittedly untimely Petition for Leave to Intervene and Request for Hearing.

On the last day of the hearing, February 16th, the Board formally closed the record and directed the parties, including the Federal Emergency Management Agency, to submit proposed findings of fact, conclusions of law, briefs and a proposed form of order or decision. However, the Board stated that the closing was conditional and that the record might be reopened because of two recent events. First, the Board noted that, in *New England Coalition on Nuclear Pollution v. NRC*, 727 F.2d 1127 (D.C. Cir. 1984), the Court of Appeals had granted the petition which challenged the Commission's rule to eliminate the need for applicants, which are electric utilities, to establish their financial qualifications. The Board observed that a former party-intervenor in the instant case, Kansans for Sensible Energy, had appealed its dismissal as a party by this Licensing Board, but that the Commission's Appeal Board had held its decision in abeyance pending the result of the District

of Columbia Court of Appeal's decision.[1] Second, the Board noted that to date it had not acted upon NAN's untimely petition for leave to intervene.

On February 3 and February 8, 1984, Applicants and the Staff respectively filed responses opposing the granting of NAN's petition for leave to intervene. Pursuant to an unpublished Order of February 9, 1984, NAN, represented by its attorney, filed a response on March 6, 1984. Applicants' and Staff's counsel advised that they did not wish to respond to NAN's response of March 6th and rested upon their submissions respectively submitted on February 3rd and February 8th (*see* unpublished Memorandum, dated March 13, 1984).

## II. DISCUSSION[2]

As it must, having filed its petition for leave to intervene exactly 3 years after the opportunity for timely intervention had expired, NAN admits that the petition is untimely. (Petition at 1). NAN asserts that it is a nonprofit Kansas corporation established in 1983 "for the express purpose of providing education, research, lobbying, and testimony on issues relating to nuclear power waste, and related matters," that two identified members live within 20 miles of the Wolf Creek construction site,[3] and that other members live, work and recreate within the Wolf Creek geographic area and have interests that may be affected by the outcome of the proceeding. (Petition at 1-2). Petitioner further alleges that within the last 30 days (prior to January 19, 1984) six former Wolf Creek workers voluntarily made statements to its director, Ms. Mary Stephens, which "strongly suggest" that the Applicants' general contractor has encouraged or permitted procedures and practices contrary to the conditions in the Safety Evaluation Report and applicable federal regulations. Should the Board permit intervention, it asserts that, based upon these statements, it would timely file contentions alleging:

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[1] In a recent policy statement, the Commission directed its adjudicatory bodies to continue to treat the rule as valid and stated that it expected to complete an adequate response to the D.C. Circuit's decision before the Court issues its mandate. 49 Fed. Reg. 7981 (1984). Because of this directive, in a Memorandum and Order of February 28, 1984 (unpublished), the Appeal Board stated that KASE's appeal would continue to be held in a deferred status.

[2] In light of our ultimate conclusion that the petitioner should not be allowed to enter the proceeding at this late date, it is unnecessary for us to reach and decide whether NAN has standing to intervene as a matter of right or, lacking standing, whether it meets the criteria established for allowing intervention as a matter of discretion.

[3] Petitioner attached to its Response of March 6, 1984, affidavits of these two members attesting that they had authorized NAN's director to file the petition on their behalves. It also attached its director's affidavit which states, *inter alia*, that she travels and recreates within 20 to 25 miles of the nuclear facility.

(a) That the deliberate policies practiced and permitted by Daniels Construction Co. as general contractor at Wolf Creek are contrary to and make mockery of quality assurance/quality control requirements putatively imposed on this project;

(b) That construction workers were directed by Daniels' foremen to perform work in safety-related areas at variance with established procedures creating doubt as to the physical soundness of the structure;

(c) That Daniels' foremen directed construction workers to mislead quality control personnel and at least one Daniels' foreman forged and falsified work documents for safety-related matters.

NAN states that, in support of its contentions relating to the breakdown of quality assurance/quality control, it proffers the testimony of these six former employees of the general contractor. It then proceeds to identify these six individuals and summarizes their statements alleging incidences of improper and/or defective quality assurance/quality control. (Petition at 3-7).

In order to determine whether this untimely petition for leave to intervene should be allowed, we must balance the five factors set forth in 10 C.F.R. § 2.714(a)(1). In pertinent part, this section provides that:

> Any person whose interest may be affected by a proceeding and who desires to participate as a party shall file a written petition for leave to intervene . . . . The petition and/or request shall be filed not later than the time specified in the notice of hearing . . . . Nontimely filings will not be entertained absent a determination . . . that the petition and/or request should be granted based upon a balancing of the following factors . . . :
>
> (i) Good cause, if any, for failure to file on time.
> (ii) The availability of other means whereby the petitioner's interest will be protected.
> (iii) The extent to which the petitioner's participation may reasonably be expected to assist in developing a sound record.
> (iv) The extent to which the petitioner's interest will be represented by existing parties.
> (v) The extent to which the petitioner's participation will broaden the issues or delay the proceeding.

### (i) Good cause, if any, for failure to file on time

Much argument was occasioned by NAN's assertion at page 7 of the petition that it was unaware of the existence of these serious allegations until mid-December 1983, when its director was contacted by a representative of the workers, who was not identified by NAN. At page 8 of the petition, however, NAN avers that the construction workers first approached its director in December of 1983. Since these allegations of

safety-related violations were not available until these individuals decided to make public this evidence, NAN urges that these allegations constituted newly arising information and good cause has been established for its failure to file on time.

Applicants, however, attached to their Response of February 3, 1984, a joint affidavit of their QA manager and of their QA management consultant who attest that they had interviewed the six former workers identified by NAN, and that each worker had stated, among other things, that NAN's director had contacted them and that they had not initiated the communication with Ms. Stephens. Applicants' two QA personnel also attest that (1) each of the six former workers were sheet metal craftsmen who had worked on heating, ventilating and air-conditioning systems and that each had indicated his first-hand knowledge of quality problems at Wolf Creek was limited to HVAC systems, and that (2) each worker had either denied some of the allegations attributed to them by NAN, corrected or revised allegations attributed to them by NAN, and/or advised that most, if not all, corrective actions had been taken and that they have no present safety concerns. Signed but unsworn statements of four of these former workers, as witnessed by the Applicants' QA manager, were also attached to the Response. (Attachments 2-5). Accordingly, Applicants argue that since NAN's recounts of allegations are in large part gross misrepresentations and since NAN initiated contact with the workers (and thus could have done so long ago), good cause has not been established to excuse the belated filing of the petition.[4] (Applicants' Response at 15). Unaccountably, Applicants did not secure and attach affidavits of the six former workers. Four of these individuals signed unsworn statements; apparently the two remaining individuals declined. Equally inexplicable is the fact that, ignoring its assertion at page 8 of its petition, NAN urges that "[n]owhere does Petitioner state or imply that the workers contacted" its director. (NAN's Response at 3). Moreover, we note that while NAN asserts that "[i]t is certainly true that NAN Director Stephens contacted the referenced six workers but only after and in response to her being contacted by their official representative" (*id.* at 7), Ms. Stephens' affidavit neither addressed nor supported this factual allegation. Finally, we note that, again without any explanation for not doing so, NAN did not reinterview any of the six former workers after receiving Applicants'

[4] Relying upon this information received from the Applicants that NAN's director had initiated the contacts with the six former workers and thus could have made these inquiries earlier, the Staff was unwilling to rely upon NAN's primary justification for its untimely filing. (Staff's Response at 10).

Response of February 3, 1984, did not append to its Response counter-statements or affidavits of four of these six individuals if indeed their statements appended to Applicants' Response were faulty, and/or did not append counter-statements or affidavits of all six individuals, if the joint affidavit of Applicants' QA manager and QA management consultant misstated information or drew erroneous conclusions from the interviews with the six former workers. Instead, at page 4 of its Response, NAN attacks the credibility of Applicants' QA manager and QA management consultant in that it is their "QA/QC program [which] is directly challenged by Petitioner."

Amidst this swirl of arguments, however, there are undisputed facts. First, at page 12 of the joint affidavit, Applicants' QA manager and QA management consultant attest that Mr. Neil Campbell's allegation of forgery of weld control records by a Daniels Construction Company sheet metal foreman had been the subject of I&E Report 81-10.[5] Exhibit C, attached to Applicants' Response, contains a Notice of Violation dated April 21, 1982, and Investigation Report 81-10, the latter of which, as signed on September 22, 1981, reflects that: (a) the investigation of this allegation involved 66 hours by two NRC investigators and two NRC inspectors in May, June and August of 1981; (b) the investigation identified one Weld Control Record Supplement Sheet which contained nine QC inspector signatures suspected to be forgeries; (c) an FBI laboratory analysis confirmed that these signatures were forgeries; and (d) efforts to identify the person responsible for these forged signatures were unproductive. Exhibit E reflects that Applicants advised that corrective actions were completed on April 16, 1982, and Exhibit I, dated April 12, 1983, reflects that the Commission closed out the violation in I&E Report 83-06. Second, at page 11 of the joint affidavit, Applicants' two QA personnel attest that Mr. Campbell's allegation that he had been repeatedly ordered to stamp false D numbers on welds had been the subject of I&E Report 81-12. Exhibit D, attached to Applicants' Response, contains a Notice of Violation dated April 21, 1982, and Investigation Report 81-12, the latter of which, as signed on September 22, 1981, reflects that the investigation of this allegation, among others, by two NRC investigators and one NRC inspector took place in June, July and August 1981, and that interviews regarding changing of welder identification numbers on HVAC hangars confirmed that this had occurred and that no justification for these actions could be provided. Ex-

[5] Mr. Campbell is one of the six former workers at Wolf Creek identified in NAN's Petition and is alleged to have made these statements to NAN's director. (Petition at 5). We have given no weight to hearsay statements in the joint affidavit alleged to have been made by him since Applicants failed to submit Mr. Campbell's affidavit, and did not even furnish his signed but unsworn statement.

hibit F, dated May 21, 1982, reflected that Applicants advised NRC that corrective action would be taken. Exhibit I, dated April 12, 1983, reflects that the NRC inspector reported that, as a result of the number of discrepancies disclosed on 120 HVAC hangars/supports, all safety-related hangar supports were 100 percent reinspected and that necessary rework had been completed on January 20, 1983. Third, said QA personnel attested at page 13 of the joint affidavit that I&E Reports 81-10 and 81-12 had been placed in the local NRC Public Document Room in May 1982, and that, as reflected in attached Exhibit L, newspaper articles of April 23, 1981, of April 30, 1982, and of May 3 and May 5, 1982 had addressed these violations and investigations.

Relying on these facts, not disputed by NAN in its subsequent response, Applicants argue that NAN has failed to show good cause because "Petitioner does not explain why it did not seek out workers or other sources of QA/QC information years ago on the basis of available information." (Applicants' Response at 15). NAN's rejoinder at page 4 of its Response is that:

> Applicant, having at this point abandoned common sense, would have this Board craft an impossible standard. Applicant's argument would, if adopted, require prospective intervenors to not only scour newspaper accounts and voluminous NRC-required filings, but to conduct daily exit-interviews at the construction site. Only in that way could Petitioner have learned of the complained-of work on safety-related plant . . .

We are guided by the Appeal Board which has held that whether there is "good cause" for a late filing depends wholly upon the substantiality of the reasons assigned for not having filed at an earlier date.[6] However, here not only are the controlling facts uncontroverted by NAN's affidavits and thus ones which we must take as true,[7] but NAN concedes that it could have learned of QA/QC problems by looking at newspaper accounts and the submissions required by the NRC. At least as early as April 1981, via the newspaper account, and by no later than May 1982, via placements of the Inspection and Enforcement Reports in the local public document room, NAN knew or should have known of these problems. Instead of acting promptly, NAN waited until January 19, 1984 before filing its petition for leave to intervene out-of-time. Intervenors are required to diligently uncover and apply all publicly available

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[6] *South Carolina Electric and Gas Co.* (Virgil C. Summer Nuclear Station, Unit 1), ALAB-642, 13 NRC 881, 887 n.5 (1981).

[7] *Florida Power & Light Co.* (St. Lucie Nuclear Power Plant, Unit No. 2), ALAB-420, 6 NRC 8, 13 (1977), *aff'd*, CLI-78-12, 7 NRC 939 (1978).

information.[8] Moreover, if it is NAN's position that its newly acquired organizational existence in 1983 was sufficient to justify belated intervention, such an explanation for the tardy filing cannot carry the day because the necessary consequence would be that the parties to the proceeding would never be determined with certainty until the final curtain fell. Assuredly, no adjudicatory process could be conducted in an orderly and expeditious manner if subjected to such a handicap.[9]

We conclude that NAN's tardiness was unjustified, and, in these circumstances where no good excuse is tendered, the petitioner's demonstration on the four other factors must be particularly strong.[10]

**(ii) and (iv) The availability of other means whereby the petitioner's interest will be protected, and the extent to which the petitioner's interest will be represented by existing parties**

It is clear that these two factors must be weighed in NAN's favor. There is no issue other than the matter of emergency planning which has been litigated in this proceeding. However, these two factors are of relatively minor importance.[11]

**(iii) The extent to which petitioner's participation may reasonably be expected to assist in developing a sound record**

The Petition does not tell us clearly whether NAN intends to present as witnesses the six former workers and, as indicated above, we are concerned that, without explanation, NAN's Response of March 6th did not even advert to the written statements appended to Applicants' Response of February 3, 1984. Moreover, while NAN asserts that its members possess technical expertise in relevant areas and that its counsel is experienced as a former Deputy General Counsel to the Kansas Corporation Commission and that he would be assisted by four co-counsel

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[8] *Duke Power Co.* (Catawba Nuclear Station, Units 1 and 2), CLI-83-19, 17 NRC 1041, 1048 (1983). While this and other cases are addressed to untimely filing of contentions, these decisions of the Commission and the Appeal Board have equal application to untimely petitions to intervene. *Long Island Lighting Co.* (Shoreham Nuclear Power Station, Unit 1), LBP-83-42, 18 NRC 112, 117, *aff'd*, ALAB-743, 18 NRC 387 (1983).

[9] *Carolina Power and Light Co.* (Shearon Harris Nuclear Power Plant, Units 1-4), ALAB-526, 9 NRC 122, 124 (1979).

[10] *Mississippi Power & Light Co.* (Grand Gulf Nuclear Station, Units 1 and 2), ALAB-704, 16 NRC 1725, 1730 (1982); *Duke Power Co.* (Perkins Nuclear Station, Units 1, 2 and 3), ALAB-431, 6 NRC 460, 462 (1977).

[11] *Detroit Edison Co.* (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-707, 16 NRC 1760, 1767 (1982).

Judges Anderson and Paxton join but were unavailable to sign this issuance.

FOR THE ATOMIC SAFETY AND
LICENSING BOARD

Sheldon J. Wolfe, Chairman
ADMINISTRATIVE JUDGE

Dated at Bethesda, Maryland,
this 26th day of March 1984.

# Directors' Decisions Under 10 CFR 2.206

DIRECTORS' DECISIONS

Cite as 19 NRC 891 (1984) DD-84-6

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**OFFICE OF NUCLEAR REACTOR REGULATION**

**Harold R. Denton,** Director

**In the Matter of**

**Docket No. 50-373**
**(10 C.F.R. § 2.206)**

**COMMONWEALTH EDISON COMPANY**
**(LaSalle County Station,**
**Units 1 and 2)**

**AND ALL LIGHT-WATER REACTORS**

**March 16, 1984**

The Director of the Office of Nuclear Reactor Regulation denies petitions by Edward M. Gogol alleging that there are severe errors, defects and loopholes in the integrated leak rate testing (ILRT) methodology now in use. The petitions sought a variety of relief including requests for immediate action such as placing the LaSalle Unit 1 of the Commonwealth Edison Company in cold shutdown, ceasing further construction and licensing activities with respect to LaSalle Unit 2 and Byron Unit 1 and shutting down reactors with insufficient evidence of adequate containment leak rate testing.

## NUCLEAR REGULATORY COMMISSION: RULEMAKING AUTHORITY

Should a petitioner pursuant to 10 C.F.R. § 2.206 wish to initiate a rulemaking, the procedures set forth in 10 C.F.R. § 2.802 should be followed.

## RULES OF PRACTICE: SHOW-CAUSE PROCEEDINGS

The Director will not institute proceedings in response to a petition under 10 C.F.R. § 2.206 to consider an issue the Commission is treating generically through rulemaking.

## TECHNICAL ISSUE DISCUSSED: CONTAINMENT LEAK RATE TESTING

The Commission's requirements for integrated leak rate testing are set out in 10 C.F.R. § 50.54(o) and Appendix J to 10 C.F.R. Part 50. While the Commission's requirements for integrated leak rate testing continue to provide reasonable assurance that the public health and safety is adequately protected, the NRC Staff has under way a review of leak rate testing requirements to see whether modifications to these requirements are appropriate. The Commission has placed leak rate testing for water-cooled power reactors on its Regulatory Agenda.

# DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

## INTRODUCTION

On November 29, 1983, Edward M. Gogol (Petitioner) filed a "Petition for Emergency Relief re: Primary Containment Leakage and Integrated Leak Rate Testing at All U.S. Nuclear Power Reactors" with the Commission. A virtually identical document, also dated November 29, 1983, was directed to the Office of Nuclear Reactor Regulation. Finally, on November 29, 1983, the Petitioner submitted his "Petition for Emergency Relief re: Primary Containment Leak Rate at LaSalle Units 1 and 2" to the Regional Administrator for Region III of the Nuclear Regulatory Commission. All three petitions (hereinafter referred to as the Petitions) address substantially the same technical issue, specifically, the adequacy of the integrated leak rate testing which is conducted on U.S. nuclear power reactor containments. Consequently, the Petitions have been consolidated and have been treated pursuant to 10 C.F.R. § 2.206 of the Commission's regulations. As the issue raised is primarily one related to the licensing standards for commercial nuclear reactor facilities, the Office of Nuclear Reactor Regulation has provided the substantive response to all Petitions.

The Petitions allege that there are severe errors, defects, and loopholes in the integrated leak rate testing (ILRT) methodology now in

use including the standards of the American Nuclear Society (ANS) and the American National Standards Institute (ANSI), specifically ANS N45.4-1972 and ANSI/ANS 56.8-1981. It is alleged that the ILRT methodology now in use offers no guarantee that actual leak rates are acceptably low. The Petitions seek a variety of relief including requests for immediate action such as placing the LaSalle Unit 1 of the Commonwealth Edison Company in cold shutdown, ceasing further construction and licensing activities with respect to LaSalle Unit 2 and Byron Unit 1 (also of the Commonwealth Edison Company), and shutting down reactors with insufficient evidence of adequate containment leak rate testing. For the reasons set forth in my letter to the Petitioner of December 16, 1983, I declined at that time to take any immediate action based upon the preliminary evaluation conducted by the NRC Staff of the Petitions and other relevant information. I indicated at that time that the NRC Staff would continue to review the Petitions and that the Office of Nuclear Reactor Regulation would issue a formal decision with regard to them in the reasonably near future. On January 6, 1984, the Petitioner submitted an "Addendum to Petition for Emergency Relief" (Addendum) to the Office of Nuclear Reactor Regulation, requesting documentation in the ILRT area. My letter to the Petitioner of February 9, 1984 informed him that the Addendum would be treated as an FOIA request to the extent it sought documents within the possession of the NRC. With respect to the request that all data from the ILRT tests of the LaSalle, Byron and D.C. Cook plants not in the possession of the NRC be obtained and placed in the public document rooms to permit access for the general public, I declined to take such action at that time and stated that I would issue a formal decision regarding this matter in the reasonably near future. My decision in these matters follows.

## DISCUSSION

The Commission's requirements for integrated leak rate testing are set out in 10 C.F.R. § 50.54(o) and Appendix J to 10 C.F.R. Part 50. These requirements call for preoperational and periodic leak rate testing of commercial nuclear power plants in accordance with ANS N45.4-1972, "Leakage Rate Testing of Containment Structures for Nuclear Reactors." Experience gained with integrated leak rate testing of commercial nuclear facilities has been drawn together in an industry consensus document, specifically, ANSI/ANS 56.8-1981, "Containment System Leakage Testing Requirements," which provides detailed measures for performing the integrated leak rate testing required by Appendix J.

The Petitions allege that there are serious errors, defects, and loopholes in both ANS N45.4-1972 and ANSI/ANS 56.8-1981, and that the ILRT methodology now in use offers no guarantee that actual leakage rates are acceptably low. The specific defects alleged in the Petitions include:

(1) The equation used to calculate containment air mass at any given time is wrong;
(2) The final calculated leakage rate may be "fudged" in a variety of ways to presumably yield an invalid leak rate; and
(3) There are "loose" requirements for the permanent archiving of raw test data and other data essential for test evaluation.

With regard to the first alleged defect, the equation presented in ANSI/ANS 56.8-1981 for calculation of containment air mass is not wrong as alleged in the Petitions. The manner in which the mean containment temperature is calculated for use in the equation, however, is important. In this regard, ANSI/ANS 56.8-1981 does not prescribe how to calculate the mean containment temperature. Either a mass-weighted mean temperature or a volume-weighted mean temperature would be acceptable. While the use of a volume-weighted mean temperature is technically more correct, for reasonably well stabilized containment test conditions, as required by Appendix J to 10 C.F.R. Part 50, the error that could result from using the mass-weighted mean temperature is not significant. To illustrate the point that either a mass-weighted mean temperature or a volume-weighted mean temperature would produce acceptable results, five sets of data from the LaSalle Unit 1 ILRT were analyzed using both techniques. The results are set out in Appendix A (unpublished) attached to this decision. The difference in the two methods is quite small; *i.e.*, on the order of 0.35°R or about 0.06%. What is necessary is that integrated leak rate testing be properly conducted to assure stable conditions and that the test data be properly evaluated.

In examining this first alleged defect, the NRC Staff has reviewed both documents referred to in the Petitions. It should be noted that the NRC Staff was aware of the content of these documents prior to the date on which these Petitions were filed. The NRC Staff is also aware of the work of Dr. Zinovy Reytblatt, which is also referred to in the Petitions.

A properly conducted test of containment leak rate obviates not only the first concern raised in the Petitions with respect to the equation used to calculate the containment air mass, but also the second deficiency alleged, namely that final calculated leakage rates may be "fudged." A properly conducted test would not likely be flawed by the types of deficiencies alleged in the Petitions such as unjustified discarding of data or the use of unjustified weighting coefficients. Such manipulation of data

would, of course, be a violation of the Commission's regulations and would subject licensees to NRC enforcement action. To ensure compliance with the Commission's requirements regarding integrated leak rate testing, NRC inspectors regularly observe the tests conducted by licensees and document the results of their observations. For example, the integrated leak rate test inspections for the LaSalle Units 1 and 2 and the Byron Unit 1 are documented in the following inspection reports:

Inspection Report 50-373/82-25 (June 9, 1982) — LaSalle Unit 1

Inspection Report 50-373/82-32 (July 29, 1982) — LaSalle Unit 1

Inspection Reports 50-373/83-28; 50-373/83-23 (DE) (July 28, 1983) — LaSalle Unit 2

Inspection Reports 50-454/83-40 (DE); 50-455/83-30 (DE) (October 11, 1983) — Byron Unit 1

Based on these inspections, the licensee's integrated leak rate testing for both LaSalle County Units 1 and 2 have been determined to meet current regulatory requirements contrary to the allegations of the Petitions. Leak rates at these facilities are within acceptable limits.

Although the inspection effort at Byron Unit 1 is not yet complete, the NRC Staff will similarly determine the acceptability of that integrated leak rate testing. A similar inspection effort is undertaken with respect to integrated leak rate testing on all other licensed commercial power reactors, thus providing assurance that the Commission's requirements are met.

With respect to the third deficiency alleged by the Petitions, namely that requirements for permanent archiving of raw data and other data essential to test evaluation are insufficient, licensees of commercial power reactors are required to retain records which furnish evidence of activities affecting quality of safety-related items, including reactor containment, pursuant to 10 C.F.R. § 50.71, 10 C.F.R. § 50.34, and Criterion XVII of Appendix B to 10 C.F.R. Part 50. Furthermore, the technical specifications, which form a part of the operating license for each plant, require the permanent retention of records associated with in-service inspections and tests required by technical specifications. Integrated leak rate testing is one of the in-service inspections and tests called out in the technical specifications. Finally, the NRC Staff has assured itself that records do in fact exist and are being retained at the LaSalle and Byron and Cook facilities.

With respect to access to records associated with ILRT, the NRC has access to all records of licensees related to their licenses as may be necessary to effectuate the purposes of the Atomic Energy Act of 1954, as amended. *See* 10 C.F.R. § 50.70(a). The bulk of such records are maintained by the licensees and unavailable for examination by the general

public. With respect to licensee's records related to ILRT, the Petitioner requested that such records be obtained by the NRC and placed in the public document rooms. I see no clear benefit to Petitioner's request and consequently that request is denied. The volume of records maintained by licensees is enormous. To honor Petitioner's request would set in motion a practice that could eventually overwhelm the NRC files, both physically and financially with no clear benefit to the public. Remedies are available to the public should there be concerns with regard to a licensee's data or its evaluation. A petition pursuant to 10 C.F.R. § 2.206 as filed by Mr. Gogol is one such remedy. The NRC has pursued the ILRT matter and the records involved and assured itself that the Commission's regulations are being met. It will do likewise when other issues are brought to it for consideration. To honor Petitioner's request would incur substantial burdens and costs without a clear corresponding benefit.

In an effort to more fully understand the concerns raised by the Petitions and at the suggestion of Mr. Gogol, the NRC Staff met with Dr. Reytblatt on January 4, 1984. A copy of the summary of this meeting is attached as Appendix B (unpublished). At this meeting, Dr. Reytblatt expressed more fully his concerns with ILRT methodology and made specific reference to a critique prepared by him of ANSI/ANS 56.8-1981. As can be seen from the summary of the meeting with Dr. Reytblatt, a number of his concerns were resolved at the meeting itself. At the meeting, Dr. Reytblatt noted that many of his concerns had already been provided to the Commission in documented submittals. In fact, Dr. Reytblatt has made a number of submittals to the NRC from May 26, 1982 to July 26, 1983 critiquing ILRT methodology. These submittals were unsolicited and classified by Dr. Reytblatt as proprietary. Consequently, no detailed discussion of these submittals is presented here. However, the NRC has reviewed these submittals and the overall conclusions of the review are:

(1) No safety issue has been identified by Dr. Reytblatt of which the NRC was unaware or which requires NRC action;

(2) Dr. Reytblatt's technical concerns are adequately accounted for if the containment's test conditions are properly stabilized;

(3) Dr. Reytblatt's assumptions on the range of parameters to be encountered during an ILRT cannot realistically be expected to occur; and

(4) The calculated containment leak rate using current methods would not be significantly altered by use of Dr. Reytblatt's proposed technical refinements.

Integrated leak rate testing of nuclear power plant reactor containment is a substantial undertaking. The testing itself is a major undertaking, as is the analysis of the test data. While the Commission's requirements for integrated leak rate testing continue to provide reasonable assurance that the public health and safety is adequately protected, these requirements are now over 10 years old and a substantial base of experience exists to apply in seeking improvements to the regulations. In fact, one modification to 10 C.F.R. Part 50, Appendix J in the area of Type B tests was recently made. *See* 45 Fed. Reg. 2330 (1980) and 45 Fed. Reg. 62,789 (1980). The NRC Staff has under way a review of leak rate testing requirements with a view to see whether other modifications to these requirements are appropriate. Possible improvements could include clarification of the procedures and conditions governing the conduct of integrated leak rate tests. Substantial efforts have been undertaken in this area. As noted above, an industry consensus document, ANSI/ANS 56.8-1981, has been developed in this area. Both Petitioner and Dr. Zinovy Reytblatt are well aware of these activities and developments from their participation in the activities of Working Group ANS-56.8 of the Standards Committee of the American Nuclear Society. The concerns raised in the Petitions have been presented to the NRC Staff on a number of occasions in the past in both oral and written manner by the Petitioner and Dr. Reytblatt. Consequently, both the nuclear industry and the NRC Staff have long had the benefit of these concerns. And, as noted above, consideration of these concerns could result in appropriate modifications to Appendix J to 10 C.F.R. Part 50 at a future date.

The Commission has placed leak rate testing for water-cooled power reactors on its Regulatory Agenda. 48 Fed. Reg. 52,931 (1983) and NUREG-0936, "NRC Regulatory Agenda" Vol. 2, No. 3 (November 1983). At the time a Notice of Proposed Rulemaking is issued, the Petitioner, along with other interested members of the public, will be given an opportunity to comment. As a general rule, the Director will not institute proceedings in response to a petition under 10 C.F.R. § 2.206 to consider an issue the Commission is treating generically through rulemaking. *See Maine Yankee Atomic Power Co.* (Maine Yankee Atomic Power Station), DD-83-3, 17 NRC 327, 329 (1983) and cases there cited. To the extent the Petitioner sought initiation of a rulemaking, his Petitions were misdirected. *See* 10 C.F.R. § 2.802. Should Petitioner wish the Commission to initiate a rulemaking in this matter, the procedures set forth in 10 C.F.R. § 2.802 should be followed. However, as noted above, ILRT is already on the Commission's Regulatory Agenda.

## CONCLUSION

In summary, compliance with the Commission's current regulations regarding integrated leak rate testing of commercial nuclear facilities provides reasonable assurance that the public health and safety are adequately protected. An important consideration in assuring compliance with these regulations is proper conduct of the tests and evaluation of the test data. To this end, the NRC Staff has in place an inspection program to monitor such testing and observe data reduction. NRC Staff findings are routinely documented in inspection reports for the affected facilities. Specific findings of these inspection efforts for LaSalle Units 1 and 2 have been reviewed and the NRC Staff has determined the integrated leak rate testing for these facilities has been properly conducted and that these facilities are in compliance with the Commission's regulations in this area. Requirements for archiving of data have also been reviewed and are satisfactory to ensure availability of data for future review should the need arise. Consequently, I conclude that the overall state of integrated leak rate testing regarding commercial nuclear power facilities is adequate to assure the public health and safety. Accordingly, I decline to take any of the actions solicited by the Petitions. For reasons stated above, I also decline to grant the request sought by Petitioner's Addendum, specifically that all licensee's ILRT data be placed in the public document room.

The Petitioner's request for action pursuant to 10 C.F.R. § 2.206 is denied. As provided by 10 C.F.R. § 2.206(c), a copy of this decision will be filed with the Secretary for the Commission's review. This decision is made without prejudice to the Petitioner's filing of a petition for rulemaking in accordance with 10 C.F.R. § 2.802.

Harold R. Denton, Director
Office of Nuclear Reactor
Regulation

Dated at Bethesda, Maryland,
this 16th day of March 1984.

[The attachments have been omitted from this publication but may be found in the NRC Public Document Room, 1717 H Street, NW, Washington, DC 20555.]

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**OFFICE OF INSPECTION AND ENFORCEMENT**

**Richard C. DeYoung,** Director

**In the Matter of**

**Docket No. 50-397**
**(10 C.F.R. § 2.206)**

**WASHINGTON PUBLIC POWER SUPPLY SYSTEM**
**(WPPSS Nuclear Project No. 2)**

**March 19, 1984**

The Director of the Office of Inspection and Enforcement denies a petition of the Coalition for Safe Power requesting that the Nuclear Regulatory Commission institute show-cause proceedings pursuant to 10 C.F.R. § 2.202 to determine whether the construction permit for the Washington Public Power Supply System Nuclear Project No. 2 (WNP-2) should be revoked, a stay of construction imposed, the pending application for an operating license denied, and hearings instituted before an Atomic Safety and Licensing Board. The petition alleged as its supporting bases deficiencies primarily in the construction and management of the WNP-2 facility.

## TECHNICAL ISSUE DISCUSSED: QUALITY ASSURANCE

It would be unreasonable to hinge the grant of an NRC operating license upon a demonstration of error-free construction. What is required is a careful consideration of whether all ascertained construction errors have been cured and whether the errors indicate that there has been a breakdown in quality assurance procedures of sufficient dimension to raise legitimate doubt as to the overall integrity of the facility and its safety-related structures and components. *Union Electric Co.* (Callaway Plant, Unit 1), ALAB-740, 18 NRC 343, 346 (1983).

**RULES OF PRACTICE: SHOW-CAUSE PROCEEDINGS**

An order to show cause is appropriate in those instances in which the NRC concludes, based upon alleged violations by the licensee or potentially hazardous conditions or other facts, that enforcement action should be taken but that a basis could reasonably exist for not taking the enforcement action proposed. *See* 10 C.F.R. § 2.202(a)(1) and 10 C.F.R. Part 2, Appendix C, § IV.

**RULES OF PRACTICE: SHOW-CAUSE PROCEEDINGS**

Sufficient grounds must be present for the NRC to institute a show-cause proceeding. The standard to be applied in determining whether to issue a show-cause order is whether substantial health or safety issues have been raised.

## DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

### Introduction

On October 14, 1983, the Coalition for Safe Power (Petitioner) filed its "Show Cause Petition from the Coalition for Safe Power Requesting Revocation of the Construction Permit and Denial of an Operating License for Washington Public Power Supply System Nuclear Project No. 2" (Petition). The Petition requested that the Nuclear Regulatory Commission institute show-cause proceedings pursuant to 10 C.F.R. § 2.202(a) to determine whether the construction permit for the Washington Public Power Supply System Nuclear Project No. 2 (WNP-2) should be revoked, a stay of construction imposed, the pending application for an operating license denied, and hearings instituted before an Atomic Safety and Licensing Board. The Petition alleged as its supporting bases deficiencies primarily in the construction and management of the WNP-2 facility. Receipt of the Petition was acknowledged by letter of November 9, 1983. By letter of December 20, 1983, I advised the Petitioner that a review of the Petition had been conducted jointly by the Offices of Nuclear Reactor Regulation, Inspection and Enforcement, and Region V, and that the issues raised in the Petition had been evaluated. That evaluation concluded that the issues raised in the Petition should not preclude the issuance of an operating license for the

WNP-2 facility.[1] Based in part on the results of that evaluation, the Office of Nuclear Reactor Regulation on December 20, 1983, issued a license to the Washington Public Power Supply System (WPPSS or licensee) to permit fuel loading and low-power testing for the WNP-2 facility. My letter of December 20, 1983 further informed the Petitioner that, on the basis of the evaluation conducted to date, I did not intend to grant the relief sought by the Petition and that my formal decision, in accordance with 10 C.F.R. § 2.206(b), would be issued in the reasonably near future.

My formal examination of the Petition follows. The Petition raises essentially five issues, each of which is treated in turn.

## Background

To meaningfully discuss the issues raised by the Petition, some background information is required.

WPPSS was issued Construction Permit No. CPPR-93 (Nuclear Project No. 2) by the Atomic Energy Commission in 1973, which authorized construction of the WNP-2 plant. The WNP-2 plant is located near Richland, Washington and consists of one 1100-MWe boiling water reactor of General Electric design and related facilities for use in the commercial generation of electric power.

Early construction activities at WNP-2 were routine; however, in 1978, NRC inspections revealed signs of poor-quality construction. Intensified NRC inspection efforts resulted. Several investigations were conducted in response to noted construction problems and allegations. In May 1980, meetings were held between the NRC and licensee upper management to focus needed attention on observed problem areas.

An NRC investigation completed in February 1980 resulted in the imposition of a Civil Penalty in the amount of $59,500 for identified structural deficiencies in the sacrificial shield wall (SSW); failure to establish and use a suitable test program for the SSW; failure to provide control of special construction processes; various procedural inadequacies; and generally inadequate record-keeping practices. A

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[1] No hearings were held regarding issuance of an operating license. A hearing notice was issued on July 26, 1978. *See* Receipt of Application for Facility Operating License; Notice of Consideration of Issuance of Facility Operating License; and Notice of Opportunity for Hearing, 43 Fed. Reg. 32,338 (1978). An intervention petition was filed in response to the notice.

By "Order Subsequent to the Prehearing Conference on January 25, 1979," the Atomic Safety and Licensing Board, on March 6, 1979, concluded that no justification for granting intervention in the operating license proceeding existed. *Washington Public Power Supply System* (WPPSS Nuclear Project No. 2), LBP-79-7, 9 NRC 330 (1979). On October 9, 1979, the Atomic Safety and Licensing Board issued a "Notice of Dismissal of the Proceeding."

letter was also issued on June 17, 1980 pursuant to 10 C.F.R. § 50.54(f) seeking assurance from the licensee that the WNP-2 quality assurance program would be improved and implemented to ensure adequate quality of construction. In addition, the letter requested that the licensee develop a plan for determining the quality of past work. In July 1980, another NRC investigation resulted in the identification of twelve items of noncompliance which demonstrated a continuing problem in the control of safety-related work being performed by contractors at WNP-2.

The licensee, in response to the enforcement actions, issued stop-work orders to all WNP-2 site contractors to permit initiation of appropriate corrective measures. The NRC issued a Confirmatory Action Letter (CAL) to the licensee in July 1980 regarding a stop-work order applicable to the principal mechanical contractor. NRC hold points were placed into effect to ensure timely review of the licensee's corrective actions prior to restart of work by the principal mechanical contractor. The NRC inspection force for WNP-2 was supplemented to provide increased audit capability.

The licensee's corrective measures included significant changes to the quality assurance program, including a 100% review and revision of the quality-related work procedures. Major personnel changes were made to the site management organization, and a new construction manager (Bechtel) was brought in to review the adequacy of previous work and provide surveillance over new work. In 1981, safety-related construction work was permitted to resume.

In response to NRC concerns about the quality of past construction work, the licensee initiated a Quality Verification Program (QVP)[2] to determine the quality of work completed up to 1980. This effort, performed in large part by the various contractors involved, was conducted under surveillance by the newly hired construction manager (Bechtel) in accordance with approved procedures. The NRC staff performed independent audits of the overview effort, inspected samples of QVP documentation, reviewed report findings and independently verified selected pieces of WNP-2 hardware.

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[2] The initially conceived program was titled Reverification of Completed Safety-Related Work (RCSW); it encompassed both work restart and the projected hardware reinspection activities. After work restart, the reinspection activity was titled the Quality Verification Program (QVP). Detailed record review activities were later also encompassed by the QVP, as were other special review and rework programs at the site. The QVP was loosely referred to as the reverification program. A separate design-oriented review was performed during 1982-1983, titled the Independent Design Verification Program (IDPV). The QVP and IDVP were together considered the Plant Verification Program.

The NRC Construction Appraisal Team (CAT)[3] also included various pieces of hardware in its special site inspection during 1983. This inspection identified various discrepancies between as-installed pipe supports and the construction drawings, reinforcement steel placement deficiencies, several welding concerns and questionable bolting installations. These matters were referred to the NRC Region V inspection staff for follow-up and resolution in accordance with standard practices.

From the time of the identification of the major construction problems noted above, the NRC staff has conducted a series of Systematic Appraisals of Licensee Performance (SALP) reviews in connection with the WNP-2 facility. These reviews provided a basis for the NRC to evaluate the positive and negative attributes of the licensee's performance. These reviews assisted in improving both licensee performance and the effectiveness of the NRC regulatory program.

The first SALP Board findings at WNP-2 for 1980 centered primarily on significant weaknesses in various aspects of the licensee's quality assurance program. Other findings dealt with a lack of control over the quality of work by the site contractors. The associated SALP report discusses concerns over the number and type of noncompliance items in areas such as safety-related structures, piping and pipe supports, electrical installations and record-keeping practices.

The SALP Board findings for 1981 recognized significant changes the licensee had made in the WNP-2 construction organization. Experienced management personnel had been brought in to implement newly established project management programs to better control the quality of construction. However, the Board also noted that the licensee had been remiss in moving ahead in some areas without making associated changes to the program plan and developing and issuing needed procedures in a timely manner. Other items were identified which highlighted concerns over incomplete corrective measures, design changes, piping supports, and timeliness of responses to NRC licensing matters.

The SALP Board findings for 1982 found the overall performance of the licensee to be acceptable. However, two weaknesses were identified in the areas of design and installation of electrical systems and the implementation of proposed corrective action relative to a reported construction deficiency.

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[3] The Construction Appraisal Team, developed as an NRC headquarter function, focuses primarily on determining the quality of safety-related structures, systems and components by direct hands-on inspections. To a lesser extent, the licensee's quality assurance program is relied on by the team to confirm the findings of the hands-on inspection results. The CAT is made up of highly qualified NRC and independent contractor personnel selected to provide in-depth evaluations of plant hardware.

The most recent SALP Board review on the WNP-2 project for 1983 found that the licensee has been responsive to the previous findings of the SALP reviews and that acceptable corrective actions have been initiated, supervised and directed at the highest level of management. While the Board's findings were favorable, the licensee was strongly encouraged to be especially alert for signs of performance deterioration during completion of the project.

The SALP reviews at WNP-2 served, in large part, to focus attention on the licensee's capability to provide prompt and effective corrective actions to identified construction problems. SALP Board findings, as a matter of policy, have been acted upon by the cognizant NRC regional and site staff as needed to bring about desired changes in inspection emphasis and follow-up of identified weaknesses.

During the latter part of 1982, NRC staff discussions with the licensee led to the development and implementation of an Independent Design Verification Program (IDVP) effort at WNP-2. This effort was directed toward gaining additional assurance regarding the as-built design of the facility and was carried out by licensee staff personnel who were independent from WNP-2 design and construction responsibilities. This effort centered on three safety-related reactor systems. Also, studies were conducted to evaluate operational interaction between the reactor systems. An independent consultant firm, Technical Audit Associates Incorporated (TAA), evaluated the technical adequacy of the IDVP and audited its entire implementation. The NRC staff has completed its evaluation of the program and its findings and concludes that there are no indications of significant deficiencies in the WNP-2 design process and that the design verification program provides additional confidence that acceptable QA design practices were followed during construction of the facility.

Before discussing each one of the five major areas identified in the Petition, it is important to recognize that the Petition provides no new information. The Petition consists almost exclusively of excerpts taken from findings of NRC Inspection Reports. The NRC inspection program recognizes that deficiencies will be found as a result of inspection activities. Corrective action is required for every violation of NRC requirements. *See* 10 C.F.R. § 2.201. Consequently, all the allegations in the Petition which stem from inspection findings have been the subject of corrective action and have been adequately resolved.

With respect to the other allegations raised in the Petition, the NRC has been generally aware of these matters and had taken action with respect to them to the extent appropriate.

The Petition does not provide new information but only restates that which the NRC was already aware of and had already addressed in various inspection and investigation reports. Consequently, the response to the Petition has been organized around the five principal issues raised by the Petitioner to indicate how the corrective action process worked to resolve the various concerns, rather than by a detailed discussion of each of the scores of allegations contained in the Petition, which have already been looked at and resolved once before during the inspection process.

## Principal Issues Raised by Petitioner

### I. THE QUALITY ASSURANCE PROGRAM AT THE WNP-2 FACILITY

The first issue raised by the Petitioner concerns allegations of numerous failures by WPPSS to implement an adequate quality assurance program at the WNP-2 facility as required by 10 C.F.R. Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants." The Petitioner discusses a number of areas wherein it is alleged that the quality assurance provisions of Appendix B have not been met. Such areas include design control, record control, worker qualifications, and materials control. The Petitioner refers to various inspection findings and reviews conducted by either Region V or the Office of Inspection and Enforcement in support of the contention that quality assurance at the WNP-2 facility is deficient. The NRC inspection activities routinely find deficiencies in the performance of construction activities at nuclear power plants. It is not unusual, therefore, that such deficiencies were identified in the NRC Inspection Reports referenced in the Petition. NRC inspection activities involve the auditing of construction of nuclear facilities with the purpose of assuring that the overall construction program in place at a construction site is effective in ensuring that proper quality standards are maintained. Such inspection activities routinely result in enforcement actions and the identification of unresolved items. Isolated deficiencies in the licensee's program do not necessarily undermine the program to such an extent as to give rise to a significant safety concern. Given the magnitude of construction activities associated with completing a nuclear power plant, even numerous deficiencies in such construction activities do not necessarily give rise to a significant safety concern. As has been recently recognized by the

Atomic Safety and Licensing Appeal Board,[4] it would be unreasonable to hinge the grant of an NRC operating license upon a demonstration of error-free construction. What is required in any inquiry is a careful consideration of whether all ascertained construction errors have been cured and whether the errors indicate that there has been a breakdown in quality assurance procedures of sufficient dimension to raise legitimate doubt as to the overall integrity of the facility and its safety-related structures and components.[5]

The following specific categories of quality assurance issues raised by the Petition have been resolved as follows.

**A. Design Control**

The Petitioner contends that the licensee experienced an ongoing failure to conform to applicable design criteria, specifically Criterion III of 10 C.F.R. Part 50, Appendix B, Design Control. The Petition references several NRC design and construction inspection observations which discuss the standby service water system (SSWS). The Petitioner concludes that there has been a general failure by the licensee to conform to applicable design criteria with respect to the SSWS. The Petition further presents NRC findings regarding electrical cable separation and concrete structures, and concludes that lack of design control in these areas has resulted in failure to meet the appropriate design criteria. The Petition then concludes that there is no reasonable assurance that Criterion III of Appendix B has been met. These matters are discussed below.

In the 1981 Inspection Report 50-397/81-17, referenced in the Petition, the NRC inspector observed that forty-nine questions had been identified by the architect-engineer during a design audit of various quality systems, including the SSWS. The NRC inspector noted the absence of anyone's assessment of the significance of these questions relative to the effectiveness of the design verification quality assurance program and concluded the design verification process appeared to deserve further review. The licensee committed at that time to address the inspector's concerns prior to continued execution of the program. The NRC subsequently reviewed details of the existing design verification process, both at the site and the home office of the architect-engineer, and concluded that the process in-place was acceptable.

In 1982 the NRC observed that Drawing Interim Revision Sheets on the SSWS had not been compiled and incorporated into composite draw-

[4] *Union Electric Co.* (Callaway Plant, Unit 1), ALAB-740, 18 NRC 343, 346 (1983).
[5] *Id.*

ings at the frequency called for by procedures and questioned whether working drawings were correct. This was considered to be a relatively minor administrative matter and no items of noncompliance or unacceptable work were identified. The drawings were subsequently updated and controls were adopted and initiated to assure that working drawings were correct.

The SSWS did not provide the design coolant flow for certain pieces of equipment during the initial preoperational tests. On August 11, 1983, the licensee properly reported this information to NRC in accordance with 10 C.F.R. § 50.55(e) and took appropriate corrective actions, including the installation of flow-restricting orifices, valve position adjustments, and system cleaning. Additional permanent orifices will be installed to preclude the need for continued valve position adjustments.

With respect to electrical cable separation, the 1982 SALP Board expressed concern and the need for a clear definition of acceptance criteria for ensuring the electrical independence of redundant safety-related circuits. This area relates to NRC observations and findings documented in various inspection reports and management meetings from 1978 through 1983 regarding the licensee's efforts to interpret industry standards and define field inspection criteria for electrical cable installation separation inspection. This matter has been reviewed by the NRC licensing technical staff of the Office of Nuclear Reactor Regulation and final agreements have been reached on the appropriate criteria and the nature of field inspections. The NRC staff noted the resolution of this matter during the 1983 SALP review.

With respect to electrical cable installation, the CAT identified some errors in cable pull slips but did not identify any improperly installed cables associated with these errors. Also, field variations noted within a group of single-division wall penetrations do not violate separation requirements. With respect to cable tray separation, the licensee has now considered installation tolerances and has conducted physical walkdown inspections of tray installations and has taken appropriate corrective actions for noted discrepancies.

With respect to concrete structures, the CAT identified a number of deviations in the structures. The CAT identified reinforcing steel spacing discrepancies in several areas, and an inability to locate some steel dowels or determine reinforcing steel patterns within the areas of limited excavation of concrete. The licensee subsequently performed additional concrete excavations and obtained additional data. NRC inspectors, including CAT representatives, performed additional inspections of licensee actions. The nature and extent of the discrepancies and their impact on the ability of the structure to take its design loads has been

considered by the licensee assuming worst-case loadings and discrepancies. Evaluations were also conducted by independent third parties. The as-built structures were found to be capable of substantially exceeding design loads. The deviations would have initially been acceptable under the American Concrete Institute Code had they been evaluated before rather than after the fact. No programmatic changes were required since all civil structures had been completed and no additional work is contemplated. The structural significance was also evaluated and found acceptable by NRC licensing technical staff of the Office of Nuclear Reactor Regulation. These conclusions are documented in Supplements 4 and 5 to the Safety Evaluation Report (SER)[6] for the WNP-2 facility.

After the July 1980 stop-work action, the licensee conducted a work restart and work reverification program as part of the QVP and reviewed the past design change control and nonconformance control systems. This included reviews of samples of the different kinds of design change procedures used on the project and reviews of the engineering disposition of nonconformance report documents. This effort was reviewed by the NRC staff which concluded that the design change control process had been improved substantially and was now acceptable. Since that time, design change control has been satisfactory.

To provide additional assurance of proper design control, the licensee conducted its IDVP to review the design activities performed by the architect-engineer, using licensee engineers not associated with the WNP-2 project design and construction responsibilities. Overview audits were conducted by an independent audit organization, TAA. The NRC staff has reviewed the results of the IDVP and concludes that it does provide reasonable assurance that the WNP-2 facility has been designed in accordance with Criterion III of 10 C.F.R. Part 50, Appendix B, Design Control.

### B. Record Control, Worker Qualifications, Material Control, and Maintenance and Preservation

The Petitioner contends that NRC inspection data show that: (1) the licensee has had a continuing inability to produce adequate documentation required by NRC regulations; (2) engineering, quality assurance

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[6] NUREG-0892, "Safety Evaluation Report Related to the Operation of WPPSS Nuclear Unit No. 2," and Supplements 1 through 4. Supplement 4 was issued in December 1983. Supplement 5 is in preparation and will be issued shortly.

and craft personnel were not properly qualified and/or trained; (3) measures had not been established for the identification and control of certain materials to prevent the use of incorrect material; and, (4) there has been a continuing problem with site housekeeping, cleanliness control, and preventative maintenance for safety-related systems or components. These areas are addressed below.

The subject areas have been periodically audited by NRC inspectors as a part of the NRC's routine inspection program to assure that an acceptable level of performance is being maintained by the licensee and its contractors. The examples the Petitioner describes are generally reflective of our inspection experience at this and other construction sites. The licensee has been responsive to the inspection findings and has taken the necessary corrective actions to resolve each of the issues identified.

The licensee experienced problems with generation of quality assurance records prior to July 1980. Default of some contractors contributed to the loss of some records, as did deferrals of final reviews of certain work packages. Through 1980 and after, efforts were undertaken by the licensee to identify the discrepancies in past records and resolve any omissions, discrepancies, and deficiencies. Corrective actions were taken in the specific areas mentioned in the Petition. The licensee's corrective action programs, including quality control reinspections, have been monitored by NRC inspectors. Corrective actions and resolutions, including CAT findings, have been documented in NRC Inspection Reports. No deficiencies remain outstanding.

With respect to worker qualifications, the licensee, as a part of the QVP, conducted reviews to determine the nature of design-change-type actions by engineering personnel, and found such actions acceptable. These reviews were also used to evaluate engineering qualifications. Past work performed by crafts and inspected by field quality control personnel contained discrepancies which may have been due to qualifications problems or lack of training. Work and records associated with such work have been reexamined under the QVP and the as-built programs to provide additional confidence of worker and inspector qualifications. After the July 1980 period, the indoctrination and training programs for craft personnel and quality control inspectors were reinforced.

The Sandler Affidavit contends that worker qualifications were still considered to be a problem at WNP-2 as late as November 1982 based on a discussion with an NRC inspector. Specific issues, including the discussion with the NRC inspector, as related to the Sandler Affidavit

regarding welding engineers and quality assurance personnel qualifications are discussed in Appendix A (unpublished). Resolution of these items, including CAT findings, has been documented in NRC inspection reports.

With respect to material control, there have been isolated cases of material control discrepancies even though the licensee and its contractors had established general and specific programs for material identification and control in accordance with NRC regulations. The CAT observed that an incorrect grade of nuts appeared to have been installed in some pump couplings, pipe flanges, and pressure relief valves. Of twenty-one bolted connections inspected, identifying markings were not observed on five. Markings indicated that an inferior grade had been used on six others. Subsequent removal and inspection of the nuts showed that some markings had been concealed on the underside of the nut. The licensee conducted a complete reinspection of the fasteners for mechanical equipment and identified that only Grade 2H and Grade 7 nuts had been used. These are of equivalent physical and chemical properties for the temperature service of the equipment since physical properties only differ above approximately 900°F. For flanges, the architect-engineer considered the highest fastener loading with the lowest commercially available grade bolting and found this within the Code-allowable bolt stress. The licensee also corrected the minor discrepancies identified in mixed nuts in the material bins at the Bechtel warehouses and audited the other bins. This audit was performed in conjunction with the investigation of apparent improper bolting materials in equipment flanges and couplings.

NRC observations in late 1978 through early 1980 identified weaknesses in the licensee's site housekeeping and system cleanliness control, and equipment preventive maintenance program during construction. Repetitive findings in this area in 1979 resulted in NRC enforcement actions which subsequently led to effective corrective measures by the licensee. Continued NRC attention to this area identified a few additional minor discrepancies in 1981. The enforcement history in this area does not support the existence of significant uncorrected defects in plant structures or equipment. System flushing and preoperational testing provided additional means for the identification and correction of conditions which may have resulted from past weaknesses in the cleanliness, housekeeping and preventive maintenance programs.

With respect to preventive maintenance, the CAT observed that no deficiencies were noted with the preventive maintenance requirements or actions taken for the sample of thirty-six components reviewed. The CAT further observed that the system appeared to be effective. The

CAT concluded that the system currently in place is consistent with regulatory requirements but requires further updating, which is now being done by the licensee.

### C. Quality Class II

The Petitioner alleges that there is no reasonable assurance that the licensee has or will apply installation and inspection techniques to Quality Class II (QCII)[7] equipment important to safety and governed by Criterion II of Appendix B. While the Petitioner acknowledges that Appendix B is generally applied to Quality Class I (QCI) materials and equipment,[8] the Petitioner alleges that there are numerous instances where QCII equipment is important to safety but Appendix B is not applied. The Petitioner describes CAT questions regarding quality assurance measures for supports of Quality Class II/Seismic Category I installations which could impact safety-related equipment in the event the support fails.

The licensee has always applied quality assurance measures to QCII/Seismic Category I installations. For piping and component supports, this included design by the architect-engineer to QCI standards and installation to QCI procedures. In 1981, subsequent to the June 1980 work stoppage, the new construction manager concluded that rework and new installations of QCII/Seismic Category I items did not require all of the same documentation and inspection activities required for QCI items as was the case prior to the stop-work order. The program was therefore revised to permit field inspection by the construction field engineers responsible for this work. The NRC reviewed this change and determined it to be acceptable and equivalent to practices at other nuclear plant construction sites.

The Petitioner notes that the CAT found that the various quality control inspection and as-built programs have not been totally effective in identifying installed hardware that does not meet design requirements. CAT also found that the accuracy of previous inspection and as-built information for QCII/Seismic Category I supports and restraints did not appear to provide sufficient confidence in the acceptability of this hardware. An NRC Notice of Violation was issued relative to this matter. The licensee corrective actions, to problems identified by the CAT, included inspections and engineering evaluations, including use

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[7] QCII items are those items that do not have a safety function but their failure could impact safety-related equipment.

[8] QCI materials and equipment have been defined as safety-related components and are specifically identified in the licensee's Final Safety Analysis Report (FSAR).

of a third-party engineering organization to assess the installations. The evaluation data showed that none of the deviations found would have a significant effect on the structural integrity of the supports. The evaluation data were reviewed by the NRC staff which concluded that the as-built QCII/Seismic Category I structures and supports provide adequate margin of safety and are consistent with NRC requirements. The Office of Nuclear Reactor Regulation with responsibility for licensing the WNP-2 facility has reviewed the CAT concerns with representatives of the CAT organization and concluded that there are no outstanding issues.

**D. Procedures**

The Petitioner contends that procedures have not been properly produced, reviewed, and utilized, and that there has been a failure to properly use procedures at WNP-2 affecting preoperational testing, environmental sampling, reverification, and systems lineup, which continues to this day.

The procedures in use at WNP-2 were generated by various contractors engaged in work on the project, to govern their internal activities and to interface with other organizations at the site. All contractors were required to have quality assurance programs for safety-related work. Each contractor's internal quality assurance organization included a quality control section for direct inspection of hardware to assure compliance with procedures and/or specifications. The contractor organizations included quality assurance audit sections, for assessing internal compliance with procedures by all elements of the organization. In addition, the construction manager (Burns and Roe) had oversight responsibility over the site contractors, which included review of each contractor's work procedures. Such reviews were conducted by segments of the Burns and Roe organization staffed with personnel with appropriate qualifications. Technical, contractual or quality assurance aspects were considered by the organizational element most familiar with the subject, and procedures were routed to such elements for review.

The Burns and Roe organization included technical groups to assist the contractors in handling and processing of field-identified problems prior to submittal to design engineering. The construction manager also included a quality assurance staff to perform daily surveillance over the activities of the site contractors, and to perform formal audits of the contractors and the construction manager's own internal organization. As a part of the surveillance function, the construction manager's quality assurance staff received copies of the contractor's work procedures for

comment regarding inclusion of quality assurance program requirements. The coordinating function for both technical and quality assurance comments was generally performed by project engineering.

The NRC staff generally performed monthly inspections of work procedures, in-process work, and records. The inspectors looked for compliance with applicable codes, standards, commitments to the NRC, and additional specification requirements imposed by the architect-engineer.

As a result of these reviews and other associated work experiences, the various work procedures were revised many times. Some revisions were necessary to resolve ambiguities or errors, improve methods of performance, and to reflect design changes. Some changes were made to prevent recurrence of situations identified by auditors or NRC inspectors.

As a result of the NRC inspection findings from 1978 through 1980, indicating numerous deficiencies in implementing procedures, the licensee stopped work in July 1980 and initiated a complete review of the work procedures of each contractor engaged in safety-related work. Contractors were required to perform comprehensive reviews of their quality discrepancy documents to identify negative trends. These trends were considered when the new procedures were reviewed to assure that program changes would be implemented to preclude recurrence. Their revised procedures were then reviewed by a task force of independent reviewers under direct management of the licensee. These reviews were generally completed in early 1981. The task force compiled the significant discrepancies identified during the reviews and provided these and the backup data sheets to the contractors for consideration in the subsequent record review and hardware reinspection programs, to ascertain adequacy of work completed prior to upgrade of the procedures. The licensee also performed technical re-review on a sample of work procedures for inactive and pre-purchased contracts as a result of issues raised by an NRC management team in 1983. The procedure review and work reverification activities were monitored by an NRC Resident Inspector and Region V inspection staff between July 1980 and December 1983. The NRC staff finds that the licensee had implemented proper procedures for the QVP. These procedures were reviewed, approved, and monitored by Bechtel. The QVP accomplished its intended mission.

In June 1983, the CAT inspection examined various types of hardware at the site, including items subject to the reinspection program and the applicable procedures. The CAT found minor hardware discrepancies and raised questions related to procedure content and/or adherence.

Licensee management promptly responded to these items and undertook their satisfactory resolution.

The inspection history shows that there have been individual problems with the production and use of procedures at WNP-2. With a project of this magnitude, omissions and errors cannot be precluded. Licensee management has been advised of procedural deficiencies and cases of failure to follow procedures, including the specific cases raised in the Petition. In each case, results of subsequent NRC inspections indicate that licensee management has been responsive, corrective action has been initiated, and the items have been satisfactorily resolved, including the CAT issues referred to by the Petitioner.

In discussing the procedures issue, the Petitioner claims that the Sandler Affidavit attached to the Petition demonstrates procedural deficiencies. The issues raised by the Sandler Affidavit had been examined prior to receipt of the Petition by the NRC and either found acceptable or satisfactorily resolved. The Sandler Affidavit is discussed in detail in Appendix A to this decision. The conclusion of the NRC staff is that all the issues raised by the Sandler Affidavit have been satisfactorily resolved.

### E. Corrective Actions and As-Built Plant

The Petitioner contends that the NRC inspections to date demonstrate or strongly suggest that the licensee has not complied with the NRC quality assurance criteria for corrective action in that the licensee has not addressed the underlying programmatic causal factors of individual problems and has an inability to identify, analyze and ensure proper and timely completion of corrective actions. The Petitioner points specifically to continuing difficulties with the Bechtel as-built program[9] for examining pipe supports and restraints. Given the alleged inability of the licensee to take timely corrective action, it is not clear to the Petitioner why the NRC continued to rely on the good-faith effort of the licensee.

The NRC staff has examined the examples presented in this section of the Petition and has determined that each one has been satisfactorily resolved. Based on NRC staff inspection experience, the licensee has routinely addressed causal factors leading to deficiencies in its actions to prevent recurrence and has repeatedly demonstrated the ability to take

[9] The Bechtel as-built program was a 1982-1983 effort to identify differences between as-installed pipe supports and installation records. It encompassed the consideration of NRC Bulletin 79-14, regarding seismic analysis of pipe supports.

effective corrective actions. As a consequence, there is reasonable assurance that the plant has been constructed substantially in accordance with the conditions of the construction permit and NRC regulations. This has been confirmed by an examination of the as-built pipe supports and restraints, including the utilization of an independent third party to perform evaluations and independent calculations of a sample of these items. Corrective actions have generally been of sufficient timeliness.

In March 1983, an NRC special management team reviewed the status of implementation of the QVP commitments made to NRC by the licensee in July 1980. The team found ten areas where the licensee's interpretation or implementation of program commitments did not appear consistent with the NRC's initial understandings or expectations. Most of the NRC questions related to the scope or implementation of reviews of records and material supplied by inactive site contractors or offsite material suppliers. It is noted that the licensee had previously informed the NRC of changes in commitments prior to their implementation, both by phone and in bi-monthly reports. However, the NRC staff did not specifically agree to these changes at the time. The licensee was cooperative in addressing the issues raised by the NRC, and implemented additional reviews and field inspection activities to satisfy the NRC staff that the reverification would be effective and adequately implemented.

The 1982 SALP Board recommended that additional effort appeared warranted to ensure implementation of corrective action decisions regarding significant construction deficiencies reported under 10 C.F.R. § 50.55(e). This was based upon inspection findings that the licensee had not instituted an effective tracking system for assuring that directives for corrective actions were in fact accomplished and accomplished satisfactorily. The 1983 SALP acknowledged licensee quality assurance actions, including adequate corporate audits to assure that all corrective actions were completed, but also noted the need for continued vigilance in verifying the adequacy and implementation of corrective actions.

The CAT found that the Bechtel as-built program had not been totally effective in identifying hardware deficiencies. However, the CAT observed that the deficiencies found during the team's inspection of QCI piping and supports would probably not endanger system function. The licensee's actions on this matter included: (1) a sample reinspection performed by the WPPSS staff, including the CAT inspection sample, and evaluation of the findings; (2) a Burns and Roe evaluation of the Bechtel as-built program and discrepancies identified; and (3) Stone and Webster (third-party architect-engineer) performance of independent

field measurements and an assessment of design capability of a sample of pipe supports.

The engineering evaluations and assessments of worst-case conditions, performed by Burns and Roe and Stone and Webster, concluded that none of the deviations impacted the design, function, or operability of the specific supports and that similar deviations in other supports would not significantly affect their structural integrity. The evaluations and assessments were reviewed by the NRC staff of the Office of Nuclear Reactor Regulation and it determined that none of the deviations had a significant effect on the structural integrity of the support. The NRC staff conclusions were documented in Supplements 4 and 5 to the SER for the WNP-2 facility.[10]

In summary, the NRC staff has considered the matters referenced in the Petition and has determined that these matters have been satisfactorily addressed or resolved.

### F. Test and Startup

The Petitioner contends that the NRC inspection findings demonstrate that the startup organization at WNP-2 is unqualified and its activities reflect the same deviations from FSAR and Appendix B requirements as has the QA/QC program as a whole. The Petitioner references CAT findings that the startup organization has failed to develop adequate documentation to ensure that sufficient corrective actions were taken when deficiencies were identified.

The NRC Staff has examined the examples identified in the Petition and does not consider them significant. The NRC inspection findings referenced in the Petition, regarding test and startup activities were of minor significance and were adequately resolved by the licensee. The licensee revised the startup program to eliminate the deficiencies referenced by the Petitioner through establishment of separate functions, *i.e.*, the startup personnel would perform those tasks for which they were specifically qualified and other construction and quality-related inspections would be handled by others specifically trained and qualified in these areas.

Startup activities are unlike construction activities in that they principally involve the conduct of operational-type tests to determine if the equipment meets its design function. Findings are referred to other organizations for evaluation, repair, or modifications. The weaknesses that

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[10] *See* note 6, *supra*.

have been identified in the startup program are principally in the area of documentation and do not necessarily suggest inadequacies in the plant hardware.

The startup organization is different from the construction organization. Different individuals are involved and the staff is much smaller. Thus, there is insufficient basis for concluding that inadequate performance of the construction organization is reflective of inadequate performance of the startup organization.

The CAT did observe that adequate documentary evidence of corrective actions could be provided for only thirteen Inspection Reports (IRs) from a group of fifty-six reviewed. Each of these IRs was originated by a person within the electrical contractor organization to document what that person perceived to be departure from the electrical specifications. Although each such IR involved equipment which was no longer the responsibility of the electrical contractor, and no longer under his quality assurance program control, these IRs were offered to the licensee startup organization for consideration. Some of the discrepancies noted by these IRs were simply observations of conditions associated with in-process work being performed by the startup organization. The IRs were not a part of the startup organization's quality assurance program, and the startup engineers apparently ignored those which related to such in-process work. For other matters, the startup engineers translated the information on the IR into the rework or repair control document (Startup Deficiency Report) prescribed by the startup organization's quality assurance manual. The CAT considered that the IRs related to in-process work should have had some sort of documentation of the startup engineer's decision. However, the CAT did not identify any IR items which were actual deficiencies and which were overlooked by the startup organization. The licensee responded to the CAT concern by reexamining all such IRs that had not been dispositioned by the startup organization by instituting a procedure to document actions on such IRs in the future. These actions were subsequently reviewed by an NRC inspector and determined to be satisfactory.

The startup organization at WNP-2 has performed satisfactorily. In those instances where deficiencies were identified, appropriate corrective actions were taken.

In summary, the NRC staff does not agree with the various conclusions reached by the Petitioner concerning the licensee's quality assurance program. The NRC staff has been fully aware of the items identified by the Petitioner; it was the NRC staff who identified and reported these items. It was also the NRC staff who tracked these items to completion to assure sufficient corrective action. For most of the cases, it was the

NRC staff member who originally identified the item who was also involved in the assessment of the resolution of the issue involved. The NRC inspectors had access to all detailed records, personnel and physical hardware to aid in their assessments.

## II. FAILURE TO MEET GENERAL DESIGN CRITERIA

A second issue in the Petition concerns conformance of the facility with 10 C.F.R. Part 50, Appendix A, "General Design Criteria for Nuclear Power Plants." The Petitioner alleges nonconformance with a variety of the General Design Criteria in such areas as electrical circuits, structures, and fluid systems. The Petitioner alleges that these nonconformances make operation of the facility an unacceptable risk. The Petitioner further asserts the need for an Independent Design Verification Program (IDVP) to be completed prior to the licensing of operation of the WNP-2 facility. The staff has recognized the need for such a program at the WNP-2 facility and indeed such a program has been undertaken and completed by WPPSS.

At the time of my December 20, 1983 letter to the Petitioner, the NRC staff's preliminary review of the IDVP had been completed. The NRC staff had not completed its detailed review of the licensee's report and the Technical Audit Associate's reports of the IDVP effort. The Staff has now completed its review of these reports and has confirmed its conclusions that there are no indications of significant deficiencies in the WNP-2 design process. The IDVP that was conducted provides additional confidence that acceptable quality assurance design practices were followed at WNP-2 including the ability to correctly translate applicable NRC design criteria into plant design drawings and specifications.

With respect to the specific references in the Petition concerning areas where the General Design Criteria have allegedly not been met, specifically the electrical circuits, structures and fluid systems, the NRC has been aware of each of the items of concern. As a routine NRC program function, the licensee's progress towards resolution of each item has been tracked by the NRC to ensure complete and acceptable corrective action. Some of these matters have been discussed above. For most of the specific items discussed in the Petition, the individual NRC staff member who originally identified the item was also involved in the assessment of the licensee's resolution of that issue. Consequently, the NRC staff is reasonably assured that each of the items referenced in the Petition, including those having to do specifically with WNP-2 plant electrical circuits, structures and fluid systems, have been resolved.

As stated in my letter to the Petitioner of December 20, 1983, the Office of Nuclear Reactor Regulation (NRR) has completed a thorough review of the WNP-2 facility, including its conformance to the General Design Criteria, and has concluded that the facility, as constructed, meets these criteria.

## III. THE SANDLER AFFIDAVIT

A third issue raised by the Petition relates to allegations made by Mr. Stewart Sandler, in an affidavit attached to the Petition, concerning lack of quality construction and effective quality assurance at the WNP-2 site, principally in the area of welding. The Sandler Affidavit has been evaluated by the NRC staff. This evaluation is attached as Appendix A (unpublished). The results of the evaluation show that all issues raised by the affidavit have been satisfactorily resolved.

## IV. WPPSS MANAGEMENT

The fourth issue raised by the Petitioner concerns the competence of WPPSS management to properly operate the WNP-2 facility. The Petitioner alleges that WPPSS management has failed to maintain an adequate quality assurance program to ensure that design and construction of WNP-2 has met applicable requirements. The Petitioner refers to a variety of sources including SALP and CAT findings as supporting the Coalition's position that the WPPSS management is not qualified to operate the WNP-2 facility.

Contrary to the above, the NRC staff has found that the licensee has been responsive to NRC concerns regarding management weaknesses, particularly since issuance of the Civil Penalty and 10 C.F.R. § 50.54(f) request in June 1980. Further, the NRC staff has reviewed the licensee's managerial qualifications during the operating license review and concluded that licensee management is qualified and competent to manage the WNP-2 facility for operations. Specific findings pertaining to the contentions raised in the Petition are discussed below.

Over the 1978 to 1980 time period, the NRC staff identified licensee management difficulties in obtaining effective implementation of quality assurance programs by the various site contractors. Inspection findings and management meetings resulted in various corrective actions during this period, and eventually led to the stop-work decision by the licensee and definition of a site-wide corrective action program in July 1980. A new management team was brought in to supplement and/or replace

those individuals who had been ineffective in controlling the project. Included in the program was the termination of some contractors. The licensee's management demonstrated a commitment to assess the adequacy of prior work and the work methods for future work. This included the introduction of significant personnel resources in the form of a restart task force in 1980 and a new construction completion and construction management contractor (Bechtel) in early 1981. The resources and experience of the Bechtel organization strengthened the management team and the corrective action programs coincident with completion of construction of the plant.

The NRC staff has reviewed the licensee's and Bechtel's efforts to assure that all quality deficiencies have been identified and addressed. In addition to programs of records reviews and hardware reinspections, program revisions were initiated to assure that discrepant conditions were documented for proper corrective action. The licensee's management also established a telephone hotline for employees to openly or anonymously report observed quality discrepancies. Also, employee exit-interviews included inquiries regarding knowledge of quality problems.

The licensee's independent consultant (TAA) took note of the current management's improved attitude towards quality in its September 1983 final report.[1] Acceptable cooperation of licensee management was also demonstrated during the NRC CAT inspection.

The Petitioner notes that, in 1982, an NRC inspector was informed by the ASME authorized nuclear inspector (ANI) that Bechtel was not properly implementing its quality assurance program in several areas, including training of crafts, availability of work procedures, departures from work procedures, and insufficient material identification and segregation. The NRC in its review of this matter found that Bechtel construction management had requested the ANI to first address issues to management in meetings or by other informal means and then document his concerns if warranted. Such a request by Bechtel was questionable in the view of the NRC staff in that it could reduce the effectiveness of the quality assurance program. Corrective actions by Bechtel included resolution of the ASME and the NRC inspector's specific concerns and implementation of routine documentation by the Bechtel quality assurance department. Contrary to the allegation in the Petition that this item remains open, the item was closed in NRC Inspection Report 50-397/82-14.

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[1] "An Independent Evaluation of the Quality Verification Program and Quality Control Effectiveness," Vol. I, p. 9, September 1983

The NRC staff considers that licensee and Bechtel management have now demonstrated a sense of responsibility for the establishment and implementation of the quality assurance program and associated compliance with NRC regulations.

The CAT did identify several issues related to management competence in its audit of the WNP-2 facility. NRC Region V issued a Notice of Violation on August 30, 1983 containing six items of noncompliance regarding these issues. Region V referred several of the items to the Office of Nuclear Reactor Regulation for evaluation to assure that corrective action had a sound technical basis. Both NRR and the Region V staff coordinated further reviews with the CAT staff. This included two follow-up inspections by CAT inspectors who had been involved in the original inspection. All of the CAT issues have been satisfactorily resolved. While the CAT perceived that identified hardware deficiencies required increased management attention to assure prompt satisfactory resolution, the CAT did not perceive these deficiencies to represent a pervasive management breakdown.

Finally, the technical and management competence of WPPSS to operate the WNP-2 facility has been reviewed by the NRC staff in accordance with the requirements of 10 C.F.R. § 50.40(b) and the Standard Review Plan (NUREG-0800), Section 13.1. The results are reported in the WNP-2 SER[12] issued in March 1982. The organizational changes made by WPPSS have also been reviewed and are reported in Supplements Nos. 1 and 3 of the SER issued in August 1982 and May 1983, respectively. The NRC staff has concluded that the licensee has complied with all appropriate Commission requirements in the area of management competence and is qualified to operate the WNP-2 facility.

## V. CONDUCT OF NRC PERSONNEL

The fifth and final issue raised in the Petition questions the propriety of the conduct of NRC personnel in their review of matters related to the WNP-2 facility. Paragraphs 51, 71, and 94 of the Petition allege a lack of decisive actions on the part of Region V to ensure that WPPSS met commitments and regulatory requirements.[13] In Paragraph 95, the Petitioner alleges NRC "improprieties" including informal release of information to licensees and further alleges that the NRC Office of Inspec-

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[12] *See* note 6, *supra*.

[13] Paragraph 83 alleges that an inspection item concerning implementation of the WPPSS Quality Assurance Program has remained open for an extended period of time. This matter is discussed at p. 920, *supra*.

tor and Auditor (OIA) did not thoroughly investigate the "improprieties."

The Petition has been referred to the NRC's Office of Inspector and Auditor for review and consideration to determine whether any improper conduct occurred on the part of NRC personnel. The Office of Inspector and Auditor has reviewed the Petition and believes that no action by OIA in response to the Petition is warranted at this time.[14]

Based upon my review of the extensive inspection and enforcement effort conducted by Region V, and by the Office of Inspection and Enforcement, I am convinced that these efforts form an adequate basis upon which to make determinations regarding the possible existence of any health and safety concerns raised by the allegations as contained in the Petition. While the Petitioner asserts that the CAT findings show that Region V has not vigorously pursued its inspection and enforcement responsibilities, I find the opposite to be true. The CAT's findings of no pervasive breakdown in the quality assurance activities at the WNP-2 facility confirm that Region V has been effective in overseeing the response of WPPSS to the earlier quality program breakdown to reduce construction errors to an acceptable level.

## Conclusion

The Petitioner argues at length that the circumstances identified by the Petition warrant the exercise of this agency's discretion to issue to WPPSS an order pursuant to 10 C.F.R. § 2.202(a) to show cause why the construction permit for the WPPSS Nuclear Project No. 2 should not be revoked, a stay of construction imposed, the pending application for an operating license denied and a proceeding initiated before the Atomic Safety and Licensing Board.[15] An order to show cause is appropriate in those instances in which the NRC concludes, based upon alleged violations by the licensee or potentially hazardous conditions or other facts, that enforcement action should be taken but that a basis could reasonably exist for not taking the enforcement action proposed. *See* 10 C.F.R. § 2.202(a)(1) and the "General Policy and Procedures for NRC Enforcement Actions," 10 C.F.R. Part 2, Appendix C, § IV. The information provided by the Petitioner is, in almost all instances, derived from the

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[14] OIA memo to Director, Office of Inspection and Enforcement, dated January 6, 1984.

[15] Given the issuance of an operating license to WPPSS for the WNP-2 facility, much of the relief sought by the Petitioner is moot. However, had the Petitioner identified deficiencies warranting action such as suspension, modification or revocation of the operating license, such actions would have been taken.

results of NRC inspection activities. The various deficiencies raised by the Petitioner, to the extent that they exist, have been satisfactorily addressed by WPPSS either through its response and corrective action to specific violations or in support of its application for an operating license. In those instances where allegedly new information has been provided by the Petitioner, *e.g.*, the Sandler Affidavit, the NRC staff had already been generally aware of those allegations, had examined them, and had found them to be without merit.

Sufficient grounds must be present for the NRC to institute a show-cause proceeding. The Petitioner, as discussed above, fails to state a sufficient basis for the institution of show-cause proceedings. The standard to be applied in determining whether to issue a show-cause order is whether substantial health or safety issues have been raised.[16] In this instance, both the NRC inspection program and the licensing process have resulted in a careful review of the design and construction of the WPPSS facility. This process culminated in the completion of a satisfactory IDVP program at the WNP-2 facility. Given the substantial basis for a finding that the public health and safety will be reasonably assured following operation of the WNP-2 facility, I decline to institute a show-cause proceeding.

Accordingly, Petitioner's request for action pursuant to 10 C.F.R. § 2.206 has been denied as described in this decision. As provided by 10 C.F.R. § 2.206(c), a copy of this decision will be filed with the Secretary for the Commission's review.

Richard C. DeYoung, Director
Office of Inspection and
Enforcement

Dated at Bethesda, Maryland,
this 19th day of March 1984.

[Appendix A has been omitted from this publication but may be found in the NRC Public Document Room, 1717 H Street, NW, Washington, DC 20555.]

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[16] *Consolidated Edison Co. of New York* (Indian Point, Units 1, 2 and 3), CLI-75-8, 2 NRC 173, 176 (1975).

Cite as 19 NRC 924 (1984) DD-84-8

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

**OFFICE OF INSPECTION AND ENFORCEMENT**

**Richard C. DeYoung**, Director

**In the Matter of**

**Docket No. 50-275**
**(10 C.F.R. § 2.206)**

**PACIFIC GAS AND ELECTRIC COMPANY**
**(Diablo Canyon Nuclear Power Plant, Unit 1)**

**March 26, 1984**

The Director of the Office of Inspection and Enforcement denies a petition under 10 C.F.R. § 2.206 filed by the joint intervenors in the Diablo Canyon operating license proceeding. The joint intervenors contended that the low-power license for Diablo Canyon Unit 1 should be revoked or at least remain suspended on the basis of the licensee's failure to report a 1977 audit of the quality assurance program of the licensee's prime piping contractor. Although the Director finds that the failure to report the audit constituted a material false statement under the Atomic Energy Act, the Director did not find revocation or suspension of the license to be an appropriate remedy for the reporting failure.

## REPORTING OBLIGATIONS: 10 C.F.R. § 50.55(e)

Section 50.55(e) does not require the reporting of every design or construction deficiency, but requires holders of construction permits to evaluate identified deficiencies and report significant deficiencies as defined by the regulation.

**ATOMIC ENERGY ACT: MATERIAL FALSE STATEMENTS**

The licensee is found to have made a material false statement by not reporting an audit of its prime piping contractor's quality assurance program where quality assurance was an issue being heard in the operating license proceeding and the audit on its face appeared to contradict the licensee's testimony in the proceeding.

**ATOMIC ENERGY ACT: MATERIAL FALSE STATEMENTS**

The fact that an item is not reportable under 10 C.F.R. § 50.55(e) may not obviate reporting under the "full disclosure" standards of section 186 of the Atomic Energy Act.

**NRC ENFORCEMENT POLICY**

Not every violation of Commission requirements mandates the severe sanction of license revocation. The choice of sanctions for violations of NRC requirements rests within the sound discretion of the Commission.

**NRC ENFORCEMENT POLICY: MATERIAL FALSE STATEMENTS**

In view of the minimal significance of the material false statement (*i.e.*, failure to report) here, and upon consideration of enforcement actions for other material false statements, a Notice of Violation is the most appropriate enforcement action for the failure to report the quality assurance audit.

## DIRECTOR'S DECISION UNDER 10 C.F.R. § 2.206

On October 20, 1983, counsel for the joint intervenors in the Diablo Canyon operating license proceeding filed a request before the Commission to revoke the low-power license for Unit 1 of the Diablo Canyon Nuclear Power Plant or, alternatively, to continue the suspension of the license. The joint intervenors' request rests on the alleged failure of the Pacific Gas and Electric Company (PG&E or the licensee) to report the existence of a 1977 audit performed by Nuclear Services Corporation (NSC) of Pullman Power Products' quality assurance program. Pullman

is the principal piping contractor for the Diablo Canyon Plant. PG&E opposed the joint intervenors' request in an answer dated October 25, 1983. On November 8, 1983, the Commission rescinded in part its prior suspension of Facility Operating License No. DPR-76 so as to permit fuel loading and pre-criticality testing at Unit 1. CLI-83-27, 18 NRC 1146 (1983). In its Memorandum and Order partially reinstating the low-power license, the Commission referred the joint intervenors' request to the Staff for consideration under 10 C.F.R. § 2.206.

Upon consideration of the joint intervenors' request and other relevant information, the Staff agrees that PG&E should have reported the NSC audit. However, for the reasons set forth in this decision, the Staff does not believe that the extreme remedy of either license suspension or revocation is warranted under these circumstances.

## FACTUAL BACKGROUND

In July 1977, PG&E requested Pullman to obtain an independent audit of Pullman's work at Diablo Canyon. PG&E concurred in Pullman's selection of NSC to perform the audit.[1] NSC conducted the audit between August 22 and September 20, 1977, and sent its report to Pullman on October 24, 1977. In its summary of its report, NSC found "little evidence available to verify the adequacy of the work performed" before early 1974; it concluded that, though documentation was available increasingly since early 1974, "the present program and controls still do not meet 10 C.F.R. 50, Appendix B requirements" for the reasons identified in the report.[2] Upon its review of the NSC audit, Pullman disagreed with NSC's conclusion that necessary documentation did not exist for pre-1974 work. Pullman noted that NSC had failed to examine installed work and had misapplied the applicable codes and regulatory criteria. Pullman asserted that it met Appendix B requirements, but indicated that the audit results were useful in identifying areas in which the quality assurance program could be upgraded.[3] Pullman submitted the final report of its review of the NSC audit to PG&E on April 11, 1978.

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[1] *See* Affidavit of Russell P. Wischow at 1-2, attached to PG&E's Answer to Joint Intervenors' Supplement to Motion to Reopen the Record on the Issue of Construction Quality Assurance (Sept. 21, 1983), which was filed with the Atomic Safety and Licensing Appeal Board.

[2] NSC Audit at 42. The NSC audit and the related Pullman and PG&E reports are attached to the PG&E filing referenced in note 1, *supra*.

[3] Pullman Report, section 4, "Observations," and section 5, "Summary."

Apparently, PG&E did not receive a copy of the NSC audit until February 1978 when Pullman provided a draft of its review of the audit and the NSC audit report to PG&E.[4] PG&E reviewed the NSC audit and also performed an audit of Pullman's installation work. This audit by PG&E was conducted from April 2 through June 1, 1978, and resulted in a report to J.D. Worthington, PG&E Executive Vice President, on June 13, 1978, and a separate report to R.S. Bain, PG&E Manager of Station Construction, on June 16, 1978. While PG&E concluded that, contrary to the NSC audit's findings, Pullman essentially met applicable requirements, PG&E opened two nonconformance reports and four minor variation reports to initiate corrective actions as the result of its review. PG&E generally agreed with Pullman's assessment of the failings of the NSC audit.

At the time that the NSC audit was conducted and was being reviewed by Pullman and PG&E, the Atomic Safety and Licensing Board, on its own initiative, was considering the issue of quality assurance in the Diablo Canyon operating license proceeding. On May 25, 1977, the Board denied the joint intervenors' motion of April 29, 1977, to add a quality assurance contention to the proceeding. At the same time, the Board directed PG&E and the Staff to present evidence on the quality assurance program for Diablo Canyon. The hearing was conducted on October 18 and 19, 1977. Russell Wischow, the Director of the PG&E Quality Assurance Department, testified for PG&E. A panel of three witnesses from NRC's Region V office and the Office of Nuclear Reactor Regulation testified for the Staff. Mr. Wischow described the quality assurance program and testified that the program had generally been effective in detecting defects and in ensuring their correction. The Staff testified that implementation of the Diablo Canyon quality assurance program had been adequate. Counsel for the joint intervenors declined to cross-examine either Mr. Wischow or the Staff's witnesses. PG&E filed its proposed findings of fact and conclusions of law on the quality assurance issue on November 11, 1977, in which PG&E asserted that its quality assurance program had uncovered and then had corrected defects in construction and that its quality assurance program for design and construction of the plant was acceptable. The joint intervenors opposed those findings on February 28, 1978. PG&E replied to the joint intervenors' opposition on March 14, 1978, and reiterated its view that the quality assurance program was acceptable. The Staff filed its proposed findings on March 17, 1978. The Board issued its decision on quality

[4] Affidavit of Russell P. Wischow, *supra* note 1, at 2-3.

assurance in a "Partial Initial Decision" in 1981. The Board found that the quality assurance program for the design and construction phase of Diablo Canyon complied with 10 C.F.R. Part 50, Appendix B, and that implementation had been acceptable. LBP-81-21, 14 NRC 107, 116 (1981).[5]

## REPORTABILITY OF THE NSC AUDIT

The basic issue raised by the joint intervenors' request is whether PG&E had an obligation to report the NSC audit. Reporting obligations to the Commission may arise from various sources, *e.g.*, license conditions, regulations such as 10 C.F.R. Part 21 and 10 C.F.R. § 50.55(e), and section 186 of the Atomic Energy Act.[6] The joint intervenors contend that, by failing to report the NSC audit, PG&E violated 10 C.F.R. § 50.55(e) and committed a material false statement under section 186 of the Atomic Energy Act.

### A. Reportability of the NSC Audit Under 10 C.F.R. § 50.55(e)

The joint intervenors believe that the NSC audit was reportable under 10 C.F.R. § 50.55(e) because the audit revealed a breakdown in Pullman's and PG&E's quality assurance programs. Under 10 C.F.R. § 50.55(e)(1), the holder of a construction permit is required to:

> notify the Commission of each deficiency found in design and construction, which, were it to have remained uncorrected, could have affected adversely the safety of operations of the nuclear power plant at any time throughout the expected lifetime of the plant, and which represents:
>
> (i) A significant breakdown in any portion of the quality assurance program conducted in accordance with the requirements of Appendix B to this part . . . .

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[5] In November 1981, shortly after issuance of a low-power license for Unit 1, the Commission suspended the license in view of the discovery of deficiencies involving quality assurance for design activities. CLI-81-30, 14 NRC 950 (1981). The Appeal Board reopened the operating license record on design quality assurance by Memorandum and Order dated April 21, 1983 (unpublished).

[6] The NSC audit may also have been reportable under PG&E's responsibility to make appropriate Board notifications. Since the Appeal Board's decision in *Duke Power Co.* (William B. McGuire Nuclear Station, Units 1 and 2), ALAB-143, 6 AEC 623, 625-26 (1973), parties to NRC adjudicatory proceedings have been held to an absolute obligation to alert NRC adjudicatory tribunals to new information that is relevant and material to the matters being adjudicated. *See also Tennessee Valley Authority* (Browns Ferry Nuclear Plant, Units 1, 2 and 3), ALAB-677, 15 NRC 1387, 1394 (1982). The enforcement of the obligation to make Board notifications is within the purview of the Commission's adjudicatory tribunals. The Staff itself is responsible to ensure that new, relevant and material information of which the Staff becomes aware is provided to the Boards and parties.

This regulation does not require the reporting of every deficiency in design or construction that could ultimately affect the safety of plant operations. Rather, the deficiency must be significant. The licensee must evaluate identified deficiencies in design and construction to determine whether a particular deficiency is significant. In determining whether the deficiency represents a significant breakdown in the quality assurance program or one of the three other types of significant deficiencies under § 50.55(e), the regulation permits the licensee reasonable latitude in determining a deficiency's significance.

PG&E evaluated the NSC audit and Pullman's response and concluded that Pullman's quality assurance program generally met applicable requirements. PG&E initiated its review after receiving the NSC audit with Pullman's own review of it. Pullman had reviewed the audit and determined that the findings did not substantiate major deficiencies in Pullman's quality assurance program. Pullman also noted that NSC had not reviewed or identified any hardware or installation deficiencies in Pullman's work, though such a review had been intended to be within the scope of the NSC audit. PG&E reviewed the NSC audit and Pullman's response and also audited the as-built condition of components and supports fabricated and installed by Pullman. PG&E concluded that Pullman's response to the NSC audit was generally correct. As a result of its findings, PG&E opened two nonconformance reports and four minor variation reports to ensure corrective action for identified deficiencies in the programmatic description of the quality assurance program and in the implementation of procedures and for several minor installation deficiencies. PG&E did not conclude in its report that the identified deficiencies were "significant" or that Pullman's quality assurance program had suffered a "significant breakdown."

In recent months the Staff has reviewed the findings of the NSC audit and has examined extensively those findings that would affect the quality of installed hardware.[7] The Staff examined Pullman's records and procedures and the licensee's audits of Pullman's activities. The Staff also interviewed various Pullman personnel, particularly those with experience at the site in the early 1970's. *See* NUREG-0675, "Safety Evaluation Report Related to the Operation of Diablo Canyon Nuclear Power Plant, Units 1 and 2," Supp. No. 21, at 2-157 (December 1983); NRC Region

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[7] No one on the Staff recalls specifically whether the NSC audit was reviewed by NRC inspectors in 1977 or 1978. However, an inspector may have seen the audit or at least PG&E's report of its review of the NSC audit during a July 1978 inspection. The inspection report only indicates that NRC examined a number of PG&E quality assurance audits performed between May 25 and July 6, 1978, the same time frame within which the PG&E review of the NSC audit was issued. *See* NRC Region V Inspection Reports Nos. 50-275/78-10 and 50-323/78-10, at 10 (July 25-26, 1978), attached to the PG&E filing referenced in note 1, *supra*.

V Inspection Reports Nos. 50-275/83-34 and 50-323/83-24; 50-275/-83-37 and 50-323/83-25. The Staff did not identify any significant breakdown in Pullman's quality assurance program or safety concerns with the installed hardware.[8] Additionally, an NRC contractor reviewed some 100 radiographs, independently measured weld attributes, and examined records of Pullman's work. The NRC contractor's review did not establish the existence of welding problems.

Although the timeliness of its evaluation could have been improved, PG&E's failure to make a report under § 50.55(e) does not appear unreasonable. Based on the Staff's review of the NSC audit, Pullman's response, PG&E's review, and pertinent inspection reports during the period, the Staff does not believe that the Pullman quality assurance program suffered a significant breakdown in 1977 such that PG&E was obliged to submit a report under § 50.55(e).[9]

### B. Reportability of the NSC Audit Under Section 186 of the Atomic Energy Act

Apart from 10 C.F.R. § 50.55(e), PG&E may have had an obligation to report the NSC audit under the "full disclosure" doctrine that has developed in NRC case law interpreting section 186 of the Atomic Energy Act. In holding that an omission of material information could constitute a material false statement under section 186 of the Atomic Energy Act, the Commission has imposed an obligation on licensees and applicants to ensure that relevant and material information is promptly furnished to the Commission. *Virginia Electric and Power Co.* (North Anna Power Station, Units 1 and 2), CLI-76-22, 4 NRC 480 (1976), *aff'd sub nom. Virginia Electric and Power Co. v. NRC*, 571 F.2d 1289 (4th Cir. 1978).

Materiality of an omission or statement depends on "the context in which information appears and the stage of the licensing process involved" and "whether information has a natural tendency or capability

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[8] In response to the joint intervenor's supplemental motion to reopen the record on construction quality assurance before the Atomic Safety and Licensing Appeal Board, the Staff has also taken the position that the NSC audit report did not reveal a major breakdown in the Pullman quality assurance program. *See* NRC Staff's Response to Joint Intervenors' Supplement to Motion to Reopen the Record on Construction Quality Assurance (Oct. 6, 1983) and attached Affidavit of Gonzalo H. Hernandez, Jr. (Oct. 4, 1983). The Appeal Board denied the joint intervenors' motion to reopen on October 24, 1983. In its Memorandum and Order issued on December 19, 1983, which details the rationale for its decision, the Appeal Board stated, "[w]e have carefully reviewed the NSC audit report and the responses of Pullman and the applicant. These lead us to conclude that the deficiencies identified by NSC in 1977 did not evidence a significant or systematic failure of the quality assurance program." ALAB-756, 18 NRC 1340, 1354 n.35 (1983).

[9] In view of PG&E's findings regarding the NSC audit's results, reporting under 10 C.F.R. Part 21 would not have been required since neither a defect nor noncompliance was present that could create a substantial safety hazard.

to influence a reasonable agency expert." *Id.*, 4 NRC at 491. Put another way, "materiality should be judged by whether a reasonable staff member should consider the information in question in doing his job." *Id.* at 486. The Commission has noted that "[a]t the hearing stage . . . where agency decisionmaking is imminent, arguably relevant data must be promptly furnished if the agency is to perform its function." *Id.* at 488. Intent to mislead or to withhold information is *not* a prerequisite to the finding of a material false statement under section 186.[10]

Here, PG&E had an obligation to submit the NSC audit to the Commission before it had reached the conclusion that the NSC audit had not revealed significant deficiencies in Pullman's quality assurance program because of the apparent conflict with PG&E's quality assurance testimony.[11] By not reporting the NSC audit, PG&E committed a material false statement by omission. The obligation to report the NSC audit arose primarily because the Board had held a hearing to develop a record on quality assurance in the operating license proceeding. Although the Board had determined *sua sponte* to receive evidence on quality assurance, that fact did not absolve the licensee from any reporting obligation.

One can only speculate about the specific actions that would have been prompted if PG&E had reported the NSC audit; however, the NSC audit would likely have had some influence on the Board's and the Staff's examination of the quality assurance issue. PG&E had testified on October 18, 1977 that its quality assurance program, including that of its contractors, was sufficient to ensure adequate design and construction of the Diablo Canyon Plant. Within a few days of the hearing, Pullman, PG&E's prime piping contractor, received the NSC audit report which on its face suggested serious inadequacies in Pullman's quality assurance program. Thus, the audit's findings appeared to conflict with the testimony of PG&E which portrayed an adequate, effective quality assurance program. Given the interest of the Board in establishing a record on quality assurance, the Board may well have kept open the record until evidence was received on the validity and significance of the NSC

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[10] *See North Anna, supra*, 4 NRC at 486-87. However, the degree of carelessness or intent in failing to provide material information is a pertinent consideration in determining whether and what enforcement action is appropriate for a given material false statement.

[11] This may be an instance in which the failure to provide information would constitute both a failure to meet the obligation to keep the adjudicatory boards informed and a material false statement by omission. Although the obligations are derived from different sources, the obligations under the Board notification policy and under section 186 are very similar. Moreover, two of the omissions for which the applicant was held liable in *North Anna* were based upon the applicant's failure to adduce evidence before the Licensing Board. *See Virginia Electric and Power Co.* (North Anna Power Station, Units 1 and 2), LBP-75-54, 2 NRC 498, 532-33 (1975).

audit's findings. Furthermore, the Staff would likely have followed PG&E's review and resolution of the audit's findings.

Although PG&E determined ultimately that the NSC audit had not in fact detected a significant quality assurance breakdown, PG&E did not make that determination until June 1978. Prior to June, the parties had filed proposed findings on quality assurance, and no decision had been rendered by the Board on the quality assurance issue. Given the pendency of the quality assurance issue, PG&E should have provided the NSC audit to the Commission. The audit was reportable *not* because it was an audit, but because the audit report appeared to contain more significant findings than might be expected of a typical audit. These findings appeared to contradict the record developed in the operating license proceeding and, most likely, would have resulted in follow-up review by the Staff to ensure proper resolution of the audit's findings.

PG&E apparently did not have the NSC audit until February 1978, when PG&E received the audit with Pullman's draft review indicating that NSC's conclusions were generally invalid. This fact does not absolve PG&E from any reporting responsibility. Pullman obtained a copy of the audit in October 1977. In *North Anna*, the Commission held that the applicant or licensee is chargeable with the knowledge of information in the possession of its contractors and consultants. *See North Anna, supra*, CLI-76-22, 4 NRC at 486; LBP-75-54, 2 NRC 498, 504-06, 523 (1975); *cf.* 10 C.F.R. Part 50, Appendix B, Criterion I; *Atlantic Research Corp.*, CLI-80-7, 11 NRC 413, 421-22, 424 (1980). In any event, PG&E received the NSC audit in February 1978 with Pullman's draft response. Although PG&E would ultimately determine that the NSC audit did not reveal significant quality assurance deficiencies, PG&E should have reported the NSC audit when PG&E received it, rather than waited to complete its review. At best, the status of the audit was indeterminate when PG&E received it, but, in light of the Commission's interest in the quality assurance issue and the potential conflict between PG&E's earlier testimony and the audit's findings, PG&E should have submitted the NSC audit to the Commission. Reportability under the facts here is a close call. In other cases, licensees and applicants have been expected to provide information during the hearing stage of the licensing process even where its materiality was uncertain.[12] To decide otherwise here would weaken the incentives for licensees to ensure that the Commission is informed of potentially relevant and material information.

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[12] *See North Anna, supra*, LBP-75-54, 2 NRC at 523 and CLI-76-22, 4 NRC at 488. *Compare McGuire, supra*, 6 AEC at 625 n.15, in the context of the obligation to make Board notifications. *See also supra* note 11.

One could argue that, for purposes of reporting construction deficiencies, the Commission has established a specific reporting threshold in 10 C.F.R. § 50.55(e) which requires only the reporting of certain deficiencies. Nonetheless, the Commission has imposed a distinct reporting obligation through the "full disclosure" doctrine developed under section 186 of the Atomic Energy Act. While 10 C.F.R. § 50.55(e) establishes a reporting standard for most instances in which construction deficiencies are identified, licensees have an obligation under section 186 to report information not otherwise reportable under 10 C.F.R. § 50.55(e), particularly where a particular matter is being adjudicated before an NRC tribunal.

Although the Commission and its licensees are more sensitive to reporting issues today, the standards applied in the foregoing analysis were in place in 1977 when the NSC audit was performed. Accordingly, the Staff believes that the NSC audit should have been reported and that the failure to report constitutes a material false statement under section 186 of the Atomic Energy Act.

## ENFORCEMENT ACTION FOR THE REPORTING FAILURE

Having determined that PG&E made a material false statement, the question remains whether any enforcement action should be taken. The joint intervenors would have the Commission revoke the low-power license for Diablo Canyon Unit 1 or continue its suspension.

Not all violations of NRC requirements, including material false statements, warrant the extreme remedy of license revocation or suspension. *See Petition for Emergency and Remedial Action*, CLI-78-6, 7 NRC 400, 405-06 (1978); *Washington Public Power Supply System* (WNP Nos. 4 & 5), DD-82-6, 15 NRC 1761, 1766 n.9 (1982). The choice of enforcement sanctions for violations of NRC requirements rests within the sound discretion of the Commission, based on consideration of such factors as the significance of the underlying violations and the effectiveness of the sanction in securing lasting corrective action. The Commission's current policy on the application of enforcement sanctions is set forth in 10 C.F.R. Part 2, Appendix C.[1] The enforcement policy classi-

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[1] At the time PG&E failed to report the NSC audit, the effective enforcement policy was the one issued on December 31, 1974. That policy did not classify material false statements under the categories of "violations," "infractions," and "deficiencies" used to rank the relative severity of violations of NRC requirements. In those instances in which civil penalties were imposed for a material false statement, the amounts of civil penalties were equivalent to the range of penalties imposed for items of noncompliance in the "violation" category. The categories of violations and the schedule of civil penalties for violations are reproduced in *Atlantic Research Corp.*, ALAB-594, 11 NRC 841, 856-59 (1980).

fies different types of violations by their relative severity and describes circumstances in which formal sanctions, including orders, civil penalties, and notices of violation, are appropriate.

The severity categories for violations involving material false statements are addressed in Supplement VII of the current enforcement policy. Applying this guidance to the material false statement at issue here, the Staff would classify PG&E's failure to report the NSC audit as a Severity Level IV violation. Classification at this level is appropriate for two basic reasons. First, the Staff is not aware of any evidence which suggests that the failure to report resulted from a deliberate, calculated effort to conceal or withhold the NSC audit. Thus, the material false statement here does not carry the degree of intent or recklessness which would warrant classification at Severity Levels I or II. Second, the failure to report — though material — is not significant enough to warrant classification at Severity Level III. Although the Staff would probably have ensured that PG&E or its contractor had evaluated the audit report and had initiated appropriate corrective actions as might be required, the NSC audit would not have changed the Staff's position at the time on quality assurance because ultimately FG&E concluded and the Staff agreed that the NSC audit did not identify a significant quality assurance breakdown. In any event, PG&E took appropriate corrective actions without Staff action. In sum, while the NSC audit would have influenced the Staff in the sense that the Staff would have probably sought more information, the NSC audit would not have resulted in a different Staff position on the quality assurance issue.

Third, in comparison with some Severity Level III material false statements in other cases, this violation is less significant. For example, in the Pilgrim case, the licensee represented that it was in compliance with an NRC regulation when it had not, in fact, met the applicable requirement.[14] In Brunswick, the material false statement involved the licensee's inaccurate representation of its corrective actions in response to an NRC Notice of Violation.[15] These two instances are more severe than the material false statement at issue here, particularly in view of the fact that the affirmative representations in those cases were false and were made in response to express Staff requests for information. The Staff has, in another case, applied the Severity Level IV classification to a material false statement which the Staff did not consider significant. *See Cleveland Electric Illuminating Co.* (Perry Nuclear Power Plant, Units

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[14] *See* NUREG-0940, Vol. 1, Nos. 1 and 2, at 1-8 (September 1982) (EA-81-63).

[15] *See* Letter to E.E. Utley, Carolina Power & Light Co., from J.P. O'Reilly, NRC Region II Administrator (EA-83-88, Jan. 10, 1984).

1 & 2), DD-83-17, 18 NRC 1289 (1983). In view of these precedents, the Staff has concluded that Severity Level IV is the appropriate classification for the violation in this case.

In view of the minimal significance of this particular material false statement, license revocation or continued suspension is inappropriate. As noted above, the failure to report the NSC audit does not appear to have been deliberate or willful.[16] Even if this particular instance were considered in conjunction with the material false statement for which PG&E was cited in early 1982, escalation of enforcement sanctions to the level of license revocation or suspension would not be warranted. Moreover, continued suspension or revocation would not appear to be an appropriate remedy here. The material false statement for which PG&E received a Notice of Violation on February 11, 1982 involved an inaccurate characterization of its receipt of draft reports of the seismic reverification program. *See Pacific Gas and Electric Co.* (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-82-1, 15 NRC 225 (1982). The false statement was compounded by the failure of other PG&E officials to correct the false statement although they knew it to be false at the time. This violation, although more significant than the current violation, did not result in suspension or revocation of the license or even in the imposition of a civil penalty.

Furthermore, the material false statement currently under consideration predated by several years the enforcement action taken in 1982. In connection with that enforcement action, PG&E was required to take appropriate corrective actions. In letters dated March 23, April 15 and 28, 1982, PG&E described its corrective action to ensure good communication between PG&E and the NRC to prevent the recurrence of material false statements or similar reporting failures. The Staff would expect such corrective actions to preclude in the future the type of reporting failure involved in the failure to report the NSC audit.

A Notice of Violation pursuant to 10 C.F.R. § 2.201 is an appropriate sanction for a material false statement of the type made here. Civil penalties are not usually imposed for Severity Level IV violations. In view of the circumstances surrounding this violation including its age and minimal safety significance, a civil penalty for the failure to report

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[16] For an instance in which the making of deliberately false statements regarding the status of licensed activities led to license revocation, *see* American Testing Laboratories, Inc., Order to Show Cause and Order Temporarily Suspending License, 48 Fed. Reg. 28,371 (1983); Order Revoking License, 48 Fed. Reg. 57,182 (1983).

the NSC audit would serve no remedial purpose and, accordingly, a Notice of Violation at most is the appropriate sanction here.[17]

## CONCLUSION

For the reasons stated in this decision, PG&E committed a material false statement by failing to report the 1977 NSC audit. Because license revocation or the continuation of the suspension of the low-power license is inappropriate for this material false statement, the intervenors' request for such relief is *denied*.

A copy of this decision will be provided to the Commission for possible review in accordance with 10 C.F.R. § 2.206(c). Unless the Commission otherwise directs, the Staff will issue a Notice of Violation regarding this matter after the conclusion of the period within which the Commission may review this decision.

Richard C. DeYoung, Director
Office of Inspection and
Enforcement

Dated at Bethesda, Maryland,
this 26th day of March 1984.

[17] Having concluded that a civil penalty is not appropriate in these circumstances, I do not need to reach the question whether imposition of a civil penalty would be barred by the statute of limitations in 28 U.S.C. § 2462.