

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

HOUSTON LIGHTING AND POWER COMPANY,
ET AL.

(South Texas Project, Units 1 & 2)

Docket Nos. 50-498
50-499

100

NRC STAFF'S PROPOSED FINDINGS OF
FACT AND CONCLUSIONS OF LAW

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I. Findings of Fact

A. Jurisdiction, Issues, and Procedural History

A.1 This Partial Initial Decision involves the application for licenses to operate the South Texas Project, Units 1 and 2 (STP) by Houston Lighting and Power Company (HL&P) as project manager, the City of San Antonio, Texas, Central Power and Light Company, and the City of Austin, Texas. This is the second Partial Initial Decision (PID) issued in this matter. The first PID, LBP-84-13, appears at 19 NRC 659 (issued March 14, 1984) (hereinafter referred to as Phase I PID).

A.2 The STP is located approximately fifteen miles southwest of Bay City in Matagorda County, Texas. The application is for operation of two pressurized water reactors, each with a rated core power level of 3800 megawatts thermal and a net electrical output of 1250 megawatts.

A.3 Construction permits were issued by the Commission on December 22, 1975. 41 Fed. Reg. 831 (1976). By contract dated July 1, 1973, the firm of Brown and Root (B&R) was awarded the architect-engineer, construction, and construction manager functions for the STP. CEU Ex. 1, at 10-11. In addition, B&R was to formulate, establish, and administer a quality assurance and quality control program covering all aspects of the design and construction effort. Id. at §§ 2.2.1.7, 5.0.

A.4 On August 2, 1978, the Commission published a notice of its receipt of an application for facility operating licenses and of the opportunity for a hearing on said applications. 43 Fed. Reg. 33968 (1978).

A.5 Two of the five petitioners for intervention were admitted as parties: Citizens Concerned About Nuclear Power, Inc. (CCANP) and Citizens for Equitable Utilities, Inc. (CEU). The State of Texas was also admitted as an interested state. See LBP-82-91, 9 NRC 439 (1979). CEU withdrew from the proceeding on June 15, 1982 (see Tr. 10384), prior to issuance of the first Partial Initial Decision. It has not participated since its withdrawal; similarly, the State of Texas has not participated in the proceedings since issuance of the first Partial Initial Decision. CCANP has participated fully since its admission throughout the recently completed hearings.

A.6 Findings of Fact Nos. 6-8 of our first Partial Initial Decision are hereby adopted and incorporated here as this finding by reference. These Findings appear at 19 NRC 724-725.

A.7 By Order dated December 2, 1980 (unpublished), this Board articulated six issues (Issues A through F) addressing the Commission's concerns in this case that were set forth in CLI-80-32, 12 NRC 281, 291-92 (1980). The hearings on CLI-80-32 Issues A through E (and on Contentions 1 and 2, addressing purported QA/QC deficiencies) were denominated as Phase I of the operating license proceedings. See Phase I PID, 19 NRC 659.

A.8 On September 24, 1981, the Applicants informed the Board that they were dismissing B&R as STP's architect-engineer and construction manager and that Bechtel Power Corporation (Bechtel) would assume those duties. Later, on November 5, 1981, the Applicants advised the Board that they were unable to reach agreement with B&R to continue as constructor; thereafter, notifying the Board on February 16, 1982, of the selection of Ebasco Service Inc. (Ebasco) as B&R's replacement as project constructor.

A.9 On September 28, 1981, HL&P informed the Board that a design review of B&R engineering work had been prepared for HL&P by the Quadrex Corporation (hereinafter the Quadrex Report). See App. Ex. 60. Copies of the Report were soon thereafter provided to the parties and this Board.

A.10 On November 21, 1981, CCANP moved for the admission of some twenty new contentions regarding the Quadrex Report. In our unpublished Fourth Prehearing Conference Order (issued December 16, 1981), this Board ruled that all issues surrounding the Quadrex Report, including its

commissioning, its findings, its submission to and handling by the Applicants, and Applicants' notification of its existence to the NRC Staff and the Board would be designated for Phase II of the proceedings. The Board deferred ruling on CCANP's specific proposed contentions concerning Quadrex. See infra Finding A.11. The Board also stated that Phase II would include design issues such as the hurricane issue raised by Contention 4, any QA/QC matters not completed during Phase I, and any matters from Phase I which require modification because of subsequent findings.

A.11 Adopting the NRC Staff argument (agreed to by HL&P and CCANP) that the new contentions proposed by CCANP regarding the Quadrex Report should be rejected -- since these contentions were already encompassed within existing issues or within the scope of examination of the Quadrex Report scheduled for Phase II outlined in the Fourth Prehearing Conference Order of December 16, 1981 (see id. Finding A.10) -- the Board declined to admit the proposed new contentions. See Memorandum, issued June 24, 1982 (unpublished).

A.12 On March 14, 1984, the Board issued its Phase I PID, holding, that HL&P was not shown to be deficient in character so as to warrant denial of operating licenses; further, 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 (see supra Finding A.6), was not so deficient as to preclude the award of operating licenses. Houston Lighting and Power Company (South Texas Project, Units 1 and 2),

LBP-84-13, 19 NRC 659 (1984), aff'd ALAB-799, 21 NRC 360 (1985). This Board concluded that there was reasonable assurance that structures which were then complete and work which had been performed complied with applicable regulatory requirements and that future work activities (including QA/QC activities) would be carried out satisfactorily. Id., 19 NRC at 723. These conclusions were subject to any later applicable phases of the proceeding. Id. In addition, to enhance the record concerning the on-the-job performance of Bechtel and Ebasco, as well as the up-to-date performance by HL&P, the Phase I decision required a report by the NRC Staff since the close of the Phase I record. Id. at 697. The other parties were invited to supplement or comment upon the Staff report or provide their own reports. Id.

A.13 In an unpublished Memorandum and Order, at 4-6 (issued May 22, 1984), this Board limited Quadrex-related issues in Phase II to those involving the reportability of the Quadrex Report and the adequacy of the corrective action for deficiencies identified in the Quadrex Report. The Board reiterated that these Quadrex-related issues required greater specificity by Intervenor prior to any hearings in Phase II.

A.14 In the Fifth Prehearing Conference Order (Consideration of Issues for Phase II), of November 16, 1984 (unpublished), the Board concluded that CCANP had not adequately specified any issues suitable for litigation regarding the substantive questions raised by the Quadrex Report.

A.15 In a subsequent Order, on February 26, 1985, the Board ruled that all Quadrex-related issues were dismissed except for those issues regarding the reportability of the Quadrex Report that CCANP had set forth in its various filings. LBP-85-6, 21 NRC 447 (1985). The Board set out the following contentions as encompassing those matters (LBP-85-6, 21 NRC 447, at 462-463):

9. The Applicants' failure to notify the NRC (Region IV) of the Quadrex Report, and of many findings beyond those actually reported, within 24 hours from the time HL&P became aware of the findings or prospective findings of the Report (including drafts), violates 10 C.F.R. § 50.55(e)(2) and reflects adversely on the character and competence of the Applicants and on their ability to manage the construction and operation of a nuclear power plant.

10. The Quadrex Report was relevant and material to issues of character and competence addressed in Phase I of this proceeding and should have been furnished to the Licensing Board and parties shortly after its receipt by HL&P, under obligations imposed by the McGuire line of decisions. Failure to have furnished this Report reflects adversely on the character and competence of the Applicants and on their ability to manage the construction and operation of a nuclear power plant. Id.

A.16 A prehearing conference was held in Bethesda, MD on April 30 through May 1, 1985. Tr. 10865-11264. The Applicants, the NRC Staff and CCANP participated in that conference. See id.

A.17 The scope of Contention 9 was limited initially by the terms of LBP-85-6 (21 NRC 464-466) and later restricted further by the Sixth Prehearing Conference Order (Further Definition of Phase II Issues), of May 17, 1985 (unpublished), to the reportability of specific findings of

the Quadrex Report and the reportability of the Report as a whole. In LBP-85-6, the Board also stated that it expected HL&P to address in the Phase II hearings apparent inconsistencies between the Quadrex Report and Phase I testimony concerning the adequacy of B&R's services and HL&P's satisfaction with those services, and the fact that HL&P witnesses did not mention the Quadrex Report or review during Phase I testimony. 21 NRC 447, at 460.

A.18 The Staff filed a joint affidavit on December 21, 1984 (amended on January 24, 1985), on the current competence of HL&P and its new contractors since the close of the Phase I record in accordance with the Board's Order in its first PID. See supra Finding A.12. Applicants also filed affidavits on these issues, on February 25, 1985. CCANP responded to the Staff filing on that date as well. After designating the Staff and Applicant affidavits as motions for summary disposition and providing CCANP with the opportunity for further response, the Board ruled that CCANP had not raised any material issues of fact with regard to the affidavits' statements. The motions for summary disposition were, in effect, granted, with the provision that the NRC Staff present testimony in the Phase II hearings updating its conclusions on the competence of HL&P and its new contractors from the filing of the affidavit to the hearing. Sixth Prehearing Conference Order (Further Definition of Phase I Issues), at 7-9, issued May 17, 1985 (unpublished). See infra Section J.

A.19 In a previous Memorandum and Order the Board had delineated certain matters related to HL&P's competence with respect to questions regarding

soils and backfill that should be explored in Phase II. LBP-85-9, 21 NRC 524, 529-30 (1985). These matters were also admitted in our Sixth Prehearing Conference Order, at 8, as Issue B/D-1. See infra Finding I.1.

A.20 In the Sixth Prehearing Conference Order, the Board also resolved Contention 4 (hurricanes) with regard to design, at least, in favor of the Applicants by granting their motion for summary disposition on that issue. Sixth Prehearing Conference Order, at 4-6. In that Order, the Board also denied a CCANP motion to reopen the Phase I record. Id. at 2-3. The motion had alleged untruthfulness and manipulation on the part of HL&P witnesses and attorneys in Phase I with regard to the timing of the replacement of B&R. Id. at 3-4. The Board ruled that Contention 10 was broad enough to include reporting of the replacement of B&R as an outgrowth of the Quadrex Report. Id. See infra Section G.

A.21 Evidentiary hearings on Phase II issues were held in Bay City, Texas, on July 11-13, and in Houston, Texas, on July 15-19, July 29 - August 3, August 5-9, and August 13-14, 1985. Limited appearance statements were received during the sessions held on July 13 and July 15, 1985. The record was closed on August 14, 1985, with the exception of receipt of an affidavit dated September 4, 1985, from Charles G. Thrash responding to questions agreed upon by the Board and parties in a telephone conference call on August 20, 1985. See Tr. 15381-85, 15387;

Letter of Alvin H. Gutterman to Licensing Board, dated September 6, 1985. 1/

A.22 The Applicants presented the direct testimony of nine witnesses or panels of witnesses during the Phase II hearings: Jerome H. Goldberg (ff. Tr. 11491); Don D. Jordan (ff. Tr. 11908); James R. Sumpter (ff. Tr. 12699); Loren Stanley (ff. Tr. 13047); a panel of Sidney A. Bernsen and Frank Lopez, Jr. (ff. Tr. 13441); a panel of Thomas J. Jordan, Alfredo Lopez, and Walter R. Ferris (ff. Tr. 13645); George W. Oprea, Jr. (ff. Tr. 14095); Richard A. Frazar (ff. Tr. 14412); and Mark R. Wisenburg (ff. Tr. 14514).

A.23 The NRC Staff presented five witnesses or panels of witnesses during the Phase II hearings: Joseph I. Tapia (ff. Tr. 13752); a panel of Eric H. Johnson, George L. Constable, Robert G. Taylor, and Robert F. Heishman (ff. Tr. 14846); a panel of Donald L. Garrison (ff. Tr. 15110), Claude E. Johnson (ff. Tr. 15118), Dan P. Tomlinson (ff. Tr. 15112), Danny R. Carpenter (ff. Tr. 15114), and H. Shannon Phillips (ff. Tr. 15116); and a panel of H. Shannon Phillips (ff. Tr. 15192) and Donald E. Sells (ff. Tr. 15190). In response to a request from CCANP and an Order

1/ On November 14, 1985, the Board granted a CCANP motion to reopen the Phase II record to admit certain versions of notes taken by Mr. Thrash at various meetings of the STP Management Committee. Memorandum and Order, LBP-85-45, 22 NRC _____ (1985). Further hearings will be held with regard to these documents and the questions these raise in December 1985.

from the Board (Tr. 13019-20), the Staff also produced John T. Collins as a witness (Tr. 15286).

A.24 CCANP presented two witnesses subpoenaed during the hearings: Jesse Poston (Tr. 14199) and Alvin G. Robertson (Tr. 14583). The Board denied CCANP requests for various other witnesses at the hearing.

A.25 The State of Texas did not appear and offered no witnesses or other participation in the Phase II hearings.

B. HL&P's Commissioning and Review of the Quadrex Report and Communications Related thereto with the NRC Staff

B.1 HL&P commissioned the Quadrex Corporation in January, 1981, at the impetus of Mr. Goldberg, then HL&P's Vice President, Nuclear Engineering and Construction. Goldberg, ff. Tr. 11491, at 4-5; Tr. 12760-61 (Sumpter). Mr. Goldberg's direct testimony stated that the objective in hiring Quadrex was to gain a third party assessment of B&R's design activities in order to judge what improvements were necessary to complete STP successfully, as well as to provide useful information regarding the status of the project for discussions with HL&P management, the other STP owners and regulatory authorities. Goldberg, ff. Tr. 11491, at 4-5; Tr. 12761, 12763-64 (Sumpter). Mr. Goldberg briefly notified the NRC Project Manager for STP, Donald E. Sells, that the review had been authorized. Sells, ff. Tr. 15190, at Statement, p.1.

B.2 Quadrex was instructed that HL&P was interested in ascertaining B&R's understanding of the significant nuclear engineering issues of then-current concern in the nuclear industry. Goldberg, ff. Tr. 11491, at 6; Tr. 12522-23 (Goldberg); see Stanley, ff. Tr. 13047, at 3. HL&P did not commission an overall review of engineering work, but instead directed Quadrex to look for needed improvement in certain areas where problems were most likely to be found. Tr. 11574-77 (Goldberg). Mr. Goldberg did not seek an analysis of B&R's procedures. Goldberg, ff. Tr. 11491, at 6-7.

B.3 Mr. Loren Stanley (Quadrex's Project Manager for the STP review) confirmed Mr. Goldberg's description of the intended focus of the Quadrex review. Stanley, ff. Tr. 13047, at 3. He testified that the Report concentrated on B&R's ability to complete the Project in an efficient and orderly manner. Id. Quadrex was asked to conduct its evaluation by reviewing B&R's responses to selected issues known to present difficulties in the nuclear industry and/or issues with which HL&P believed B&R was experiencing problems. Id.; Tr. 13073 (Stanley); App. Ex. 60 at 1-1. Mr. Stanley also testified that Quadrex was not asked to assess B&R's design or QA procedures with regard to 10 C.F.R. Part 50, Appendix B, and that it did not attempt to do so. Stanley, ff. Tr. 13047, at 4.

B.4 The review was conducted through a series of questions about the STP design prepared by Quadrex on the basis of information provided from HL&P, as well as through the evaluation of various specified design

documents, such as drawings and calculations. App. Ex. 60, at §2; Goldberg, ff. Tr. 11491, at 7-8; Sumpter, ff. Tr. 12699, at 5-6. Dr. Sumpter, who was at the time of the review HL&P's Manager-Nuclear Services, served as HL&P coordinator. Goldberg, ff. Tr. 11491, at 7; Sumpter, ff. Tr. 12699, at 3-4, 8. A series of meetings between Quadrex and B&R was held in February-March, 1981, first to clarify the questions, and then for B&R to answer those questions. Goldberg, ff. Tr. 11491, at 7-8; Sumpter, ff. Tr. 12699, at 7; App. Ex. 60 at 2-1 to 2-12. At these meetings, Quadrex requested B&R to identify documentary materials, such as calculations, drawings, and reference documents, that could be examined in support of its answers. Goldberg, ff. Tr. 11491, at 7; App. Ex. 60 at 2-12.

B.5 HL&P attempted to keep its involvement in the review process to a minimum in order to obtain the stated objective of an independent third party assessment. Goldberg, ff. Tr. 11491, at 8; Sumpter, ff. Tr. 12699, at 6; Tr. 12836-37 (Sumpter); Sumpter, ff. Tr. 12699, at 8; Tr. 12806 (Sumpter); see also Stanley, ff. Tr. 13047, at 3; Tr. 13116 (Stanley).

B.6 During the course of its review, Quadrex briefed HL&P on its preliminary results on several occasions. See Goldberg, ff. Tr. 11491, at 9-14. The first such briefing occurred on March 18, 1981, and was a relatively short meeting in which Mr. Stanley described to Mr. Goldberg and Dr. Sumpter some of his initial impressions of B&R's engineering capability. Goldberg, ff. Tr. 11491, at 9. Mr. Stanley testified that his comments at the meeting were based on limited evidence gleaned during the first

two weeks of the Quadrex review. Tr. 13083 (Stanley). He stated that "there was a fairly good chance" that some of those comments would turn out not to be true as Quadrex gathered more evidence. Id.

B.7 In the next briefing of HL&P, on April 13, 1981, Quadrex summarized a large number of findings on a discipline by discipline basis. Goldberg, ff. Tr. 11491, at 10; Tr. 12807-08 (Sumpter); Tr. 14590 (Robertson). One area deemed potentially significant by HL&P participants on April 13 was computer code verification. Goldberg, ff. Tr. 11491, at 10-1. Quadrex stated that, while its review was continuing, there was some indication of problems in that area. Id. Accordingly, HL&P requested that Quadrex look closely at the matter and provide additional detail. Id. at 10-11; Tr. 14598-99 (Robertson).

B.8 During the April 13 meeting, Quadrex did not specifically identify any finding as being reportable or potentially reportable. Goldberg, ff. Tr. 11491, at 11. Mr. Goldberg's notes of the April 13 meeting include lists of items discussed at the meeting, some of which he noted as "potentially reportable." Id. at 11, 14; App. Ex. 57. Most of these items noted ultimately turned out not to be reportable under 10 C.F.R. 50.55(e). Id. at 14.

B.9 Mr. Goldberg testified that he suggested at the April 13 meeting that Quadrex categorize its findings in a manner that would facilitate HL&P's reportability review as well as assist in setting priorities for corrective action. Goldberg, ff. Tr. 11491, at 15-16; Tr. 11646-47,

11658-60 (Goldberg). He suggested that Quadrex, in its final report, categorize any areas where HL&P had not satisfied NRC requirements as a "most serious" finding. Goldberg, ff. Tr. 11491, at 11-12; see Sumpter, ff. Tr. 12699, at 9-10; Tr. 11647-48 (Goldberg). His suggestions for categorizing the Quadrex findings were memorialized in a memorandum to Dr. Sumpter on April 15, 1981. App. Ex. 58; Goldberg, ff. Tr. 11491, at 11-12; Sumpter, ff. Tr. 12699, at 9-10; Tr. 11646 (Goldberg); Tr. 12809 (Sumpter).

B.10 Quadrex broadened the "most serious" category to include matters that, in its judgment, had significance for licensing purposes, irrespective of whether NRC requirements were satisfied. Goldberg, ff. Tr. 11491, at 16; Sumpter, ff. Tr. 12699, at 10; Stanley, ff. Tr. 13047, at 5; Tr. 13137-40 (Stanley). Quadrex felt it lacked sufficient information to make a judgment on which items were potentially reportable items. Stanley, ff. Tr. 13047, at 5; Tr. 11645 (Goldberg). Its "most serious" category was, however, intended to include any findings that might possibly be reportable under NRC regulations. Stanley, ff. Tr. 13047, at 5; Tr. 13140, 13143, 13149-50 (Stanley).

B.11 After the April 13, 1981 meeting, on April 21, 1981, Mr. Goldberg again called the NRC STP Project Manager, Mr. Sells, and told Mr. Sells that the Report was due soon. Goldberg, ff. Tr. 11491, at 49; Sells, ff. Tr. 15190, at Statement, p. 1; Tr. 15261 (Sells). He also informed Mr. Sells that some Section 50.55(e) reports were expected and offered to give Mr. Sells and NRC's Office of Nuclear Reactor Regulation (NRR) a

briefing on the Report as soon as it became available. Id. When Mr. Sells asked whether HL&P planned to file the Report with the NRC, Mr. Goldberg told him that it did not plan to do so, but that the NRC could review it at HL&P's offices at its convenience. Goldberg, ff. Tr. 11491, at 49; Tr. 12658 (Goldberg); Tr. 14740-41 (Robertson); Tr. 15261 (Sells).

B.12 The next briefing of HL&P by Quadrex was on April 30, 1981. HL&P did not consider any of the information presented at that meeting to be potentially reportable pursuant to Selection 50.55(e) and did not immediately initiate a reportability review. Goldberg, ff. Tr. 11491, at 13-14; Tr. 14602 (Robertson). HL&P felt the information was of too preliminary a nature to report under 50.55(e) or the NRC guidelines. Goldberg, id. at 17; Sumpter, ff. Tr. 12699, at 11; Tr. 12883-85, 12890-92 (Sumpter).

B.13 On May 6, 1981, in anticipation of the receipt of the Quadrex Report on the next day, Mr. Goldberg wrote a letter to B&R (Mr. Saltarelli) directing it to advise HL&P as to reportability of the Quadrex findings by noon on May 8, and to develop a plan to resolve the Quadrex findings and to issue any stop work orders required as a result of its determinations. Goldberg, ff. Tr. 11491, at 14, 21-22; Tr. 11710 (Goldberg); App. Ex. 61.

B.14 On May 7, 1981, the Quadrex Report (App. Ex. 60) was delivered to HL&P and a briefing on its contents was held for HL&P and B&R personnel.

Goldberg, ff. Tr. 11491, at 17-18. Mr. Goldberg asked Quadrex whether any factual basis for the generic findings existed (see App. Ex. 60, at §3.0) other than the information in the discipline findings (see id. at § 4); Quadrex stated that there was no other basis. Goldberg, ff. Tr. 11491, at 18; Tr. 13195 (Stanley). At the end of that meeting, based on Quadrex' statement that the generic findings were based on the discipline findings, HL&P determined that only the "most serious" discipline findings would need be included in B&R's reportability review. Goldberg, ff. Tr. 11491, at 18-19, 21.

B.15 The Quadrex Report is a three volume report containing, in Volume I, Quadrex's findings (categorized as "generic" and "discipline" findings) and, in Volumes II and III, the questions Quadrex posed to B&R, B&R's responses thereto, and Quadrex's assessments of those responses. App. Ex. 60. The discipline findings are based upon the B&R responses and Quadrex assessments in Volumes II and III of the Quadrex Report. See id. at §2. These discipline findings were ranked into five categories, entitled "most serious findings," "serious findings," "noteworthy findings," "potential problem findings," and "other findings." Id. at 4-1 and 4-2. The generic findings were also ranked into two categories entitled "most serious findings" and "serious findings." Id. at 3-1.

B.16 After first reading the Quadrex Report, Mr. Goldberg's initial reaction was that the magnitude of B&R's engineering problems was greater than he had expected. Tr. 11706-07 (Goldberg). However, after discussing the Report with Mr. Stanley and Dr. Sumpter on May 7 (Tr.

11706-07 (Goldberg); Tr. 13196 (Stanley)) and again on May 8 with Mr. Robertson and Dr. Sumpter (Tr. 11707-08 (Goldberg); Tr. 14633-34 (Robertson); Tr. 12826-28 (Sumpter)), Mr. Goldberg then viewed the Quadrex Report differently. Tr. 11707-08 (Goldberg). He concluded that his initial impressions of the Report were not reflected in actual problems. Tr. 12523-26, 12537-38 (Goldberg). While some design problems were mentioned by the Quadrex Report, these were deficiencies that had been previously identified and were being resolved. Goldberg, ff. Tr. 11491, at 19.

B.17 B&R discipline engineers then evaluated the most serious discipline findings in their respective disciplines for reportability. Goldberg, ff. Tr. 11491, at 21-22; Sumpter, ff. Tr. 12699, at 12. In a lengthy meeting running late into the evening of May 7, B&R's chief discipline engineers reviewed their reportability determinations with B&R's most senior engineering management personnel. Sumpter, ff. Tr. 12699, at 12; Tr. 14718-20 (Robertson). B&R had sufficient information available on May 7 to assess the reportability of all of the most serious discipline findings. Tr. 12799-805 (Sumpter); Tr. 14713-14 (Robertson). Dr. Sumpter and Mr. Robertson attended that meeting. Goldberg, ff. Tr. 11491, at 21-22; Sumpter, ff. Tr. 12699, at 12; Tr. 12812-'s (Sumpter); Tr. 14609 (Robertson).

B.18 On May 8, Mr. Goldberg received a letter from Mr. Saltarelli, B&R's Project General Manager, providing B&R's advice on the reportability of each of the Quadrex "most serious" discipline findings. App. Ex. 62;

Goldberg, ff. Tr. 11491, at 22; Sumpter, ff. Tr. 12699, at 12. Additionally, Mr. Saltarelli's letter also responded to Mr. Goldberg's request for B&R's plan for resolving all of the Quadrex findings and expressed B&R's judgment that no stop work orders would be necessary. App. Ex. 62; Tr. 11713 (Goldberg). Upon receipt of B&R's letter, Mr. Goldberg met with Dr. Sumpter and Mr. Robertson (hereinafter these gentlemen are referred to as the "review team"). The review team met to go through the findings, review B&R's advice, and make HL&P's independent decisions on reportability. Goldberg, ff. Tr. 11491, at 22.

B.19 Use of this review team was not the usual HL&P practice in May, 1981 for conducting reportability reviews. Goldberg, ff. Tr. 11491, at 24. Normally, such reviews were conducted by the HL&P Incident Review Committee (IRC), made up of the Team Leader for Nuclear Licensing; the Project QA Supervisor in the Houston office; and the Supervising Project Engineer-Design Engineering. See id. The usual IRC review was not used because the Quadrex Report was different from the matters usually considered by the IRC. Goldberg, ff. Tr. 11491, at 25. The Report covered a wide scope of design considerations, contained a large number of findings, and raised a number of questions that required an in-depth understanding of nuclear engineering design and design processes. Id. Mr. Goldberg felt the reportability determinations needed to be made by HL&P's most senior engineers, ones who had the greatest experience in the nuclear design process. Id.; see Tr. 14714-16 (Robertson). The review team was at least as well technically qualified as the IRC to perform

reportability reviews under 50.550(e). Tr. 12527-31 (Goldberg); see also Goldberg, ff. Tr. 11491, at 24-25.

B.20 The HL&P review team read each of the "most serious" discipline findings and B&R's advice regarding those findings, and made its own independent judgment as to whether each finding was reportable. Goldberg, ff. Tr. 11491, at 23; Sumpter, ff. Tr. 12699, at 13; Tr. 12583 (Goldberg); Tr. 12827 (Sumpter); Tr. 14636-37 (Robertson). In addition to the Quadrex findings, and the results of B&R's review, the review team members used other information in the Report such as the questions, answers and assessments that formed the bases for the findings in order to assess their reportability. See id. They also had the benefit of information that Dr. Sumpter gained through his contacts with Quadrex, as well as the information gained by Dr. Sumpter and Mr. Robertson while attending the B&R meeting in the late afternoon and evening of May 7. Goldberg, ff. Tr. 11491, at 23, 33; Tr. 11736-37, 11783 (Goldberg). Finally, the review team's knowledge of the Project design and nuclear design in general assisted it in reaching its determinations. Sumpter, ff. Tr. 12699, at 3-4; Sumpter (Supplemental Testimony), ff. Tr. 15357, at 1-4; Tr. 12737-41 (Sumpter); Tr. 11563-66 (Goldberg).

B.21 The Quadrex Report defined the "most serious findings" as "those that pose a serious threat to plant licensability because either (a) the finding would prevent the obtaining of a license or (b) the finding could produce a significant delay in getting a license, or (c) the finding addresses a matter of serious concern to the NRC at this time." App.

Ex. 60 at 4-1. Quadrex had indicated that if HL&P reviewed the "most serious" findings, it would have examined all of those matters with the potential for reportability in the opinion of Quadrex. Stanley, ff. Tr. 13047, at 5; Tr. 13149-50 (Stanley). The review team, consequently, focused its attention on the most serious discipline findings since those were the most likely to have reportability implications. Id.

B.22 Intervenor misquotes a portion of Mr. Stanley's testimony (see Intervenor's Proposed Findings, at III.35) in an attempt to overemphasize the import of what the generic findings of the Quadrex Report actually pointed to with respect to "potential design deficiencies." See Tr. 13183 (Stanley). Mr. Stanley testified that, "[t]he potential for design deficiencies in both the process and the output are reflected in the generic findings." Id. This testimony did not refer to design deficiencies in the sense of reportability under 10 C.F.R. 50.55(e). As Mr. Stanley specifically testified, and CCANP acknowledges (see Intervenor's Proposed Finding III.102), Quadrex was unwilling to make the determination on 50.55(e) reportability. Stanley, ff. Tr. 13047, at 5; see also Goldberg Tr. 11645. The Board finds that Mr. Stanley used design deficiencies merely in the context of the problems Quadrex perceived at the site and not in terms of 50.55(e) or the NRC guidance.

B.23 Some of the Quadrex "most serious" findings related to design activities not yet completed by B&R which HL&P did not consider a deficiency under 10 C.F.R. 50.55(e). Goldberg, ff. Tr. 11491, at 31-32. Quadrex' Mr. Stanley stated that the "most serious" category included

findings that clearly were not reportable. Stanley, ff. Tr. 13047, at 5. The "serious" findings were not reviewed for reportability by HL&P because these findings related to generation of reliable power rather than safety. Goldberg, ff. Tr. 11491, at 29. The "noteworthy findings" were not reportable because they did not relate to safety but only to project schedule and/or cost increases. Goldberg, ff. Tr. 11491 at 29. The "potential problem findings" only identified areas for further investigation and were based on very preliminary and limited information. Tr. 13143-44 (Stanley). The "other findings" category identified only minor items that were not amenable to corrective action. App Ex. 60, at 4-2; Goldberg, ff. Tr. 11491, at 29.

B.24 The generic findings were not reviewed expressly for reportability separately since the Report and the Quadrex briefings indicated that these were based on the specific discipline findings. App. Ex. 60, at 3-1; Goldberg, ff. Tr. 11491, at 30; Stanley, ff. Tr. 13047, at 6-7; Tr. 13195, 13330-33 (Stanley). These generic findings were examined by the review team, however, and the team knew of and specifically kept in mind those generic findings when it reviewed the discipline findings for reportability. Goldberg, id; Tr. 11674-75, 12523, 12630-31 (Goldberg); Tr. 14648-49 (Robertson). The team was looking for "those common threads" between the discipline findings and the generic findings. Id. at 11675 (Goldberg).

B.25 The first item from this review that was determined to be potentially reportable on May 8, involved the failure to consider faulted

condition heat loads in the design of portions of the Heating, Ventilation, and Air Condition (HVAC) system. This condition was reported in a phone call by Mr. Powell of HL&P to the NRC on May 8, 1981. See CCANP Ex. 128; Goldberg, ff. Tr. 11491, at 23-24. This condition had been identified by B&R as being potentially reportable. Goldberg, ff. Tr. 11491, at 34. The HVAC deficiency was the subject of a number of subsequent interim reports to the NRC which described HL&P's corrective actions and recurrence control measures. A final report was issued on October 20, 1982. App. Ex. 74.

B.26 The second item deemed potentially reportable by the review team indicated that the methods for identifying whether the computer code versions in use had been verified lacked adequate visibility to the users of those codes. Goldberg, ff. Tr. 11491, at 35; see also Tr. 14671-72, 14700 (Robertson). Although B&R's assessment found only procedural problems and concluded that this item was not reportable, HL&P determined that it was potentially reportable. Id. Consequently, this item was reported to the NRC in the same phone call on May 8, 1981, that reported the HVAC situation. CCANP Ex. 128. While it could not immediately be determined whether there were design deficiencies that could adversely affect the safety of operation, there was a deficiency in the process of design which represented a possible breakdown in the QA program for STP (i.e., inadequate controls on the use of computer codes in safety-related design activities). Goldberg, ff. Tr. 11491 at 35; see also Tr. 14671-72, 14700 (Robertson). This item, as well, was addressed after the

initial notification in a number of interim reports to the NRC and a final report issued on October 14, 1983. App. Ex. 73.

B.27 The third potentially reportable item indicated that B&R did not treat shielding calculations as being safety-related and therefore may not have verified the calculations in accordance with its practice for safety-related calculations. Goldberg, ff. Tr. 11491, at 35-36. B&R had indicated that some shielding calculations might be safety-related, but stated that the item was not reportable because it would not impact the safe operation of the plant or the public health or safety. App. Ex. 62, Enclosure 1 at 4.8.2.1(d). It could not immediately be determined whether this item could adversely affect the safety of operations; however, HL&P decided to treat it as potentially reportable, because it appeared to identify a deficiency in the design process which represented a significant breakdown in a part of the QA program for STP (i.e., a systematic failure to perform verifications). Goldberg, ff. Tr. 11491, at 35-36; Tr. 14688-90 (Robertson). This third item was also notified to the NRC in Mr. Powell's phone call to Mr. Crossman on May 8, 1981. See CCANP Ex. 128. After HL&P notified the NRC that the shielding item was potentially reportable, HL&P determined that shielding calculations are generally considered in the industry not to be safety-related and, therefore, that any failure to verify these calculations was not a deficiency in the QA program for STP. Goldberg, ff. Tr. 11491, at 36. Accordingly, this item was subsequently determined not to be reportable and a final report was sent to the NRC on June 5, 1981. App. Ex. 75.

B.28 In March 1982, a Bechtel Task Force issued a report (App. Ex. 63) which reviewed each of the discipline findings in the Quadrex Report. With the exception of the matters pertaining to computer codes, HVAC, and the common instrument air line discussed above, the Bechtel Task Force concluded that none of the discipline findings were potentially reportable. See App. Ex. 63, at 4-9.

B.29 In December 1982, the NRC issued a review (NUREG 0948) of the Quadrex Report which evaluated each of the generic and discipline findings. Staff Ex. 136. With the exception of the matters actually reported to the NRC by HL&P, NUREG 0948 concluded that the findings in the Quadrex Report and the Report as a whole were not reportable. See Staff Ex. 136, at 19-20, 23, and 405. At the request of the Board, the Staff undertook another review of the discipline findings in August of 1984 and again concluded that none were reportable with the exception of those actually reported by HL&P. See App. Ex. 77, at Enclosure.

B.30 In its investigation of the handling of the Quadrex Report by HL&P (I&E Report 82-02), the Staff concluded that while there was no evidence of a conspiracy to withhold information from the NRC, HL&P apparently had sufficient information prior to the initiation of the Quadrex review, to notify the Staff earlier of the computer code and HVAC items. Staff Ex. 140; see Johnson and Constable, ff. Tr. 14846, at 7; Staff Ex. 141, at Appendix A. The Applicants' response concurred in the Staff's judgment with respect to HVAC, but took issue with the conclusion that sufficient information was available prior to May 8 to report the computer code

item. App. Ex. 76, at 1-2. With the exception of the foregoing items, the Staff concluded that HL&P adequately applied the applicable NRC guidance on reportability to the Quadrex Report and had reported the items it was required to report. Staff Ex. 136, at 1-2; Johnson and Constable, ff. Tr. 14846, at 8-11; Tr. 15159-60 (Phillips).

B.31 The Board asked the HL&P witnesses to address the adequacy of HL&P's documentation of its decision with regard to those findings it determined were not reportable on May 8, 1981. Tr. 12650-56 (Goldberg); Tr. 12874-77 (Sumpter); Tr. 14561-65 (Wisenburg). As the Staff witnesses testified, there are no regulatory requirements for the documentation of non-reportable items. Id.; Tr. 15053-58 (Johnson, Taylor). HL&P's documentation was adequate to permit the Staff to make its own judgments as to reportability. Id.; see Staff Ex. 136.

B.32 HL&P brought the Quadrex Report to the NRC Staff's attention. In about Jan/Feb 1981, during either a meeting or a telephone conversation, Mr. Goldberg mentioned to Mr. Don Sells, NRR Project Manager, that HL&P was contracting with an outside consulting firm to conduct an audit of the B&R design at STP. Sells, ff. Tr. 15190, at "Statement", p. 1. On April 21, 1981, Mr. Sells had a telephone conversation with Mr. Goldberg during which Mr. Goldberg told Mr. Sells that the Quadrex Report would be completed in early May '81. Id. Mr. Goldberg stated that he expected some 50.55(e) reports to result from the audit by Quadrex. Id. Mr. Goldberg also raised a question as to the best method for him to present these results to "headquarters" (which Mr. Sells assumed to mean NRR and

I&E HQ Staff) and Region IV. Mr. Sells indicated that would be given some thought and they could discuss it upon receipt of the Report. Id. Mr. Goldberg also told Mr. Sells that he could see the Report once HL&P had received it. Id.; Goldberg, ff. Tr. 11491, at 49-50; Tr. 15225-26 (Sells). Mr. Sells understood this to mean that he would be able to review the Report in Houston or Bay City. Id.

B.33 During the week of May 11, 1981, while the Phase I evidentiary hearings were being held, Mr. Sells met with Mr. Goldberg (at the latter's suggestion) for a briefing on the result of the Quadrex Review at the Holiday Inn in Bay City, Texas. Sells, ff. Tr. 15190, at "Statement," p. 2; Staff Ex. 140, at 5. The meeting lasted about fifteen or twenty minutes. Id. Mr. Goldberg advised Mr. Sells that three potential 50.55(e) items had been identified in the report and had been reported to Region IV. Sells, id. Mr. Sells testified that Mr. Goldberg mentioned the various areas looked at by Quadrex and identified the categories into which each issue in the Report was placed. Id. Mr. Goldberg testified that he recollects showing the Report (or at least Volume I thereof) to Mr. Sells at that briefing (Tr. 11336-37, 12532-35 (Goldberg); Staff Ex. 140, at 5); Mr. Sells, however, testified he did not see any part of the Report at that time (Sells, ff. Tr. 15190, at "Statement", p.2). No adverse inference with respect to HL&P character or competence should be drawn from this minor factual discrepancy; consequently, we do not do so here. Irrespective of which testimony is credited on the point of whether Mr. Goldberg had the Quadrex Report with

him, the critical fact that is material to this proceeding is that Staff personnel were informed of the existence of the Report.

B.34 Intervenor's Phase II Proposed Findings of Fact attack the credibility of Mr. Sells and Mr. Goldberg with respect to their testimony regarding communications between them about the Quadrex Report. See "Intervenor's Phase II Proposed Findings of Fact and Conclusions of Law in the Form of a Partial Initial Decision," dated November 5, 1985 (hereinafter "Intervenor's Proposed Findings"), at III.91-III.92. This attack, as indicated in the proposed CCANP finding by the use of such phrases as "We cannot help but suspect that . . ." and "It is quite possible that . . .", is based only on unsubstantiated conjecture without a fact cited. Further, intervenor argues that since Mr. Sells appeared ill to CCANP and was, in fact, hospitalized during the hearing, this somehow supports a supposition that Mr. Sells was untruthful in his testimony. CCANP's argument is not only illogical, but beyond the scope of propriety. Cf. Memorandum and Order (CCANP Motions II and III to Reopen Record), LBP-85-45, 22 NRC ____ (issued Nov. 14, 1985), slip op. at 14-15 (regarding other serious unsubstantiated accusations by CCANP). The Board fails to see how the illness of a witness -- either real or imagined by one of the parties -- can be construed as the manifestation of prevarication. We find Mr. Sells' testimony as to the facts regarding the communications he had with Mr. Goldberg regarding the Quadrex Report to be true to the best of his recollection. Irrespective of the discrepancy between Mr. Sells' recollection and that of Mr. Goldberg as to the exact details of that meeting, we do not view those discrepancies

as being either perjury or particularly material to the resolution of this case. The critical fact regarding this May 1981 meeting between Mr. Goldberg and Mr. Sells was that the Quadrex Report's availability was made known fully to the NRC Staff. Intervenor's attempt to discount the significance of that one salient fact by pointing to a minor discrepancy in the detail of the testimony and by attacking Mr. Sells on spurious grounds should be, and is, rejected. While CCANP may be correct that the discussion with Mr. Sells "in no way diminished" the responsibility to report to Region IV under 50.55(e), assuming such a responsibility in fact exists under the regulation, the discussion did evidence that HL&P was not hiding the Quadrex Report from the Staff.

B.35 Messrs. Goldberg and Oprea each believed that NRR (through notification to Mr. Sells) was the appropriate NRC office to inform of the Report. Opera, ff. Tr. 14095, at 5-6; Goldberg, ff. Tr. 11491, at 50-51. This belief was understandable in the view of the Staff witnesses, and the Staff witnesses drew no negative conclusions regarding HL&P's competence or character based upon its decision to discuss the Report with NRR rather than with Region IV. Constable, ff. Tr. 14846, at 9-10; Tr. 15058-59 (Johnson); see Staff Ex. 140, at 4.

B.36 An NRC inspector and an investigator (Messrs. H. Shannon Phillips and Richard Herr, respectively), in the course of an investigation in August, 1981, requested a copy of the Quadrex Report from Mr. Frazar, HL&P's QA Manager. Frazar, ff. Tr. 14412, at 3-4. Since he did not have

a copy of the Report, Mr. Frazar called Mr. Oprea. Id. Mr. Oprea stated that the Report should be provided to the Staff for review. Oprea, ff. Tr. 14095, at 6; Tr. 14179-81 (Oprea); Frazar, ff. Tr. 14412, at 3-4; Tr. 14418-19 (Frazar). A copy was made available to Mr. Phillips and Mr. Herr the next day, as well as the following week at the STP site. Tr. 14705 (Robertson); Phillips, ff. Tr. 15192 at 3-4. Mr. Phillips testified that he was given an adequate opportunity to review the Report and he perceived "no reluctance" on the part of HL&P to provide the Report. Tr. 15251-52 (Phillips); see Frazar, ff. Tr. 14412, at 4.

B.37 Mr. Oprea arranged for a meeting with Region IV personnel in August 1981. He and Mr. Goldberg met on September 8, 1981 with about a dozen NRC Staff personnel including the then-Director (Mr. Seyfrit) and then-Deputy Director Mr. Collins of Region IV. Mr. Oprea and Mr. Goldberg described the Quadrex review and its results, the number and significant of the findings, and the utility's plans for resolving the problems identified in the findings. Goldberg, ff. Tr. 11491, at 53; Tr. 12417-18 (Goldberg); Oprea, ff. Tr. 14095, at 6-7, Tr. 14303-04 (Oprea); Tr. 15292 (Collins); see also CCANP Ex. 140.

B.38 At that meeting, Mr. Collins suggested that HL&P consider submitting the entire Quadrex Report under 50.55(e) (Tr. 15347-48, Collins); however, Mr. Goldberg (while he remembers a similar suggestion being made at the meeting by Mr. Seyfrit) either at that meeting, or later, stated to the Staff that he saw no basis to do so. Goldberg, ff. Tr. 11491, at 53. Based on what Mr. Collins knows now about the Quadrex

findings and the subsequent Staff evaluation, he testified that he did not now believe that the entire Report should have been submitted under 50.55(e). Tr. 15348 (Collins). At the time he made the original suggestion regarding 50.55(e) (at the Sept. 8, 1981 meeting), he based his judgment solely on that initial briefing and what he knew of "the past history of the site." Id.; compare Findings F.8-F.10 infra (regarding duties under the McGuire doctrine).

B.39 The testimony of the NRC Executive Director for Operations, Mr. William J. Dircks, before the House of Representatives' Subcommittee on Energy and the Environment of the Committee on Interior and Insular Affairs (Committee Print No. 97-26, 97 Cong., 1st Sess., November 19, 1981) was offered into evidence by intervenor and admitted as CCANP Ex. 147A. Mr. Dircks' statement before the Subcommittee included references to the Quadrex Report and a QA failure at the South Texas Project. Id. at 94-95, see Tr. 9064. Mr. Collins, by then NRC Administrator for Region IV, was consulted on, and had reviewed, the statement prepared for Mr. Dircks. Tr. 15290-92, 15347-48 (Collins). He confirmed that the statements was based on a preliminary review of the Report and that subsequent comprehensive reviews performed by the Staff found no reportable QA breakdown in the Report, and that he does not believe now that the entire Report should have been submitted under 10 C.F.R. §50.55(e). Tr. 15290-92, 15347-48 (Collins).

B.40 The NRC investigation (No. 82-02) of CCANP's allegation of a conspiracy to withhold the Quadrex Report is cited at Intervenor's

Proposed Findings III.155 and III.156. That investigation's results were admitted into evidence as Staff Ex. 140, and stand unrebutted. As CCANP recognizes (III.155), that investigation concluded that there was no conspiracy. CCANP attempts to discount these conclusions by now maintaining that the NRC investigation did not address the "real" conspiracy which was "to prevent the entire report from being turned over to the NRC." Id. How this matter was not encompassed within CCANP's original charge is unexplained by intervenor. CCANP then casts an innuendo that perhaps an NRC employee was "enlisted" into this conjectured conspiracy to keep the Quadrex Report from the NRC. No support for this or any other part of the CCANP conspiracy theory appears in any part of the record. Moreover, the supposed NRC participant in this conspiracy was on the stand in this hearing, and CCANP elicited no testimony tending to establish such a conspiracy. In addition, Mr. E. Johnson, who reviewed I&E Report No. 82-02, and Mr. Collins, under whose direction that investigation was conducted, appeared as witnesses in this proceeding. Again, CCANP made no attempt to rebut or undercut the weight of Staff Ex. 140 through those witnesses. CCANP's conduct in proposing such serious findings of conspiracy and criminal wrongdoing based only on its own imagination is reprehensible. See supra Finding B.34.

B.41 In light of the foregoing Findings of Fact, the Board concludes that HL&P did not attempt to conceal the Quadrex Report from the NRC Staff and no adverse inference with regard to HL&P's character or competence to operate a nuclear plant can be drawn with respect to the

facts surrounding HL&P's commissioning of the Report or its communications with the NRC Staff about the Quadrex Report.

C. The Quadrex Report Discipline Findings in Issue and Reportability under 10 C.F.R 50.55(e)

C.1 The Board set out the reportability of 26 specific findings of the Quadrex Report for litigation under Contention 9. Those findings to be litigated consist of the ten generic findings in the "most serious" category and sixteen discipline findings in that category. See App. Ex. 60, at §3, §4. The discipline findings in issue are: 4.1.2.1(b), 4.3.2.1(a), 4.3.2.1(d), 4.3.2.1(n), 4.5.2.1(b), 4.6.2.1(n), 4.7.3.1(a), 4.7.3.1(b), 4.7.3.1(k), and 4.8.2.1(a) through 4.8.2.1(g). See Memorandum and Order of February 26, 1985 (LBP-85-6, 21 NRC 447); Sixth Prehearing Conference Order of May 17, 1985 (unpublished); Memorandum and Order of May 24, 1985 (unpublished). Each of the litigable findings in issue is addressed in this and the following section. The reportability under 10 C.F.R. 50.55(e) of the Quadrex Report as a whole is then examined (see Sec. E infra).

C.2 The NRC Staff offered the direct testimony of four witnesses on the question of reportability of the various Quadrex findings in issue. They were: Eric H. Johnson, Acting Deputy Director of the Division of Reactor Safety and Projects, and Branch Chief, Reactor Project Branch 1, NRC Region IV; George L. Constable, Section Chief, Project Section C, Reactor Project Branch 1, NRC Region IV; Robert G. Taylor, Project Inspector, NRC Region IV; and Robert F. Heishman, Chief of Reactor Construction Programs

Branch, Division of Inspection Program, NRC Office of Inspection and Enforcement. See Johnson et al., ff. Tr. 14846.

C.3 Applicant called three witnesses on its behalf in this regard: Jerome H. Goldberg, HL&P Group Vice President, Nuclear; Sidney A. Bernsen, Bechtel Power Corporation Quality Assurance Manager; and Frank Lopez, Jr., a Bechtel Corporation Assistant Project Engineer assigned to the STP. Goldberg, ff. Tr. 11491, Bernsen/Lopez, ff. Tr. 13441. Dr. Bernsen and Mr. Lopez are hereinafter referred to as the "Bechtel witnesses."

C.4 The Board finds that the professional education and experience of each of the Staff and Applicant witnesses qualifies each as experts with regard to nuclear plant design deficiencies which are reportable under 10 C.F.R. 50.55(e). In addition, the Staff witnesses are qualified to testify as to the regulatory policy and needs of the NRC in applying 10 C.F.R. 50.55(e).

C.5 Having offered no witnesses of its own on the issue of the reportability of Quadrex' discipline findings, Intervenor's Proposed Findings make no attempt to analyze or rebut the extensive testimony of the Staff on those discipline findings. CCANP utterly failed to address the Staff testimony on the discipline findings in any serious way, leaving such testimony, in essence, unrebutted. Moreover, CCANP expressly limits itself to addressing "a selection" of the discipline findings. See Intervenor's Proposed Findings III.56. Given that

position, testimony with regard to reportability under 50.55(e) of Quadrex discipline findings 4.5.2.1(b), 4.6.2.1(n), 4.7.3.1(a), 4.7.3.1(b), 4.8.2.1(a), and 4.8.2.1(c) through 4.8.2.1(f) (nine of the sixteen admitted discipline findings) stands uncontroverted and the Board is constrained to reach the conclusion that none of those aforementioned Quadrex findings were reportable under 50.55(e). Nevertheless, the Board examines herein the relevant testimony as to each of the discipline findings admitted for hearing and reaches conclusions as to the reportability of each under 10 C.F.R. 50.55(e). The "selection" of discipline findings that Intervenor's Proposed Findings did address consists of: 4.1.2.1(b), 4.3.2.1(a), 4.3.2.1(d), 4.3.2.1(n), 4.7.3.1(k), 4.8.2.1(b), and 4.8.2.1(g).

C.6 Quadrex Report Finding 4.1.2.1(b) states:

There was no evidence of Civil/Structural evaluation of the reasonableness of postulated internal missiles or that the criteria for internal missiles presented in TRD IN209RQ013-A had been implemented in the design (see Question C-9).
App.Ex.60, at 4-6.

Mr. Taylor testified with regard to this finding that Quadrex was apparently dissatisfied by a finding that the B&R civil/structural engineering group was not ascertaining the reasonableness of postulated missiles generated from within a component, in this case a pump. Taylor, ff. Tr. 14846, at 36. Although the finding does not so state, Mr. Taylor said it is apparent that the postulated missiles from within the pump were postulated by another engineering group. Id. Mr. Taylor stated that he would not expect that a civil engineer would have the expertise

to challenge the reasonableness of the missiles that were postulated. Id. The Quadrex assessment of question C-9 indicated that civil/structural was handling the missiles that had been postulated in accordance with industry practice and the state-of-the-art. The remainder of the concern was that there was no evidence that the requirements of a document pertaining to determining and protecting against missiles had been implemented in design. Id.

C.7 Mr. Taylor testified, and we agree, that the lack of evidence cited in this finding of Quadrex would not be a violation of Appendix P. Taylor, ff. Tr. 14846, at 36. Question C-9 would not have caused B&R to demonstrate in design documents (other than its procedure, the Technical Review Document (TRD)) how it had treated missiles. Id. Mr. Taylor stated that more information would be needed relative to whether the requirements of the TRD document had been implemented in construction use drawings -- such as the civil/structural drawings for the buildings -- before a determination could be made as to whether this finding was reportable under 10 C.F.R. 50.55(e). Id. at 37.

C.8 With regard to 4.1.2.1(b), Mr. Taylor characterized whether it was reportable as a "very close call." Id. He stated that it probably should have been reported as a potential deficiency. Id. He added, however, that not reporting the finding did not reflect, in his view, on the candor or willingness to abide by regulatory requirements on the part of HL&P. Id.

C.9 Mr. Taylor also testified with regard to this Quadrex finding that he had no knowledge of whether HL&P personnel on May 8, 1981, were familiar with B&R's handling of the missiles in actual design and were therefore not concerned with the Quadrex comment. Tr. 15001 (Taylor).

C.10 Mr. Goldberg of HL&P testified that the finding was not "potentially reportable" because it did not identify a deficiency in a design or in quality assurance since it dealt with an activity yet to be performed in future design work. Goldberg, ff. Tr. 11491, at 38-39. Dr. Sumpter testified that although some design work associated with the generation of internal missiles is performed early (such as turbine orientation and specifications for rotating equipment), this finding, however, dealt with protection against postulated internal missiles identified by the hazards analysis, and the HL&P review team knew that these design activities had not yet commenced. Tr. 15367-68 (Sumpter), Tr. 11783; 11794-95 (Goldberg).

C.11 This type of design activities is usually performed late in the design process when the relative location of components and equipment is finalized; thus, potential sources of missiles and targets can be identified, and it is then possible to determine which measures should be utilized to protect against potential missiles. Goldberg, ff. Tr. 11491, at 38-39; Bernsen/Lopez, ff. Tr. 13441, at 91-92; Sumpter, ff. Tr. 15357, at 3-4; Tr. 11804-07 (Goldberg); Tr. 14043-48 (Bernsen/Lopez); Tr. 15367-68 (Sumpter).

C.12 CCANP restricts its discussion of this discipline finding to taking issue with Mr. Goldberg's testimony that the work related to the reasonableness of postulated missiles had not yet begun. See Intervenor's Proposed Finding III.57-58. While Mr. Taylor of the Staff testified that the reportability of this finding was a "very close call" (See supra Finding C.8) and probably "potentially reportable," he said that the failure to report did not reflect adversely on character or competence. CCANP's Proposed Findings have not demonstrated that Mr. Taylor's conclusion is incorrect or unfounded. This Quadrex finding did not, within the meaning of 50.55(e), identify a significant breakdown in any portion of the QA program. See Staff Ex. 136, at 19-20; Bernsen/Lopez, ff. Tr. 13441, at 91-92; App. Ex. 62, at Enclosure 1.

C.13 Irrespective of whether finding 4.1.2.1(b) was in fact "potentially reportable" on May 8, 1981, the Board finds that at best it was, in the words of the Staff, a "very close call." See Taylor, ff. Tr. 14846, at 37. In the absence of any evidence by CCANP directly to the contrary, the Board views the fact that it was not reported as having no materiality to the issue of character or competence of HL&P.

C.14 Quadrex Report Finding 4.3.2.1(a) states:

The common instrument air line, as depicted in FSAR drawing 9.4.2-2 attached to Question R-6, does not meet the single failure criterion required by IEEE 279-1971 and 10 C.F.R. 50 (see Question E-15). The occurrence of this design error in the late 1970's in concert with the B&R response to other single failure criterion questions suggests that B&R is not sufficiently experienced in the performance of a Failure Mode and Effects Analysis that crosses

discipline boundaries. [fn.](5) In most organizations, the I&C discipline would detect and immediately correct this type of design error by performing a rigorous examination of the separation provided between redundant divisions in the safety-related portions of the plant for all involved disciplines.

[fn.](5) Instrument line blockage was identified as a potential concern for single failure analyses in the 1970 period when an early B&W plant had three instruments connected to two piping taps. Technicians repeatedly replaced the instrument connected to one tap because it read differently than the other two instruments connected in common to the other tap; only later did they discover that a blocked instrument line was causing the two common instruments to read erroneously.

C.15 Mr. Taylor testified that this item related primarily to application of the single failure criterion, as did generic finding 3.1(e), with a greater emphasis on one example that is part of 3.1(e) (see infra Findings D.45-51). Taylor, ff. Tr. 14846, at 38. Mr. Taylor was of the opinion that the item was not reportable because the designer and design verifier have to consider the design inputs in their work. Id. at 19-21, 38. The personnel subsequently preparing the SAR must perform sufficient analysis to describe a given system or structure such that they can demonstrate to the NRC that regulatory requirements have been met. Id.

C.16 Mr. Goldberg testified that this finding was not viewed as potentially reportable by the HL&P review team because the design of the common instrument air line had not been released for construction and because the finding addressed only a limited aspect of design and did not

suggest the existence of a systemic breakdown in quality assurance. Goldberg, ff. Tr. 11491, at 37-40.

C.17 The Bechtel Task Force assessment dated March, 1982 (App. Ex. 63) concluded, however, that finding 4.3.2.1(a) did identify a condition that was a potentially reportable deficiency in the design of the common instrument air line. App. Ex. 63, at B-27; Goldberg, ff. Tr. 11491, at 37-38; Bernsen/Lopez, ff. Tr. 13441, at 92-94; Staff Ex. 136, at 114-115. The NRC was notified by HL&P of a potentially reportable deficiency in the common instrument air line on March 15, 1982. Goldberg, ff. Tr. 11491, at 37; see Staff Ex. 136, at 20. The design of the common instrument air line had not been released for construction at that time. Tr. 13511-14 (Bernsen/Lopez). Design changes were made by B&R to correct the specific air line blockage design problem. Staff Ex. 136, at 115. Generic design considerations, however, required a review of all safety-related design drawings for application of single failure criterion. Id. The NRC was subsequently informed, on April 8, 1982, that this finding did not represent a reportable deficiency. Goldberg, ff. Tr. 11491, at 37-38; Bernsen/Lopez, ff. Tr. 13441, at 92-94.

C.18 The Board finds that the design of the common instrument air line had not been released for construction on May 8, 1981, and that finding 4.3.2.1(a) did not indicate the existence of a significant breakdown in any portion of the QA program for STP. Consequently, HL&P correctly determined on May 8, 1981, that finding 4.3.2.1(a) did not identify a condition which represented a potentially reportable deficiency and the

fact that this Quadrex finding was not reported under 10 C.F.R. 50.55(e) does not reflect on the character or competence of HL&P.

C.19 Quadrex finding 4.3.2.1(d) states:

No formal methodology or documentation exists to verify adequate separation or the single failure criterion (see Questions E-1, E-8, and E-19). App. Ex. 60, at 4-22.

Mr. Goldberg and Mr. Taylor both testified that this finding does not identify an actual or potentially reportable deficiency. Taylor, ff. Tr. 14846, at 40-41; Goldberg, ff. Tr. 11491, at 40. B&R did have a formal procedure, known to the HL&P review team, that required designs to be verified for failure analysis and separation. Goldberg, ff. Tr. 11491, at 40. The type of methodology apparently sought by Quadrex for documenting satisfaction of the separation and single failure requirements is neither universally used nor is it required by the NRC. See App. Ex. 62, at Enclosure 1, No. 4.3.2.1(d); Bernsen/Lopez, ff. Tr. 13441, at 95; Tr. 12025-26 (Goldberg). The Bechtel and Staff reviews concurred that this finding was not reportable. Staff Ex. 136, at 19-20; App. Ex. 63, at B-30.

C.20 CCANP attempts to shift the focus of this Quadrex discipline finding away from the finding itself to the Quadrex questions instead (specifically E-1, E-8 and E-19). Intervenor's Proposed Finding III.60. That approach ignores the testimony of Mr. Taylor (and the Applicants' witnesses as well) that the type of methodology suggested by the finding -- and necessarily the Quadrex questions -- was simply not required by

NRC regulations. See supra Finding C.19. More importantly, intervenor offers no explanation as to why that interpretation of the Quadrex questions or the NRC regulations is incorrect. Given this lack of support or analysis, we find no merit in CCANP's Proposed Finding III.60 with regard to discipline finding 4.3.2.1(d).

C.21 The Board finds that Quadrex finding 4.3.2.1(d) did not identify a deficiency in design or a significant breakdown in any portion of the quality assurance program for STP; thus, this finding was not reportable under 10 C.F.R. 50.55(d).

C.22 Quadrex finding 4.3.2.1(n) states:

It is planned that various types of isolation devices will be used. Actual devices are still under evaluation and qualification. There is no existing document that provides guidance to the designers on the circuit application of these various types (e.g., optical couplers vs. fuses vs. relays, etc.). It is our opinion that lack of such a document (TRD) could result in design errors and licensing problems (see Question E-14). App. Ex. 60, at 4-23.

C.23 Mr. Taylor of the NRC Staff testified with regard to this finding that he did not feel that a violation of Appendix B could have existed until a design had been developed that provided an application that in some manner violated design criteria. Taylor, ff. Tr. 14846, at 38. Application of fuses and relays to obtain electrical circuit isolation is nearly as old as the electrical and electronic industry according to Mr. Taylor. Id. at 38-39. The newer photo-optical devices that have now been used for several years were originally developed by component level

engineers/manufacturers who provided typical application data to the user, initially by catalogues. Id. at 39. When a user bought the product, the user was provided with a data sheet providing more specific information. Id. This practice has been largely standard to a wide range of electronic products for long periods of time. Id. In summary, it would be entirely possible for user engineer such as at B&R to develop entirely satisfactory final designs without the guidance document that Quadrex apparently felt was necessary. Id.

C.24 Since few if any design outputs had as yet been developed by B&R at the time of the Quadrex Review, no deficiency existed within the meaning of 10 C.F.R. 50.55(e); therefore, no report would have been required in Mr. Taylor's view. Taylor, ff. Tr. 14846 at 39. See also Tr. 13153-55, 13159-62 (Stanley).

C.25 Mr. Goldberg testified that this finding was not potentially reportable because, as the finding itself states, the selection of isolation devices at STP was under evaluation. Consequently, although the type of TRD mentioned by Quadrex would be a useful tool, there was not need for such a document at the time of the Quadrex review. Goldberg, ff. Tr. 11491, at 41; Tr. 12027-29 (Goldberg). The Bechtel witnesses, the Task Force review, and the Staff review agreed that this finding was not reportable or potentially reportable. Bernsen/Lopez, ff. Tr. 13441, at 96; App. Ex. 63, at B-36; Staff Ex. 136, at 19-20.

C.26 Intervenor's Proposed Findings state (at III.61) that B&R was still unable to answer what type of isolation devices were to be used at the time of the Quadrex review although it should have been able to do so years earlier. CCANP cites the testimony of Mr. Stanley for this proposition. See Tr. 13153-54. That testimony, however, states that "it was not yet to the point where there was a safety issue." Id. at 13153. While Mr. Stanley made clear that this design would have to be completed eventually or it could impact the licensability of the plant, he also made clear that selection of isolation devices was still under evaluation. See id. at 13154-55. Intervenor also places a great deal of reliance on the fact (and testimony) that procurement specifications had gone out to vendors for isolation devices (see Intervenor's Proposed Finding III.62) and that, in the absence of specific guidance from B&R, Mr. Stanley expected the vendors to select the particular isolation device. What CCANP ignores, however, is Mr. Stanley's direct response to a question from Chairman Bechhoefer as to why this situation did not represent a QA problem. Tr. 13155-56 (Bechhoefer). The witness stated that "[n]o matter what happened, it could always be corrected. The right device could be substituted for the devices that were wrong. That was always the option. But it takes time, costs money. And it was truly unnecessary." Tr. 13156 (Stanley). Mr. Stanley continued, in response to a question from Judge Shon, "I think it's more a case that [B&R] hadn't gotten to the point of taking action" Tr. 13157 (Stanley). The Board finds that Quadrex finding 4.3.2.1(n) did not identify a safety concern; rather, it illustrates only an activity that had yet to be performed and was not reportable under 10 C.F.R. 50.55(e).

C.27 Quadrex finding 4.5.2.1(b) states:

EDS did not perform a design review or design verification of preliminary loads transmitted to B&R; these loads have, however, been used as a basis for plant design (see Questions C-4 and M-8). App. Ex. 60, at 4-39.

C.28 Mr. Taylor testified that Appendix B of 10 C.F.R. Part 50 and American National Standard Institute (ANSI) document N45.2.11 (Staff Ex. 138) contain only a requirement that each design be verified. Taylor, ff. Tr. 14846, at 34. ANSI N45.2.11, entitled "Quality Assurance for the design of Nuclear Power Plants," has been endorsed by the NRC, with certain clarifications, in the NRC's Regulatory Guide 1.64, Rev. 2, June 1976 (Staff Ex. 139). Id. Neither of these references establish a time in the overall design and construction sequence within which that final verification must be done. Id. While it would seem prudent to have the verification accomplished prior to releasing the design for use, many factors bear on this task such that the risk of using an unverified design might well be less than the benefits. Id.

C.29 This view accords with the testimony of Mr. Goldberg, who stated that preliminary data, with conservative margins of safety, are frequently used as a basis for design and construction. Goldberg, ff. Tr. 11491, at 41. This situation would not constitute a violation of Appendix B unless a nonconservative design was found to exist or, at least, was strongly suspected. Taylor, ff. Tr. 14846, at 42-43. This was not shown to be the case in this instance. Id. at 43.

C.30 The Bechtel witnesses explained that this finding did not identify a significant breakdown in any portion of the QA program. Bernsen/Lopez, ff. Tr. 13441, at 97. B&R's procedure (STP-DC-015) required a check of preliminary designs prior to release for construction or procurement. Bernsen/Lopez, ff. Tr. 13441, at 85-86. This check was designed to confirm that the preliminary designs were acceptable based on the preliminary input then available. Id. at 86. It is not uncommon to defer final verification of some types of structures, systems, and components until after construction is well-advanced or has even been completed in some cases. Id. As design and construction of the structure are completed, it becomes possible to determine the actual loads on the structure, and the design of the structure can then be finally verified using these loads. Id. By using a conservative preliminary design subject to later verification, the possibility for design changes to account for final loads is minimized, construction can proceed in a timely manner, and the design is confirmed to be acceptable. The use of these preliminary data is carefully ~~used~~ used in the design process so that these are later finalized and verified. Goldberg, ff. Tr. 11491, at 41. In response to a question from the Board Chairman, Mr. Goldberg testified that the identification of the use of preliminary loads was conspicuous on the Brown and Root documents. Tr. 11818-19 (Goldberg). Furthermore, in the Quadrex questions cited in this finding 4.5.2.1(b), Quadrex stated that the preliminary loads transmitted by EDS were conservative. Bernsen/Lopez, ff. Tr. 13441, at 97; App. Ex. 60, at 4-38. Indeed, a major concern of the Quadrex Report was that there was the "potential [for] overconservatism in the design" of EDS. Bernsen/Lopez, id. The conclusions of the Bechtel

Task Force review and the NRC Staff review that this finding was not reportable or potentially reportable (App. Ex. 63, at B-57, B-58; Staff Ex. 136, at 180) are not refuted by any evidence adduced by intervenors. See also App. Ex. 62, at Enclosure (1), No. 4.5.2.1(b).

C.31 The Board finds that Quadrex finding 4.5.2.1(b) neither identifies a deficiency in design nor represents a breakdown in QA for design; thus, this finding was not reportable under 10 C.F.R. 50.55(e) and the fact that it was not reported does not reflect on the truthfulness or candor of HL&P, its willingness to abide by regulatory requirements, or its acceptance of its responsibility to safeguard the public health and safety.

C.32 Quadrex Report Finding 4.6.2.1(n) states:

Assumptions regarding the availability of various heat sinks under varying plant conditions should be re-examined (see Question N-17). App. Ex. 60, at 4-61

C.33 Mr. Taylor testified that, on the face of the Quadrex Report, he would have classified this item as an "unresolved item" for an NRC inspection report considering the 1980 guidance (Staff Ex. 139) as interpreted in 1981. Taylor, ff. Tr. 14846, at 44. He stated that there was not enough information in the data he reviewed to ascertain whether an actual violation of Appendix B existed. Id. On the basis of the limited information before him, Mr. Taylor testified that the licensee should have reported the item on May 8, 1981, as a potentially reportable

item subject to further information gathering and evaluation. Id. The item was, in fact, eventually reported to the NRC on October 19, 1982. Taylor, ff. Tr. 14846, at 44-45. Mr. Taylor stated that he believed there was sufficient information in the Quadrex Report assessment of the response to question N-17 to have caused the items to have been reported as potential items upon immediate review of the Report. Id. at 45.

C.34 Mr. Taylor further testified, however, that the decision whether to report probably was based upon all of the information contained in Question N-17. His contrary conclusion on the question simply reflects a lower threshold as a function of engineering judgment. Taylor, ff. Tr. 14846 at 45-46. He emphasized the ultimate disposition of the finding as not reportable. Id. at 46.

C.35 Mr. Goldberg, on the other hand, testified that finding 4.6.2.1(n) did not identify a potentially reportable deficiency because it did not identify a deficiency in a design or a breakdown in QA. Goldberg, ff. Tr. 11491, at 42. The basis for finding 4.6.2.1(n) was Quadrex' statement in Question N-17 that B&R had not analyzed the temperature of the Essential Cooling Pond (ECP) under conditions of normal shutdown of both units of STP. Id.; Tr. 13253-5 (Stanley).

C.36 Contrary to the Quadrex finding, B&R had in fact performed an analysis of the ECP under conditions of normal shutdown of both units in accordance with NRC Regulatory Guide 1.27, and the results of this analysis were described in Section 9.2.5 of the Final Safety Analysis

Report for STP. App. Ex. 62, at Enclosure (1), Item Number 4.6.2.1(m); Goldberg, ff. Tr. 11491, at 42; Bernson/Lopez, ff. Tr. 1344¹, at 97-98; Tr. 12389-90, 12635-66 (Goldberg); Tr. 13908-09, 13848-50 (Lopez). Mr. Taylor was not aware of this information in the preparation of his testimony. See Taylor, ff. Tr. 14846, at 54-55.

C.37 The Board finds on the basis of all the information in the record, and given the ultimate disposition of this item as not reportable, the fact that it was not identified to the NRC under 10 C.F.R. 50.55(e) does not adversely reflect on the character or competence of HL&P. See Taylor, ff. Tr. 14846, at 45-46.

C.38 Quadrex Report Finding 4.7.3.1(a) states:

B&R has not yet developed a criteria for jet impingement protection on unbroken piping systems (see Question P-20). A future TRD is planned.
App. Ex. 60 at 4-78.

C.39 Mr. Taylor testified that this finding did not identify a design deficiency. Taylor, ff. Tr. 14846, at 47. He stated that it appears that Quadrex was primarily concerned with the fact that B&R and/or EDS had not yet developed criteria that would be necessary to complete a final design of piping systems and that this might interfere with the licensing of the plant since it could be possible that significant engineering changes might have to be made to existing designs as the new information became available. Id. at 46. This lack of engineering information would not be a violation of Appendix B since it only reflected work yet to be done. Id. at 47; see Id. at 38. Both Criteria

III of Appendix B and ANSI N45.2.11 (Staff Ex. 138) reflect that changes in design may well be necessary, so long as the QA program for design activities provides appropriate controls for those changes. Id; see supra Findings C.28-30.

C.40 Mr. Goldberg also testified that this finding represented work yet to be performed. Goldberg, ff. Tr. 11491, at 43; Tr. 11695-96, 11701 (Goldberg). It did not represent a significant breakdown in any portion of the QA program as the work had not yet been performed. Bernsen/Lopez, ff. Tr. 13441, at 98.

C.41 This Board finds that Quadrex finding 4.7.3.1(a) identifies only an activity yet to have been performed, and does not identify a deficiency or potential deficiency within the meaning of 10 C.F.R 50.55(e). Hence, the finding was not reportable and the fact that HL&P did not report it is not material to the question of character or competence.

C.42 Quadrex Report Finding 4.7.3.1(b) states:

Approximately 50% of the reviewed SDDs [System Design Descriptions] do not yet contain system operating temperatures (see Question P-1). App. Ex. 60, at 4-78

C.43 Mr. Taylor testified that he reached the same conclusion with regard to this Quadrex item as he had with regard to 4.7.3.1(a) (see supra Findings C.38-39), i.e., that it represented no design deficiency and was not reportable since it was only work that had yet to be completed. Taylor, ff. Tr. 14846, at 46-47.

C.44 Mr. Goldberg stated that all but one of the SDDs contained system operating temperatures or referenced documents that did contain operating temperatures. Goldberg, ff. Tr. 11491, at 43-44. The one SDD which did not contain operating temperatures had not been released for construction, and the failure of this SDD to include these temperatures did not indicate a significant breakdown in any portion of the QA program. Bernsen/Lopez, ff. Tr. 13441, at 99-100; see App. Ex. 60, at Question P-1. The NRC Staff review confirmed that this finding was not reportable. Staff. Ex. 136, at 19-20, 308.

C.45 This Board finds that Quadrex Finding 4.7.3.1(b) does not identify a deficiency in final designs or a significant breakdown in any portion of the QA program; consequently, it was not reportable under 10 C.F.R. 50.55(e) and the fact it was not reported does not reflect adversely on HL&P's character or competence.

C.46 Quadrex Finding 4.7.3.1(k) states:

B&R assumptions for seismic to nonseismic boundary anchors are probably unconservative and difficult to technically justify as adequate (see Question P-29). App. Ex. 60 at 4-79.

C.47 Mr. Taylor testified that this finding appears to involve a difference of opinion between B&R personnel and the Quadrex reviewer as to what is an adequate method to predict loads at those piping run points where there is a transition of seismic to nonseismic. Taylor ff. Tr. 14846, at 48. This difference of opinion exists both in terms of analysis methods and means of support of the pipe. Id. On the basis of

the information before him from the Quadrex Report, Mr. Taylor concluded that he thought the finding identified a potentially reportable item. Id. at 49. He also testified, however, that it was unclear whether the method outlined by B&R was described and justified in the SAR and whether, in fact, the B&R criteria were used in completed design work. Id. at 48. Mr. Taylor specifically stated that HL&P personnel may have had knowledge of the situation which "would have subtracted" from the Quadrex assertion. Id. at 49.

C.48 Mr. Goldberg testified that this finding was not potentially reportable because, in fact, the design for the boundary anchors had not been released for construction and because the design was still in a draft status undergoing review. Goldberg, ff. Tr. 11491, at 44; Tr. 12254-55 (Goldberg). It therefore did not represent a significant breakdown in QA. Id. The Bechtel witnesses also agreed that this finding did not identify a significant breakdown in any portion of the QA program for STP given the status of the design, since it is common when one engineer reviews the work of another that differences in approach will occasionally arise. Bernsen/Lopez, ff. Tr. 13441, at 100. CCANP expressly disagrees with the testimony of the Applicants' witness, Mr. Goldberg, that since these unconservative estimates were discovered and corrected there was no reportable deficiency or breakdown in QA under 50.55(e). Intervenor's Proposed Finding III.64. Intervenor argues that this constituted a reportable breakdown in QA. Id.

C.49 This Board finds that the design of the boundary anchors was in draft form and had not been released for construction at the time of the Quadrex Review. It represented, consequently, neither a deficiency nor a significant breakdown in QA. Even if this Board were to agree with Mr. Taylor's opinion that this finding was potentially reportable as a "close call" on the strength of the Quadrex reviewers' assertion, we would share his conclusion (Taylor, ff. Tr. 14846, at 49-50) that HL&P's failure to notify the NRC Staff of this matter does not reflect adversely on HL&P's character and competence but represents merely an appropriate exercise of engineering judgment. See Bernsen/Lopez, ff. Tr. 13441, at 100.

C.50 Quadrex Report Finding 4.8.2.1(a) states:

The instrument air piping, between the valves actuated by redundant radiation monitors and the valves that divert air flow through safety-related filter trains in the FHB HVAC exhaust subsystem, does not meet the single failure criterion (see Question R-6). App. Ex. 60, at 4-86.

C.51 This finding pertains to the same matter as finding 4.3.2.1(a). See Taylor, ff. Tr. 14846, at 19-21, 50; Goldberg, ff. Tr. 11491, at 45; Bernsen/Lopez, ff. Tr. 13441, at 101; Tr. 13517-21 (Bernsen/Lopez). For the reasons the Board has previously expressed with respect to finding 4.3.2.1(a)(see Findings C.14-18 supra), HL&P correctly determined that this finding did not identify a potentially reportable deficiency.

C.52 Quadrex Report Finding 4.8.2.1(b) states:

No procedures exist that define the minimum qualification requirements for ALARA reviewers. Some design drawings have been reviewed and signed off for ALARA. There is limited

evidence that proper follow-up has occurred to verify incorporation of ALARA specified designs (see Question R-1).

C.53 Mr. Taylor testified with regard to subparagraphs (b) through (g) of Quadrex Finding 4.8.2.1 that, after reading the support references of Quadrex, in his view the designs and verification thereof had not progressed as far as Quadrex had expected and that "if B&R didn't do a better job," they would not provide sufficient input to the NRC to allow an operating license to issue. Taylor, ff. Tr. 14846, at 51. He found no condition in this Quadrex Finding that would have been reportable under 10 C.F.R. 50.55(e) as a deficiency in a design drawing released for construction or as significant breakdown in the quality assurance program. Id.; compare supra Findings C.61-63 and see Taylor, ff. Tr. 14846, at 51 (regarding 4.8.2.1(d) and how shielding there was reported).

C.54 Mr. Taylor also testified that he found no requirement within NRC regulations or in adopted subsidiary standards which establishes a set of minimum qualifications for engineers. Taylor, ff. Tr. 14846, at 52. Neither the matter of minimum personnel qualifications nor any of the Quadrex comments indicated to Mr. Taylor that any part of the design QA program had been violated. Id.

C.55 Mr. Goldberg testified that this finding was not potentially reportable because it identified neither a deficiency in a design released for construction nor a significant breakdown in any portion of the QA program. Goldberg, ff. Tr. 11491, at 45-46. B&R had a procedure

(STP-DC-016) that required ALARA reviewers to be selected by the B&R Engineering Project Manager, who was responsible for assuring that they were qualified to perform their assigned functions. Id. B&R's procedure required that the ALARA reviewer sign all relevant design drawings to verify that the cognizant engineer had incorporated, as appropriate, the comments of the ALARA reviewer. Goldberg, ff. Tr. 11491, at 45-46; App. Ex. 62, Enclosure (1) at Item Number 4.8.2.1(b); Bernsen/Lopez, ff. Tr. 13441, at 102-03. This procedure was adequate to ensure that the ALARA review process was properly controlled and performed by qualified individuals. Id.; see Staff Ex. 136, at 335, 19-20.

C.56 The Bechtel witnesses explained that the B&R procedures provided acceptable measures for assuring compliance with ALARA requirements and that this finding did not identify a significant breakdown in any portion of the QA program for STP. Bernsen/Lopez, ff. Tr. 13441, at 101-03. Intervenor's Proposed Finding III.65 states that the Quadrex Report indicates as a whole that the ALARA process and products constituted a "generically reportable deficiency." The CCANP position does not set out the complete testimony of Mr. Goldberg that, "Brown & Root was literally just getting started in this ALARA program." Tr. 12272 (Goldberg); see also Tr. 12273-74 (the fact that B&R had not reacted instantly to the post-TMI requirements was a benefit rather than risk). The testimony of the Staff and the Bechtel witnesses on this finding as to why no breakdown exists is simply not addressed by CCANP. See infra Findings C.74-80.

C.57 The Board finds that finding 4.8.2.1(b) did not identify a deficiency in design or in QA for design. It only represented a recommendation by Quadrex for improvement by B&R and, therefore, was not reportable. The fact that it was not reported is no reflection on the character or competence of HL&P.

C.58 Quadrex Report Finding 4.8.2.1(c) states:

Modification of the MAB HVAC system to eliminate filter media needs to be reexamined (see Questions R-5 and R-29). App. Ex. 60, at 4-86.

C.59 Mr. Goldberg testified that this finding was not potentially reportable because the design of the MAB HVAC system complied with the requirements of Appendix I to 10 C.F.R. Part 50 and therefore was not deficient. Goldberg, ff. Tr. 11491, at 46-47. The NRC Staff also testified that this finding was not potentially reportable because it did not identify a potential deficiency or indicate a significant breakdown in quality assurance, but merely represented the lack of progress in engineering completion that Quadrex perceived. Taylor, ff. Tr. 14846, at 50-52. The Bechtel witnesses testified that the STP design complied with applicable requirements and the finding did not identify a significant breakdown in any portion of the QA program for STP. Bernsen/Lopez, ff. Tr. 13441, at 104. See also Staff Ex 136, at 336, 19-20; App. Ex. 63, at B-152; App. Ex. 77, at Enclosure p.10.

C.60 This Board finds that Quadrex Finding 4.8.2.1(c) did not identify a deficiency within the meaning of 10 C.F.R. 50.55(e).

C.61 Quadrex Report Finding 4.8.2.1(d) states:

B&R's position that shielding calculations are not-safety-related needs to be reexamined (see Question R-7). Several shielding analyses were performed by NUS; however, there is no indication that B&R has verified this work. Standard models and codes have been used in analyses performed by B&R, yet B&R exhibited a lack of familiarity with and understanding of the codes. A re-review of plant shielding is necessary to ensure that analysis results are properly reflected in design (see Questions R-11, R-12, and R-14). App. Ex. 60, at 4-86.

C.62 In its May 8, 1981, assessment, B&R concluded that this finding was not potentially reportable. App. Ex. 62, at Enclosure (1) at Item Number 4.8.2.1(d). The HL&P review team determined that the failure to classify shielding calculations as safety-related was potentially reportable and so notified the NRC on May 8, 1981. See CCANP Ex. 128; see Staff Ex. 136, at 19-20. Subsequently, HL&P determined that this matter was not reportable because shielding calculations were not generally classified as safety-related in the industry and because B&R was processing shielding calculations in the same manner as safety-related calculations with respect to checking and verification of adequacy. Staff Ex. 136, at 337; CCANP Ex. 132; Goldberg, ff. Tr. 11491, at 35-36; Bernsen/Lopez, ff. Tr. 13441, at 50.

C.63 In light of the fact that this finding was reported to the NRC as potentially reportable and subsequently shown not to be reportable, the Board finds, of course, no adverse reflection on HL&P character or competence with respect to this Quadrex finding.

C.64 Quadrex Report Finding 4.8.2.1(e) states:

B&R has not correlated radiation zones to the shielding design and shielding design has not adequately considered ISI [In-Service Inspection] requirements or the potential locations for temporary shielding (see Question R-10.). App. Ex. 60, at 4-86.

C.65 Mr. Goldberg testified that this finding was not potentially reportable because it identified a requirement for future work and not a deficiency in design. Goldberg, ff. Tr. 11491, at 47. The NRC Staff also testified that this finding was not potentially reportable (See Finding C.53, supra) on the same basis. Taylor, ff. Tr. 14846, at 50-52. The Bechtel witnesses explained that the finding related to activities which had not yet been performed and it did not identify a significant breakdown in any portion of the QA program for STP. Bernsen/Lopez, ff. Tr. 13441, at 105-06. CCANP adduced no evidence to the contrary.

C.66 This Board finds that 4.8.2.1(e) merely identified work yet to be performed and the finding did not identify a deficiency in design or a significant breakdown in the QA program.

C.67 Quadrex Report Finding 4.8.2.1(f) states:

Radiation zone mappings based on accident conditions have not been prepared (see Question R-30). App. Ex. 60, at 4-87.

C.68 Mr. Goldberg testified that finding 4.8.2.1(f) was not potentially reportable because it did not identify a deficiency in a design or in QA for design but rather an activity to be performed in the future by B&R as

part of its remaining design work. Goldberg, ff. Tr. 11491, at 47-48; Tr. 12273-74 (Goldberg). The NRC Staff also testified that this finding was not potentially reportable for the same reasons. Taylor, ff. Tr. 14846, at 50-52. The finding did not identify a significant breakdown in any portion of the QA program for STP. Bernsen/Lopez, ff. Tr. 13441, at 106.

C.69 This Board finds that 4.8.2.1(f) merely identified work yet to be performed and the finding did not identify a deficiency in design or a significant breakdown in the QA program.

C.70 Quadrex Report Finding 4.8.2.1(g) states:

A design basis governing removable concrete block walls was not evident (see Question R-11). App. Ex. 60, at 4-87.

C.71 The NRC Staff testified that this finding was not potentially reportable because it only identified work yet to be performed and not a deficiency in design. Taylor, ff. Tr. 14846, at 50-52. Applicants' Mr. Goldberg offered essentially the same testimony as the Staff with regard to this finding. Goldberg, ff. Tr. 11491, at 48. Mr. Goldberg explained that design of removable concrete block walls must consider seismic design and radiological shielding. Id. B&R had addressed the seismic design and the need to consider radiological shielding design specification, but had not yet addressed shielding considerations applicable to removal of the walls for maintenance and repair operations. Tr. 12274-84 (Goldberg).

C.72 While maintaining that the design basis cited in this finding was "essential," CCANP fails to demonstrate how the fact that the work identified had not yet been completed constituted a significant breakdown in the quality assurance program. Intervenor's Proposed Finding III.66. While the absence of the concrete blocks must surely affect ALARA (App. Ex. 62, at No. 4.8.2.1(g)) as B&R stated, this does not indicate that appropriate design basis would not occur. The design was still being developed. Bernsen/Lopez, ff. Tr. 13441, at 106-107.

C.73 This Board finds that 4.8.2.1(g) merely identified work yet to be performed and the finding did not identify a deficiency in design or a significant breakdown in the QA program.

C.74 Whether the ALARA findings and statements in the Quadrex Report's Finding 4.8.2.1 represented a significant breakdown in the QA program under 10 C.F.R. 50.55(e)(1)(i) was set as an litigable issue for the hearing. Sixth Prehearing Conference Order, issued May 17, 1985, at 11 (unpublished). As detailed above for each of the individual subparts of Quadrex Finding 4.8.2.1 (see supra Findings C.50-C.73), we find that the fact that these were not individually reported to be no reflection upon the character or competence of HL&P. As examined below, we find also that these ALARA findings, collectively, were similarly unreportable in that the findings did not represent a significant breakdown in the QA program.

C.75 Since the initial ALARA review by B&R (see Tr. 128⁰⁹ (Sumpter)), subsequent plant design changes necessitated a new review. Tr. 12893-900 (Sumpter).

C.76 HL&P had developed an ALARA program which required the designers to address ALARA considerations in design and required a separate design review for ALARA considerations. Goldberg, ff. Tr. 11491, at 46. The program included an ALARA design manual and training program (the first in the industry) and health physics laboratories. Tr. 12758, 12894-96 (Sumpter). B&R was slower in agreeing to adopt the HL&P initiative in ALARA than HL&P would have liked. Id. at 12759, 12896.

C.77 Mr. Stanley and Dr. Sumpter agreed that Mr. Stanley would write a letter to be used in a meeting with B&R in the "hope that that would be the final push needed to get Brown & Root to agree" to begin to institute the HL&P ALARA program. Tr. 12896-97 (Sumpter); see App. Ex. 65; App. Ex. 71; Tr. 13096-97 (Stanley). The meeting between B&R and HL&P was held on March 16, 1981. CCANP Ex. 93. At that meeting, B&R agreed to do a new review of ALARA and adopt the HL&P ALARA program. Id.; see Tr. 12756-59 (Sumpter). The uncontroverted testimony of these witnesses, given the background in which the letter was written, indicates that the Quadrex Report was not identifying a significant breakdown in quality assurance with regard to ALARA.

C.78 When presented with CCANP Ex. 123 (consisting of excerpts from documents related to a 1979 HL&P audit of B&R), Mr. Taylor of the Staff testified that the work simply had not progressed far enough to indicate any violation of the regulations. Tr. 14959-14964 (Taylor). Mr. Taylor did not correlate the use of the word breakdown in that document with a quality assurance breakdown. Id. at 14964-65. His testimony did not differ in any significant way with respect to this document than that of

Applicants' Mr. Frazar. See Tr. 14966 (Bechhoefer); Tr. 14467-70, 14474-75 (Frazar). That is, the problems identified in CCANP Exhibit 123 should not be characterized as a significant breakdown in the quality assurance program. Id.

C.79 Intervenor's Proposed Findings do not address any of this aforementioned testimony. CCANP concentrates only on the subparts 4.8.2.1(b) and 4.8.2.1(g) and the testimony of Mr. Goldberg. See Intervenor's Proposed Findings III.65-66. Intervenor maintains that those particular findings were reportable. See id. We have addressed each of those findings above. See supra Findings C.52-57, C.70-72. As to the collective effect of the ALARA statements in Quadrex, CCANP proposed no findings.

C.80 This Board finds that the statements in Quadrex Finding 4.8.2.1 with respect to ALARA do not, collectively, identify a significant breakdown in the quality assurance program at STP and, therefore, were not reportable under 10 C.F.R. 50.55(e).

D. The Quadrex Report Generic Findings in Issue and Reportability under 10 C.F.R. 50.55(e)

D.1 CCANP has claimed that the Quadrex Report's so-called "generic" findings represent evidence of a QA breakdown and should have been reported to the NRC under 50.55(e) on that basis. We agreed with CCANP that, at least for purposes of reportability, a "generic" finding may indeed be greater than the sum of its discipline parts and document a

significant breakdown where no component discipline finding does so. Memorandum and Order, LBP-85-6, 21 NRC 447, 455 (Feb. 26, 1985). Consequently, the Board set out the ten "most serious" generic finding for litigation in Phase II. See id. at 456. Intervenor's Proposed Findings suggest that "the depth and professionalism of the Quadrex Corporation's investigation and [a] review of the Quadrex Report," standing alone, compels a Finding of Fact that the generic findings each independently meet the test for reportability under 10 C.F.R. 50.55(e). Intervenor's Proposed Finding III.49. This Board is unable to make the leap that CCANP is suggesting. Contrary to what CCANP proposes (see III.51), a detailed examination of each generic finding is necessary. To do otherwise would be to allow Intervenor to prove its case through its allegation and result in an improper analysis of the issues.

D.2 Intervenor's Proposed Findings, after stating that it is merely setting out "significant sections of each generic finding at issue without comment" and relying on a "common sense reading" of those findings as compelling a conclusion of reportability, only addresses four of the ten generic findings in issue (3.1(a), 3.1(g), 3.1(i), and 3.1(j)). Intervenor's Proposed Findings, at III.38; see III.51 to III.55. With regard to the generic findings, as was the case with the discipline findings, CCANP ignores the testimony of the Staff witnesses and expressly refuses to address the testimony of the Bechtel witnesses on the generic findings (see Intervenor's Proposed Findings, at III.218). In light of the extensive cross-examinations and amount of time spent on these witnesses, it was CCANP's obligation to address the merits of this

testimony. While not finding specifically that CCANP is in default with respect to the reportability of those generic findings it did not address (see Phase I PID at 19 NRC 680), in light of the unchallenged and uncontradicted testimony on six of the ten "most serious" generic findings in issue, the Board credits the testimony of the Staff and the Bechtel witnesses and finds those six generic findings were not reportable. The Board does, however, address the evidence as to each of the generic findings in issue. Mr. Taylor of the NRC Staff and Dr. Bernsen and Mr. Lopez of Bechtel testified as to each of the generic findings in issue. Other witnesses testified on certain aspects of various generic findings. The text of the generic findings is not reproduced here because of their lengthy nature.

Finding 3.1(a) (App. Ex. 60, pp. 3-1 to 3-2)

D.3 This finding consists of four sub-items of concern with the B&R design process. It states that interfaces between the various engineering disciplines are not effective, and that there is no overall plant criteria for separation of systems and components. Quadrex indicates that there is no interdisciplinary interpretation for the treatment of the single failure criterion and that the fire hazard analysis has not been converted into a control document for general design usage. Taylor, ff Tr. 14846, at 3.

D.4 Mr. Taylor of the NRC Staff testified that he examined and evaluated this finding, as well as all the generic findings, for potential

violation of any of the criteria of 10 C.F.R. Part 50, Appendix B and used American National Standard Institute (ANSI) document N45.2.11 (Staff Ex. 138) as an aid. Taylor, ff. Tr. 14846, at 3-4. See supra Finding C.28 (regarding NRC status of N45.2.11).

D.5 Mr. Taylor testified that he found no requirement in either Appendix B or N45.2.11 that would make an integrated systems level review a necessity. Taylor, ff Tr. 14846, at 4. He noted that the sub-item in regard to interdisciplinary interfaces was not supported by any reference. Id. The same comment applies to the sub-item on interdisciplinary criteria for use of the single failure criterion. Id. The other two sub-items appear to flow from the only reference, question H-6. Id. The Quadrex assessment of this question does not direct itself to whether the data provided by B&R was found adequate; rather, it states that there was no STP criteria for physical separation, with the reviewers making independent decisions on adequacy. It further states that a subcontractor document failed to indicate whether the B&R design was adequate in regard to fire hazards. Id. at 4-5. In his judgment, the lack of factual data upon which to make an assessment would make the reporting of the item as reportable or potentially reportable inappropriate. Id.

D.6 B&R did have a system integration and overview function. Bernsen/Lopez, ff. Tr. 13441, at 16. B&R employed the use of a System Design Assurance Group, Technical Reference Documents, and multidisciplinary review and comment to provide appropriate methods of

integration control. Id. at 17. The fact that B&R did not establish the Systems Design Assurance Group until 1980 does not indicate a significant breakdown in any portion of the QA program for STP. Id. at 16-17. This simply reflects the iterative nature of the design process. Id. at 17.

D.7 The Quadrex Report findings did not include a specific review of the activities of the System Design Assurance Group. Tr. 13199-200 (Stanley). Quadrex was aware of the Group's existence. Id.

D.8 The Bechtel witnesses testified that, although Criterion III of 10 C.F.R. Part 50, Appendix B requires that design interfaces be controlled, the regulation does not specify how to accomplish such control. Bernsen/Lopez, ff. Tr. 13441, at 20. There are many acceptable methods of satisfying this requirement. Id. As long as the criteria being utilized by each discipline are appropriately conservative for the work it is doing, and as long as final designs of the systems are compatible -- as confirmed during verification activities -- the lack of multidisciplinary design guidance would not be indicative of a significant breakdown in any portion of the QA program. Id.; see Tr. 13089, 13093-94 (Stanley). Further, the Bechtel witnesses testified that the B&R process being implemented was similar to that used on other nuclear projects. Tr. 13543-46 (Bernsen/Lopez); Bernsen/Lopez, ff. Tr. 13441, at 25-28.

D.9 Finding 3.1(a) also stated, in addition to the foregoing perceived problems, that a working interface relationship among the engineering disciplines at STP was not routine. App. Ex. 60, at 3-2. Mr. Robertson

of HL&P testified that, although B&R lacked informal bases for discipline interaction for resolution of concerns very early, B&R had in place a rigorously controlled process under Criterion III of Appendix B. Tr. 14730-31 (Robertson).

D.10 With respect to Quadrex Finding 3.1(a), CCANP's Proposed Findings ignore the testimony of the Staff's Mr. Taylor. Intervenor rests its reportability argument on the fact that Quadrex was aware of the B&R System Design Assurance Group. See Intervenor's Proposed Finding III.52. The testimony of the Staff and Bechtel witnesses did not rely solely on this fact as maintained by the CCANP Proposed Finding. See id. Indeed, the testimony recognizes that Quadrex was aware of the Group's existence. See supra Finding D.7.

D.11 The Board finds that finding 3.1(a) did not identify a significant breakdown in any portion of the QA program for STP. B&R had a system integration function and a systems engineering function, and the information provided in the Quadrex Report does not indicate that there was a significant breakdown in these functions. The type of multi-disciplinary design guidance identified by Quadrex is not required under Appendix B. Consequently, the Board concludes that finding 3.1(a) was not reportable or potentially reportable.

Finding 3.1(b) (App. Ex. 60, at 3-3 to 3-4)

D.12 Quadrex Report Finding 3.1(b) enumerates three Quadrex concerns: (1) that calculations containing errors were being verified as correct

with a higher frequency than should be encountered; (2) that design input was not being consistently reviewed for reasonableness by the recipient and that the use of design output was not being consistently checked by the group providing it; (3) that B&R was not providing adequate guidance to vendors relative to acceptable analysis and testing methods, required data, and report format. In addition, another concern is stated in the paragraph following the enumerated items in that B&R had a policy that work performed by subcontractor and vendors is verified by these firms, that B&R was not reviewing and approving the analysis methods used by subcontractors and vendors, that B&R did not have documented criteria governing the evaluation process for vendor reports and that its review of vendor reports was not consistent. App. Ex. 60 at 3-3 and 3-4; see Bernsen/Lopez, ff. Tr. 13341, at 29.

D.13 Mr. Taylor testified with regard to Finding 3.1(b) that the three enumerated items of the overall Quadrex finding must be considered separately, since there is no obvious synergistic relationship among these items that would have an impact upon safety. Taylor, ff. Tr. 14846, at 6. Taking the first enumerated item, the Quadrex position seems to imply that an engineering group receiving data from another group should check the reasonableness of the data. Id. At face value, this would appear to be a reasonable position, but in actuality, there will be many instances where this is not possible because the receiving group has neither the information nor the capability to test the data for

reasonableness and must place reliance on the expertise of the group from which they received the data. Id. It could be argued that Criterion X "Inspection" might be applicable. If this were the case, it would always require that the work of one group be inspected by another group. Id. Criterion III, however, allows an individual in the same work group as the originator to do the inspection which is referred to as check or verifying. Id. at 7. Regulatory Guide 1.64 (Staff Ex. 139) has placed a restriction on this practice in that the verifier shall not be a party who had input into the design, nor shall the reviewer be the originator's supervisor except under defined circumstances. Id. These apparent concessions to the general idea of independence recognize the fact that the necessary expertise to perform a meaningful review may be in only one group. Id.

D.14 The Bechtel witnesses explained why this did not indicate a significant breakdown in any portion of the QA program for STP. Bernsen/Lopez, ff. Tr. 13441, at 33. The adequacy of data provided across design interfaces is assured through such measures as interdisciplinary document reviews and through decision verification. Bernsen/Lopez, ff. Tr. 13441, at 33. B&R did have appropriate procedures for conducting these activities, and Quadrex did not identify any significant deficiencies related to interfaces controls which were not reported to the NRC. Id. at 33-34. It is not normal industry practice to require a supplier of data to perform a formal review of the use of that data by the recipient, although the discipline which supplies data

may review the other disciplines' design output documents as part of the coordination process. Id. at 34.

D.15 While it is good practice to have the recipient of data perform an informal review of the reasonableness of input data, in many cases the recipient does not have either the knowledge or experience necessary to conduct such reviews. Id. Such informal practice could not be relied upon in QA program under Appendix B. Tr. 13888-94 (Bernsen/Lopez). Accordingly, such reviews of input data are generally not part of a licensee's QA program. Id.; see also Bernsen/Lopez, ff. Tr. 13441, at 39-41. In cases where the receiving group lacks relevant expertise, such informal review is, moreover, not feasible. Tr. 11631-33 (Goldberg).

D.16 Mr. Taylor stated that the second part of the first item also indicates that Quadrex believed that each group providing data to another group has a responsibility to monitor how the receiving group uses that data. Taylor, ff. Tr. 14846 at 7. Nothing in either Appendix B or the subordinate documents implies that this is a requirement. Id. Criterion XVIII does require that a planned and scheduled series of audits be carried out by personnel competent to verify that the QA program for design is being effectively implemented. See id. Such an audit should test a design group's use of data received from other design groups but it is doubtful that each group would be so tested with a frequency that would satisfy the Quadrex expectation of "consistency." Id. Mr. Taylor had no knowledge of whether such audits were effectively implemented. Id. The Quadrex Report did not provide such information, consequently,

Mr. Taylor concluded that there was insufficient information to say that a violation existed. Id.

D.17 Mr. Taylor further testified that the second enumerated item in Quadrex Finding 3.1(b) indicates that the Quadrex review has shown design verified calculations with errors occurring at a higher rate than should be encountered. Taylor, ff, Tr. 14846, at 8. A similar statement appears in the Quadrex assessment of question C-16. Neither of the statements contain any quantification of what was found nor do they provide a baseline for an acceptable error rate. Id. ANSI N45.2.11 (Staff Ex. 138) recognizes that some errors will reside in designs throughout the entire life of the design work and may not surface until the plant is in actual operation. Id. When errors are detected, they would be evaluated for significance and appropriate corrective action would be taken. Id. The fact that the Quadrex finding states that there is an excessive error rate does not constitute a violation. Id.

D.18 The Bechtel witnesses explained that the Quadrex statement regarding errors in verified calculations did not indicate a significant breakdown in any portion of the QA program for STP. Bernsen/Lopez, ff. Tr. 13341, at 29-31. Quadrex cited four questions (C-16, H-15, N-1, and N-17) in support of its statement. App. Ex. 60, at 3-3. Of these four, one referred to an error previously identified and reported to the NRC (H-15); one identified an error previously identified and accepted because it was conservative (N-1); one did not involve an error but only the use of different but conservative assumptions by different

disciplines (N-17); and the remaining one (C-16) stated that there was evidence of a "significant number" of mistakes, but did not identify these mistakes or describe the nature or significance of the mistakes it discovered. Bernsen/Lopez, ff. Tr. 13341, at 31; see Tr. 12627-29 (Goldberg). Thus, the Bechtel witnesses concluded that the information provided in these questions was not sufficient to support a determination that a significant breakdown occurred in verification of design at STP. Id. at 31-32. Mr. Stanley also testified that he did not consider the error rate observed by Quadrex as excessive or potentially reportable; he said the biggest problem was that B&R had not done the work that Quadrex had expected would have been done by that time. Tr. 13353-55 (Stanley).

D.19 Mr. Taylor concluded as to the third enumerated item in this Quadrex finding and the textual statements following that item that it indicates a dissatisfaction with the fact that B&R did not, as a matter of policy, perform a design review of the work performed by vendors or subcontractors. Taylor, ff. Tr. 14846, at 8. Although Mr. Taylor had no specific knowledge of the contract arrangements involved, if Westinghouse were a contractor to the licensee, B&R would have no responsibility to review the design work of Westinghouse unless specifically directed to do so by HL&P. Id. Mr. Taylor saw no evidence of such a request provided by the Quadrex Report. In Mr. Taylor's experience, most architect-engineers do not have the engineering expertise to review effectively the designs of a nuclear steam supply system vendor such as Westinghouse. Id. Further, ANSI N45.2.11 effectively holds each group responsible for the quality of its own work. Id. at 8-9. None of the

three items in Finding 3.1(g), in Mr. Taylor's opinion, represented a violation of Appendix and he viewed all three as not reportable or potentially reportable. Id. at 9-10. The Bechtel witnessess' testimony accords with this assessment of Quadrex' statement regarding B&R review of the work of subcontractors. Bernsen/Lopez, ff. Tr. 13441, at 36-39, 41-43; see also Tr. 13625, 14050-53 (Bernsen/Lopez).

D.20 Intervenor maintains simply that the calculational error rate alluded to in Quadrex Finding 3.1(g), since the rate was "roughly double what they [Quadrex] would have expected to see," makes this finding potentially reportable by HL&P without more. Intervenor's Proposed Finding III.54. The Board assumes that the CCANP Proposed Finding III.53 with regard to this generic Quadrex finding was directed to 3.1(b) rather than 3.1(g), since it is there (3.1(b)) that Quadrex alludes to calculations containing errors being reviewed and verified as correct with a higher frequency than should be encountered. See App. Ex. 60, at 3-3. Indeed, the CCANP Findings reference that portion of the Quadrex Report. See Intervenor's Proposed Findings, at p. 88, line 2-3. At any rate, CCANP offers no further explanation of its argument nor does it offer any contradiction or critique of the Staff testimony on this generic finding.

D.21 This Board finds that Quadrex Report Finding 3.1(b) did not identify a significant breakdown in any portion of the QA program and was not reportable under 10 C.F.R. 50.55(e). While the finding did reference some calculational errors, these were not indicative of a significant QA

breakdown. Other items listed in the finding are not requirements of Appendix B and, consequently, were not reportable as a deficiency or as a significant breakdown in the QA program.

Finding 3.1(c) (App. Ex. 60, at 3-4 to 3-5)

D.22 Quadrex Finding 3.1(c) primarily expresses three concerns: (1) that there was a lack of consistent treatment of plant operating modes and environmental conditions and an absence of written design bases to guide designers in what combination of events and plant modes must be considered; (2) that the design criteria for STP appeared to reflect industry issues in the 1973-75 time frame but not more recent issues; and (3) that analyses of certain systems did not reflect appropriate plant operating modes and environmental conditions. App. Ex. 60, at 3-4 to 3-5; see Taylor, ff. Tr. 14846, at 11-12; Bernsen/Lopez, ff. Tr. 13441, at 43-44.

D.23 Mr. Taylor testified with regard to Finding 3.1(c) that as to Quadrex' statement that the consideration of degraded equipment performance was ignored, the statement appears to have been moderated by the following paragraph which indicates that the design bases have not been revised from the 1973-75 time frame to reflect more recent industry experience. Taylor, ff. Tr. 14846, at 11. The NRC staff has not, in general, required a continual upgrading of the design bases of the power facilities after the construction permit has been issued to reflect various events within the industry except when a substantial improvement

in public health and safety can be achieved. Id. This statement can be confirmed by reference to 10 CFR 50.55a. It provides which codes and standards are acceptable for use in designing and constructing the reactor coolant pressure boundary. Id. Generally, codes and standards applicable when the facility was given a construction permit may continue to be used as the standard throughout the entire construction process, unless NRC regulations specifically provide otherwise. Id.

D.24 The Bechtel witnesses explained with regard to the first concern that Appendix B does not require that plant operating and environmental conditions be specified in a project-wide document. Bernsen/Lopez, ff. Tr. 13441, at 44-45, 47-48. The design bases (including those for off-normal and post-accident conditions) at STP were provided for in individual systems or disciplines by System Design Descriptions (SDDs) and Technical Reference Documents (TRDs), and that this practice was sufficient to satisfy the requirements of Appendix B. Id.

D.25 The Bechtel witnesses also testified that B&R was reviewing regulatory and industry developments since 1975; but, in some cases, B&R had not yet performed the work necessary to revise its design criteria. Bernsen/Lopez, ff. Tr. 13441, at 45, 48-49. Thus, Quadrex's observation that the design criteria did not account for more recent developments did not indicate that the controls provided by the QA program were not being properly implemented but indicated instead that B&R had not yet updated its design criteria. Id.

D.26 Mr. Taylor's testimony with regard to the third concern (analyses of certain systems) was first directed to the purported problems with the HVAC and the essential cooling water pond (ECP). Taylor, ff. Tr. 14846, at 11-12. In the absence of other information, it appears to Mr. Taylor that both situations were a matter of engineering judgmental error. Id. at 12. Mr. Taylor stated that he would expect that in the case of the HVAC situation, the error would have eventually been identified by a design reviewer and corrected. Id. Had an NRC inspector found a large calculational error, as with the ECP situation, he might have issued a violation based upon either Criterion V or VI of Appendix B. Id. Based on the information provided in Question N-17 at the time of the Quadrex Report, the more likely course would have been to issue an "unresolved item" which would cause the licensee to provide more information, i.e., evaluation. Id. No violation would have been assessed. Id.

D.27 The HVAC problem was reported to NRC Region IV on May 8, 1981, just after the receipt of the Quadrex Report by HL&P. See CCANP 128; Taylor, ff., Tr. 14846 at 12. The ECP situation, in Mr. Taylor's view, should have been immediately reported on the basis of the Quadrex Report as a potential 50.55(e) item (see Findings C.32-37 supra) subject to further information gathering and evaluation considering the 1980 guidance (Staff Ex. 137). Id. at 13, 44-45. He added that there is not enough information in the data received to ascertain whether a formal violation of Appendix B existed. Id. at 44. The evaluated temperature of the ECP under certain conditions was confirmed by subsequent Bechtel analysis and the situation was reported as a potential 50.55(e) item on

October 19, 1982. Id. The item was withdrawn on December 9, 1982, on the basis that all safety-related components would perform properly even though the cooling water supply to these components was higher in temperature than originally contemplated. Id. at 44-45. According to the Bechtel witnesses, the design of the ECP did, in fact, consider the simultaneous shutdown of both units as reflected in FSAR §9.2.5. Bernsen/Lopez, ff. Tr. 13441, at 46-47.

D.28 With regard to the final paragraph of Quadrex finding 3.1(c), stating that postulated line cracks and breaks outside containment are inadequate, Mr. Taylor testified that this item appears to follow from the fact that B&R used design bases from the 1973-1975 time period when the construction permit was issued, while the Quadrex personnel were applying standards extant in 1981. Taylor, ff. Tr. 14846, at 14. The imposition of these newer standards would be a backfit of NRC requirements if applied by the staff and would require justification for their imposition. Id.; see 10 C.F.R. §50.109. The failure to upgrade those standards voluntarily does not constitute a violation of Appendix B; thus, this item was not reportable. Taylor, id.

D.29 With regard to generic finding 3.1(c) being reportable as a whole, Mr. Taylor testified that to be so reportable the two incidents of the HVAC and the ECP would have to be construed as being indicative of a significant breakdown in the design QA program. Id. at 13. Mr. Taylor viewed these two situations as individual errors in engineering judgment -- if indeed errors at all -- which did not stem from the same root

cause. Id. Considering the other specific systems as well, if there were a generic overall finding here, in Mr. Taylor's view, it can only be that there is not written design base or at least that the design base is in error. Id. at 15. The Quadrex Report does not provide sufficient information for such a conclusion. Id. There is no basis for saying that a generic problem exists; thus, it would neither be reportable as a potential deficiency nor indicative of a significant breakdown in QA as called for in the April 1980 guidance on 50.55(e) (Staff Ex. 137). Id. Intervenor CCANP adduced no contrary evidence and its Proposed Findings of Fact offer no challenge to the testimony of the Staff or Applicants' witnesses with regard to this generic finding.

D.30 The Board finds that B&R utilized acceptable means of specifying plant operation modes and environmental conditions and that B&P was not required under Appendix B to utilize a project-wide document for specifying plant operating modes and environmental conditions, that the failure to update design criteria was not a deficiency but only an activity that had not yet been performed, and that the examples cited in finding 3.1(c) did not indicate a significant breakdown in any portion of the QA program for STP. Consequently, the Board finds that finding 3.1(c) was not reportable or potentially reportable.

Quadrex Finding 3.1(d) (App. Ex. 60, at 3-5 to 3-6)

D.31 Quadrex Finding 3.1(d) states that Quadrex observed that on many occasions B&R used a very sharp distinction between safety-related and

non-safety-related categorizations for both equipment and calculations. A non-safety-related designation results in the design outputs not being subject to design verification. App. Ex 60, at 3-5. In several instances, design activities that affected plant safety were inaccurately or questionably designated as non-safety-related according to Quadrex. Id. at 2-6. Coupled with this Quadrex concern is an attitude of B&R personnel, as perceived by Quadrex, that only NRC requirements must be met. See id.; Taylor, ff. Tr. 14846, at 16.

D.32 Mr. Taylor testified that the NRC Staff only requires the application of the quality assurance criteria of Appendix B to areas which are designated as safety related. Taylor, ff. Tr. 14846 at 16. The licensee and its various agents, in accordance with Criterion II of Appendix B, develop a list of structures, systems, and components that fit into such a classification. Id. Frequently, there will be components or subsystems connected to a safety system that have no safety-related function, but are listed as well to show the distinction. Id. at 16-17. These lists are included in the Safety Analysis Report (SAR), as recommended by Regulatory Guide 1.70. Id. at 17. In addition, the piping and instrument diagrams generally contain flags that clearly show the safety classifications. Id. These diagrams are also included in the various SAR chapters to which each pertains. Id. The NRC by issuing a construction permit on the basis of the SAR concurs with these described lists and drawings in those documents. Id. These lists and drawings are generally only changed (by amendment to the SAR) when a significant error is found. Id.

D.33 Quadrex Finding 3.1(d) recited seven examples to support its statement requesting safety vs. non-safety classification. App. Ex. 60, at 3-6. The first example, regarding analysis of postulated breaks in high energy lines in the Mechanical Auxiliary Building, did not involve an improper classification but rather an activity which had not yet been performed. Bernsen/Lopez, ff. Tr. 13441, at 50.

D.34 The second example referred to shielding calculations that were not classified as safety-related. See App. Ex. 60, at 3-6. The NRC was notified that this was a potentially reportable deficiency under 10 C.F.R. 50.55(e) immediately after receipt of the Quadrex Report by HL&P on May 8, 1981. Staff Ex. 136, at 20; CCANP Ex. 128; see Bernsen/Lopez, ff. Tr. 13441, at 50. HL&P later determined, however, that shielding calculations were not generally classified as safety-related in the industry and, more importantly, the shielding calculations were internally processed by B&R in the same manner as a safety-related calculation with respect to checking and verification of adequacy. Id. This example also involved the classification of calculations regarding hydrogen concentrations in the battery room. (See App. Ex. 60, at 4-61, and at Question N-25). On cross-examination by CCANP, the Bechtel witnesses explained that the classification of this calculation was judgmental, that the system had a large margin of safety, and that this item in conjunction with the other examples did not indicate a classification problem beyond the HVAC area. Tr. 13984-88 (Bernsen, Lopez).

D.35 The third example identified the Quadrex concern that B&R had not provided safety-related HVAC systems to account for "off-normal conditions." This was reported to the NRC pursuant to 10 C.F.R §50.55(e) on May 8, 1981. Staff Ex. 136, at 19; CCANP Ex. 128; Bernsen/Lopez, ff. Tr. 13441, at 50. See supra Finding B.25.

D.36 The fourth example ("Computer code CPVR status") involved engineering tools - the codes - as not having been subject to a formal verification program prior to use on safety design work. Taylor, ff. Tr. 14846, at 17. This subitem would be a violation of Criterion VI. Id. at 18. This separate item was reported to the NRC on May 8, 1981. Id.; Staff Ex. 136, at 19; CCANP Ex. 128; Bernsen/Lopez, ff. Tr. 13441, at 51. This concern, however, did not involve a safety versus non-safety related classification problem. See Tr. 14006 (Bernsen/Lopez); Tr. 14703 (Robertson).

D.37 The fifth example involved Quadrex's concerns about various types of analyses for support systems which had not yet been completed or which Quadrex believed may have contained errors. Bernsen/Lopez, ff. Tr. 13441, at 51. This example did not indicate any problem with classifications and, as Mr. Taylor testified, does not appear related to the rest of the generic finding (except for the HVAC problem). Taylor, ff. Tr. 14846, at 17; Bernsen/Lopez, ff. Tr. 13441, at 51.

D.38 The sixth example questioned operations performed at remote panels and referenced Quadrex Questions E-13 and R-10. App. Ex. 60, at 3-6.

Mr. Taylor testified that this example, like the fifth, appeared unrelated to the generic finding as a whole. Taylor, ff. Tr. 14846, at 17. The Bechtel witnesses similarly testified that this example did not indicate any problem with safety-related classifications of operations at remote panels but only a concern that environmental conditions (temperature, humidity, and radiation) at the remote panels may not have been properly taken into account. Bernsen/Lopez, ff. Tr. 13441, at 51. This example related to the reported deficiency in the HVAC, and pertained to activities not yet performed by B&R. Id. at 51-52.

D.39 The seventh and final example in this finding involved systems interaction and cited Quadrex Questions H-18, H-23, M-3, M-10, M-50, P-20 and R-12. App. Ex. 60 at 3-6. With the exception of the Quadrex questions regarding the classification of the leak detection instrumentation and sump pumps in the essential cooling water pump rooms, these concerns did not involve classification problems but instead concerns about the adequacy of certain analyses or concerns about analyses which had not yet been completed. Id. at 52. The Bechtel witnesses explained that, based upon their review of documents which existed at the time of the Quadrex review, the leak detection system and sump pumps in the essential cooling water pump rooms were not required to have been classified as safety-related. Tr. 13476-78 (Bernsen/Lopez).

D.40 Mr. Taylor of the NRC Staff testified that, with the exception of the fourth example (computer codes), the balance of the items in Quadrex Finding 3.1(d) neither collectively nor individually constituted

reportable items under 10 C.F.R. 50.55(e). Taylor, ff. Tr. 14846, at 18; see also Staff Ex. 136, at 405. Of the seven examples, only the third (HVAC systems) involved a safety-related design which was not properly classified as such. Bernsen/Lopez, ff. Tr. 13441, at 53. The other examples included activities that were properly classified as not being safety-related, analyses which had not yet been completed, and concerns about the adequacy of certain analyses. Id.

D.41 Although only one of the seven examples correctly identified an activity which was not properly classified, the HL&P review team did notify the NRC of potentially reportable deficiencies with respect to matters encompassed within three of the examples cited by Quadrex. Staff Ex. 136, at 19; CCANP Ex. 128. If the seven examples in finding 3.1(d) are broken down into individual findings and analyzed, misclassification would not be the root cause of these examples (with the exception of HVAC); consequently, it would have been inappropriate for HL&P to notify the NRC of a potentially reportable deficiency regarding misclassification on the basis of this generic finding. Tr. 13993-4003 (Bernsen/Lopez). Mr. Robertson also testified that he did not see any "common thread" with respect to the three potentially reportable items that would indicate that B&R was not taking a technically adequate approach to safety-related design activities. Tr. 14699-704 (Robertson).

D.42 Finding 3.1(d) also states that B&R used a sharp distinction between safety-related and non-safety-related categorizations, and that designs not classified as safety-related were not subject to design

verification. App. Ex. 60, 3-6. The witnesses explained that drawing a sharp distinction between these categories and failing to verify calculations not classified as safety-related is not a violation of Appendix B to 10 C.F.R. Part 50. Bernsen/Lopez, ff. Tr. 13441, at 53-55; see Taylor, ff. Tr. 14846, at 16-17. Appendix B only applies to safety-related activities. Id.

D.43 The additional statement by Quadrex in Finding 3.1(d) that it was frequently stated by B&R during the design review that only NRC requirements must be met (whether those requirements are accurate, reasonable, or meet the intent of the regulations) was meant by Quadrex to draw HL&P's attention to the fact that, while the plant would be licensable, it may not be of an optimum design. Tr. 13241-42 (Stanley). There was no safety significant involved in the comment. Id. at 13245. Intervenor CCANP adduced no evidence contrary to that of the other parties and its Proposed Findings of Fact offer no challenge to the testimony of the Staff or Applicants' witnesses with regard to this generic finding.

D.44 The Board finds that Quadrex Finding 3.1(d) did not identify a significant breakdown with respect to the safety-related versus non-safety-related classification procedure at STP. The only identified problem with classification related to the HVAC, and this was reported to the NRC. The other statements in 3.1(d) regarding sharp distinctions between categories and minimum NRC requirement satisfaction were

similarly not reportable. Quadrex Finding 3.1(d) was not reportable as a whole.

Quadrex Finding 3.1(e) (App. Ex. 60, at 3-7)

D.45 Quadrex Finding 3.1(e) indicates that there are no written guidelines for the conduct of Failure Mode and Effects Analysis (FMEA). App. Ex. 60, at 3-7; see Taylor, ff. Tr. 14846, at 19. It also suggests that there should be documents with a title "Failure Mode and Effects Analysis" and that B&R was unable to provide the Quadrex reviewer with same or even a listing of such documents. Id.

D.46 The NRC Staff testified that the essential purpose of failure analysis is to demonstrate that the single failure criterion, as defined in Appendix A to Part 50, has been met; i.e., the failure of no single active component in a system should cause the total failure of the system to perform its safety function. Taylor, ff. Tr. 14846, at 20. Typically, redundancy is a way to satisfy the single failure criterion. Id. There is an example referenced in the generic finding where the criterion was apparently not satisfied. Id. If an air supply system furnishing control air to valves of an otherwise redundant system should have broken or become plugged, both systems would have failed to operate properly. Id.

D.47 Mr. Taylor testified further, however, that the failure to have written guidelines for FMEA or the failure to have separate documentation

of single failure analysis are not violative of Appendix B. Taylor, ff. Tr. 14846, at 20-21. While it might be argued that Criterion V of Appendix B would be applicable and that a "procedure" for failure analysis is a requirement, it could also be argued that this could be accomplished by drawings or instructions. Id. at 20. Such analysis is a fundamental part of the practice of design development and such a procedure is not necessary. Id. at 21. An engineer would gain the knowledge as a part of his education and experience. Id. ANSI N45.2.11 (Staff Ex. 138) requires that failure effects and the postulated condition to create failure must be part of the design input data for the design of a structure, system or component. Id. The designer and the design verifier have to consider the design inputs in their work. The personnel subsequently preparing the SAR must perform sufficient analysis to describe a given system or structure such that they can demonstrate to the NRC that the requirements of Part 50 and of Appendix A to Part 50 have been satisfied. Id. Mr. Taylor was of the opinion that the generic finding was not reportable. Id. at 21-22.

D.48 The Bechtel witnesses also testified that the type of guidance and documentation suggested by Quadrex was not required by Appendix B. Bernsen/Lopez, ff. Tr. 13441, at 56-57. B&R had not begun to perform FMEA for key systems and, thus, guidance for performance of the FMEA was not yet necessary. Id. at 56. A project-wide document is not necessary as long as each discipline or group uses appropriate guidance for its specific type of work. Id. It is also unnecessary to prepare documentation for the sole purpose of showing satisfaction of the single failure

criterion if that satisfaction can be demonstrated by means of other documentation. Id.

D.49 Mr. Stanley stated that Quadrex had asked four of B&R's engineering disciplines for a list of postulated single failures and that Quadrex was never provided with such a list. Tr. 13216-18, 13338 (Stanley). The Bechtel witnesses testified with respect to this matter, that there were single failure analyses presented in the FSAR, that the SDDs did identify the single failures and abnormal events that needed to be analyzed, and that B&R had not yet begun the more sophisticated analyses for failure modes and effects and single failures. Tr. 13551-55 (Bernsen, Lopez).

D.50 Finding 3.1(e) also identifies one case, involving the HVAC/I&C, which Quadrex states was a violation of the single failure criterion. App. Ex. 60, at 3-7. The Bechtel witnesses testified that nothing in the Quadrex Report indicated that this situation was related to a significant breakdown in any portion of the QA program. Bernsen/Lopez, ff. Tr. 13441, at 56-57. Intervenor CCANP adduced no evidence and its Proposed Findings of Fact offer no challenge to the testimony of the Staff or Applicants' witnesses with regard to this generic finding.

D.51 The Board finds that Quadrex Finding 3.1(e) did not identify a design deficiency or significant breakdown in the QA program and was not reportable under 10 .C.F.R. 50.55(e).

Quadrex Finding 3.1(f) (App. Ex. 60, at 3-7 to 3-8)

D.52 Quadrex Finding 3.1(f) consists of observations that there appears to be no systematic mechanism to assure that the designs meet FSAR commitments, that there were inconsistencies between the FSAR and design documents, and that there is no mechanism to cause timely updating of the FSAR to represent the design. App. Ex. 60, at 3-7 to 3-8; Taylor, ff. Tr. 14846, at 22; Bernsen/Lopez, ff. Tr. 13441, at 58.

D.53 Mr. Taylor of the NRC Staff first stated that he found that Quadrex had stated a number of times through these generic findings that the FSAR cannot be used as a design document (see Tr. 13245-47 (Stanley)). Taylor, ff. Tr. 14846, at 22. There is no basis for such a statement. Id. Further, the FSAR must become a design control document at some point in the design effort since it frequently will become the only record of the results of the ongoing design review by the NRC staff and the licensee. Id. at 23. At yet a later time, the NRC Safety Evaluation Report becomes a design input document since it represents the final staff review and frequently requires the licensee to make changes in the facility design. Id. The FSAR may not in fact be used to control design activities; but, it is used to summarize pertinent information in the design documents that govern design activities. See Bernsen/Lopez, ff. Tr. 13441, at 60-64.

D.54 While the applicant is expected to update the FSAR periodically by amendment, it is not required to maintain the FSAR as current at all times. Taylor, ff. Tr. 14846, at 23. The submittal of the FSAR often

precedes the issuance of the operating license by a considerable number of years. Id. Typically, a licensee will accumulate changes for a period of months and then file the entire package as an amendment. Id. Mr. Taylor stated he had experienced FSARs with as few as fifteen amendments to as many as fifty. Id. The licensee is required to affirm in writing that the facility and the FSAR match prior to OL issuance. Id. One year after receiving the operating license the licensee is required to provide an updated FSAR and to update that document yearly thereafter. Id. As found herein previously (see supra Findings C.28-30), inconsistencies between the FSAR and the design document do not pose a significant quality assurance problem so long as the entire process is controlled, as was B&R's process. Bernsen/Lopez, ff. Tr. 13441, at 61-67. See 10 C.F.R. Part 50, App. B, Criterion VI. Not maintaining the FSAR up-to-date generally does not constitute a violation of Appendix B. Taylor, ff. Tr. 14846, at 23-24. Since Quadrex did not cite specific examples, Mr. Taylor stated he could not determine that any violation existed from a review of the Report. Id. at 24.

D.55 The Bechtel witnesses testified that the inconsistencies Quadrex identified between design and the then-current revision of the FSAR involved design or design practices that were technically adequate. Bernsen/Lopez, Tr. 13441, at 65.

D.56 The second part of this generic finding, dealing with the lack of centralized interpretation of codes and standards, does not relate to the above issue. Taylor, ff. Tr. 14846, at 24. In Mr. Taylor's view, there is not requirement for centralized interpretation; thus, there can be no

violation by failing to have such. Id. Incorrect interpretation, regardless of who made them, could be a violation, but only on a case-by-case basis. Id. In the case of the one cited example, Mr. Taylor stated that he could make no decision on whether there were violations without considerably more information than is made available within the example Quadrex offered. Id.

D.57 Mr. Taylor concluded with respect to Finding 3.1(f) that since there are no NRC requirement applicable to the generic aspects of the finding, the licensee could not have been expected to report either of these. Taylor, ff. Tr. 14846, at 25. See Bernsen/Lopez, ff. Tr. 13441, at 65. Intervenor CCANP adduced no evidence and its Proposed Findings of Fact offer no challenge to the testimony of the Staff or Applicants' witnesses with regard to this generic finding. The Board finds that this generic finding was not reportable, in whole or in part, under 10 C.F.R. 50.55(e).

Quadrex Finding 3.1(g) (App. Ex. 60, at 3-8 to 3-10)

D.58 Quadrex Finding 3.1(g), in the opinion of Mr. Taylor, did not state one overall generic finding; rather, it lists ten separate issues. Taylor, ff. Tr. 14846, at 26. These are listed by Mr. Taylor as follows:

- (a) Much of the plant design basis is rooted in engineering judgment and it is difficult to retrieve the supporting rationale for the judgments;

- (b) There is no overall document controlling the interface information requirements;
- (c) Key front end documents apparently have not been developed and issued early enough;
- (d) Significant quality variations are contained in the design review comments;
- (e) There was uncertainty by B&R of the depth of review performed by Westinghouse;
- (f) EDS was not reviewing all B&R design changes;
- (g) Westinghouse design basis are carried over to balance-of-plant design without confirmation of applicability;
- (h) Design basis of other PWRs are used without confirmation of applicability;
- (i) There are no consistent requirements for the design basis margins to be used by each discipline; and
- (j) B&R does not require use of design manuals or engineering log books.

Id. at 25-26. The Bechtel witnesses testified that observations in this Quadrex finding primarily express the Quadrex general concern that there was very little evidence of a well thought out and consistent basis for design, that much of the plant design basis was solely rooted in engineering judgment, and that the rationale for this judgment was not documented in a retrievable manner. Bernsen/Lopez ff. Tr. 13441, at 65.

D.59 Mr. Taylor testified that there is not enough information in the finding to indicate what Quadrex was concerned with in the first item,

although he stated that it might be connected to the last item listed. Taylor, ff. Tr. 14846, at 27. The second item, regarding no overall document controlling the interface information requirements, is very similar to a concern voiced in finding 3.1(a) (See supra Findings D.3-11) with neither comment being supported by any factual information that would allow analysis. Id. The third item, regarding key front-end documents, is apparently rooted in the Quadrex philosophy (an incorrect one in Mr. Taylor's view (see supra Finding D.53)) that the FSAR cannot be considered a design input document. Id. With the exception of the ninth item (i), Mr. Taylor stated he can reach no conclusions as to the other items listed since there is no support for these. Id. Item (i) is supported by one example dealing with HVAC design but this is at least in part contradicted by another example in the civil engineering area. Id. That statement is much stronger than the cited facts seem to warrant, according to Mr. Taylor. Id.

D.60 Mr. Taylor concluded that these items are not specific enough to consider that any criterion of Appendix B had been violated; further, there is insufficient information on these items in the Quadrex Report to consider these as anything other than observations by the auditor. Taylor, ff. Tr. 14846, at 28. The fact that neither the generic finding nor any of the listed observations were reported under 10 C.F.R. 50.55(a) does not reflect adversely, in Mr. Taylor's opinion, on any of the relevant attributes of character or competence. Id. at 28-29.

D.61 As the Bechtel witnesses testified, it is acceptable for each discipline to develop its own design basis rather than relying upon a project-wide document or multidisciplinary guidance. Bernsen/Lopez, ff. Tr. 13441, at 66. Furthermore, use of engineering judgment in development of the design basis is appropriate, and the rationale for that judgment need not be documented as long as the design basis itself is documented. Id. at 66-67. Although the witnesses agreed that it would have been beneficial if new project personnel were familiar with the rationale for the design basis established by their predecessors, the absence of such familiarity does not present a problem as long as the design basis is documented. Id. at 67. Bechtel's review of B&R's design basis indicated that the design basis was primarily rooted in the Safety Analysis Reports, regulatory guides, industry codes, and other standard sources for design bases. Id. Consequently, Quadrex's concern does not indicate a significant breakdown in any portion of the QA program for STP. Id.

D.62 The examples provided by Quadrex in finding 3.1(g) do not identify a significant breakdown in any portion of the QA program for STP. Bernsen/Lopez, ff. Tr. 13441, at 67. As explained herein with regard to discipline finding 4.5.2.1(b) (see supra Findings C.28-30), basing the design upon unverified preliminary data is generally necessary at the start of design and does not identify any quality assurance problems so long as these preliminary data is strictly controlled. Id. Quadrex' concern in this area generally pertained to the over-conservatism incorporated in this data. Id. Similarly, while it may have been

desirable for B&R to have produced the key front-end criteria documents mentioned by Quadrex, many of these documents were not yet needed at that time, given the status of design. Id. Many plants have been successfully completed without using these types of documents in the design process. Id. at 67-68. Appendix B does not require that design assumptions (including the design margins) be consistent from discipline to discipline, nor does it require that one contractor review the work of other contractors, provided there is review to assure conformance with the procurement documents and compatibility at interfaces. Id. at 68. Finally, there is no requirement that design manuals be prepared to provide uniform guidance to disciplines or designers or that designers use "individual engineer log-books," provided that other acceptable means of identifying the design input and assumptions are used in preparing a design. Id. The Bechtel witnesses noted that B&R treated its collection of system design documents and technical reference documents as if it were a design manual and followed an appropriate procedure (STP-SD-001) in that treatment. Id.

D.63 The Quadrex statement that design details from other PWR plants were obtained and used without confirming their appropriateness for application at STP and the statement that significant quality variations were observed in the design review comments provided for internal documents do not constitute violations of Appendix B. Bernsen/Lopez, ff. Tr. 13441, at 68-69. Criterion I of Appendix B does not specify any requirements for reviewing, verifying, or commenting upon design details or documents; similarly, Criteria XVIII does not impose any such

requirement. Id. at 69. In addition, providing comments on internal documents prior to their issuance is not encompassed within design verification as that term is used in Criterion III. Id. at 69-70. Quadrex' concern in the area of obtaining design details from other plants does not appear to be safety-related, according to the Bechtel witnesses; rather, it related to matters of plant availability. Id. at 70-71. Quadrex' specific statement in Question P-2 is that information provided by Westinghouse is "probably satisfactory." Id. at 70.

D.64 With respect to the Quadrex statement regarding documenting of engineering judgment and lack of the use of log-books, the Bechtel witnesses testified that this represents no violation of any of the criteria of Appendix B. Bernsen/Lopez, ff. Tr. 13441, at 72-73. Engineer log-books and documentation of the rationale for engineering judgment are not explicitly identified as types of records which must be maintained. There are acceptable options to the use of engineer log-books for recording design bases, assumptions, and decisions. This includes preparing a separate document for each calculation or design activity. Id. at 72. B&R utilized acceptable alternative means. Id. at 72-73.

D.65 The absence of a review of subcontractor materials selections by the B&R Materials Group did not violate Appendix B. Bernsen/Lopez, ff. Tr. 13441, at 74. This group was not required by procedure to conduct such reviews. Id. at 74-75. Moreover, the absence of a review of the materials selections of its subcontractors by the B&R Materials Group

does not mean that the materials selections were going unreviewed. Id. Criterion III requires that these selections be reviewed and verified. Id. at 75. Review and verification by the subcontractors (whose overall QA Program was audited by B&R) satisfies the requirements of Appendix B and assures that the materials selection is appropriate. Id. at 74-76.

D.66 With regard to generic finding 3.1(g), CCANP only offers its conclusion as to why this finding was reportable. See Intervenor's Proposed Finding III.54. No explanation as to why the Staff's or Applicants' testimony is erroneous or incomplete is offered by intervenor. The CCANP position rests solely on the proposition that "technical leadership" is inadequate. See id. Why or how this proposition is reportable under 10 C.F.R. 50.55(e) in and of itself is not explained; nor is the allegation as to how this Quadrex conclusion is not reflected in the discipline findings even addressed by intervenor. The Board finds that Quadrex finding 3.1(g) did not identify a significant breakdown in any portion of the QA program for STP; thus, the Board concludes that this finding was neither reportable nor potentially reportable and the fact that the generic finding, or any of its "sub-parts," was not reported does not reflect adversely on the character or competence of HL&P.

Quadrex Finding 3.1(h) (App. Ex. 60, at 3-11)

D.67 Quadrex Finding 3.1(h) involves, in brief, a concern that B&R has apparently not developed and specified reliability requirements for

electrical and mechanical safety-related equipment. Taylor, ff. Tr. 14846, at 29.

D.68 Mr. Taylor testified that the two examples given in the Quadrex Report only partially support its finding. Id. at 29. Question E-7 indicates that some parts of the question were satisfactorily answered while other parts were largely not answered, apparently because the design was not complete. Id. Question E-8 does deal with the concept of reliability, in part, via criticism of the lack of formalized failure modes and effects analysis. Id. The last statement pertaining to the question does come directly to the point that B&R has not specified acceptance criteria for equipment reliability. Id.

D.69 The failure of B&R to specify reliability acceptance requirements for equipment does not violate Appendix B or any other NRC requirement. Taylor, ff. Tr. 14846, at 29-30. Criterion XXI of Appendix A, 10 CFR 50 requires that the reactor protection and reactivity control systems be of the highest functional reliability and shall have in-service testability. Id. Redundancy and independence is required to be sufficient to assure that (1) no single failure results in loss of the protective function and (2) removal from service of any component or channel does not result in loss of the minimum required redundancy unless the acceptable reliability of operation of the protective system can be otherwise demonstrated. See id. Since there was no regulatory requirement or actual deficiency detailed in the finding, Mr. Taylor concluded that a 50.55(e) report was not necessary as to this Quadrex finding. Id.

D.70 The Bechtel witnesses testified to similar effect as Mr. Taylor that this generic finding did not identify any violation of Appendix B or a deficiency in design QA for STP, since Appendix B does not require that procurement documents for equipment specify reliability requirements and it is not general industry practice to do so. Bernsen/Lopez, ff. Tr. 13441, at 76-78. It was the practice of B&R (which was consistent with industry practice) to specify a level of quality consistent with the intended function of the equipment, to rely on historical data and experience, and to perform qualification tests or analysis. Id. Intervenor CCANP adduced no evidence and its Proposed Findings of Fact offer no challenge to the testimony of the Staff or Applicants' witnesses with regard to this generic finding.

D.71 This Board finds that Quadrex finding 3.1(h) did not identify a deficiency or violation of Commission regulations and, therefore, was not reportable under 10 C.F.R. 50.55(e).

Quadrex Finding 3.1(i) (App. Ex. 60, at 3-11 to 3-12) ^{2/}

D.72 The exact thrust of Quadrex Finding 3.1(i) is difficult to grasp. Taylor, ff. Tr. 14846, at 31. Mr. Taylor believed that this finding was intended to point out that B&R lacked expertise in those engineering

^{2/} Finding 3.1(i) is incorrectly denominated as 3.1(j) in the Quadrex Report. See Sixth Prehearing Conference Order, issued May 17, 1985 (unpublished), at 10.

areas that are more uniquely nuclear in contrast to those areas that are relatively common to any type of design engineering work. Id. at 31-33.

D.73 Mr. Taylor concluded that this generic finding did not provide enough data to form a basis for finding any violation of Appendix B. Taylor, ff. Tr. 14846, at 32. Appendix B is primarily a prescription for establishment of well-disciplined management controls from the time period of conceptual engineering to full operation of the plant. Id. Such controls recognize human, procedure, process, and material fallibility by requiring controls, checks, inspections and testing. Id. The purpose of the SARs is to allow the NRC to assess the design adequacy of the facility. Id. As to reportability of this generic finding, Mr. Taylor viewed the Quadrex concerns stated in the finding as lacking the technical specificity needed to form a basis for a 50.55(e) report. Id. at 33. A 50.55(e) report would have been "inappropriate" in his view. Id. at 34. The finding is stated more in terms of a feel that things were not going well, in the opinion of Quadrex, rather than specifically leading to a conclusion that the operability of the plant might be seriously affected. Id. at 33.

D.74 The Bechtel witnesses viewed the finding as primarily expressing two general Quadrex concerns: (1) that insufficient nuclear-related analyses had been accomplished, that the nuclear related analysis methods and assumptions were much less adequate than the methods used by other disciplines, and that a high error rate was observed in these calculations; and (2) that a large amount of nuclear-related analysis was

subcontracted and the review of the subcontracted analyses by B&R did not appear to be adequate. See Bernsen/Lopez, ff. Tr. 13441, at 78-79.

D.75 The Bechtel witnesses testified that the first concern does not indicate a significant breakdown in any portion of the QA program for STP. Bernsen/Lopez, ff. Tr. 14846, at 79. The thrust of Quadrex' concern regarding analyses which had not yet been completed was only to indicate a productivity or scheduling problem. Id. The discipline findings did not identify a large number of inadequate calculations and, with the exception of the deficiencies which were reported to the NRC, the findings did not identify any safety-significant deficiencies. Id. at 79-80.

D.76 Some of the "errors" identified by Quadrex related to calculations which were not inadequate at the time they were performed, but which needed to be updated to account for more recent developments. Bernsen/Lopez, ff. Tr. 13441, at 80. In other cases, where "errors" in calculations were noted by Quadrex, a complete reading of the Quadrex assessment and an understanding of the related circumstances reveals that Quadrex was mostly concerned with the timeliness of certain analyses, the changing regulatory acceptance of certain analytical methods, or the over-conservatism to be found in some calculations. Id. Finally, in other cases, the "inappropriate methods" identified by Quadrex for the most part did not involve actual errors in calculations, but instead consisted of differences between the methods being used and those described in the FSAR, and differences between the methods being used and

those currently being recommended by the NRC Staff. Id. at 81-82. As a result, the Bechtel witnesses concluded that the first portion of finding 3.1(i) did not identify a significant breakdown in any portion of the QA program for STP, but only a Quadrex impression that B&R personnel were not as knowledgeable of certain design assumptions or factors as Quadrex believed they should have been. Id. at 79-83.

D.77 As to the second concern in generic finding 3.1(i), the Bechtel witnesses testified that the fact that B&R had subcontracted a large amount of nuclear-related analyses did not identify a significant breakdown in any portion of the QA program for STP. Bernsen/Lopez, ff. Tr. 13441, at 83. Appendix B, 10 C.F.R. Part 50 does not prohibit a licensee from contracting or subcontracting for design work. Id. at 82. Quadrex's concern about the technical guidance provided by B&R to subcontractors and vendors and the review of their analyses did not identify a significant breakdown in any portion of the QA program for STP. Id. at 83-84.

D.78 CCANP contends that 3.1(i) is the "most striking" generic finding because it addresses the nuclear analysis group. Intervenor's Proposed Finding III.55. CCANP's argument for reportability of 3.1(i), however, is limited to the unexplained contention that Mr. Robertson's position when he first read the Quadrex Report was correct, i.e., that this item should be reported. Id. However, CCANP's Proposed Finding concedes that after further review, Mr. Robertson changed his mind on that group. Id. Mr. Robertson determined that the real problem was productivity, not

defective outputs; thus no deficiency in design or a quality assurance breakdown existed in Mr. Robertson's view. Moreover, CCANP addressed none of the Staff testimony or testimony of the Bechtel witnesses as to why this generic finding was not reportable.

D.79 The Board finds that finding 3.1(i) did not identify a significant breakdown in any portion of the QA program for STP but only an observation that B&R did not have the degree of nuclear expertise that Quadrex expected. This finding as such was not reportable or potentially reportable under 10 C.F.R. 50.55(e).

Quadrex Finding 3.1(j) (App. Ex. 60, at 3-13)

D.80 Quadrex finding 3.1(j) expresses four concerns: (1) that B&R's design verification process permitted the use of preliminary data up to the point of fuel loading; (2) that there were no documented standards regarding the minimum qualifications for a design verifier; (3) that the only evidence of a completed design verification was a signature; and (4) that errors were not detected by design verifiers. See Bernsen/Lopez, ff. Tr. 13441, at 85; Taylor, ff. Tr. 14846, at 34.

D.81 Mr. Taylor of the NRC Staff testified that neither Appendix B nor ANSI N45.2.11 establish a requirement that would require the licensee or its engineer to establish formal minimum qualifications for personnel performing either direct design work or for performing design verifications. Taylor, ff. Tr. 14846, at 34. These people need only be

competent to perform this work. Id. The Bechtel witnesses agreed. Bernsen/Lopez, ff. Tr. 13441, at 87-91. In the same context, Appendix B and N45.2.11 contain only a requirement that each design be verified; however, neither establish a time in the overall design and construction sequence in which the verification must be done. Taylor, ff. Tr. 14846, at 34. It would seem prudent to have the verification accomplished prior to releasing the design for use; but, many factors bear on this such that the cost risk involved in using an unverified design might well be less than the benefits. Id. at 34. B&R had checks to assure that the verification process was carried out and needed changes were made when preliminary data were used. See supra Findings C.28-30, infra D.82.

D.82 Brown & Root's use of preliminary data up to the point of fuel loading did not indicate a quality or safety concern. Bernsen/Lopez, ff. Tr. 13441, at 85-86. Appendix B, and in particular Criterion III, does not include specific requirements regarding the timing of verification activities. Id. at 86. It is not uncommon to defer final verification of some types of structures, systems, and components until after construction is completed. Id. at 86; see Goldberg, ff. Tr. 11491, at 41; Tr. 13120-23 (Stanley). B&R's design verification procedure (STP-DC-015) required that preliminary designs be checked prior to release for construction to confirm that the preliminary designs were acceptable, based upon the preliminary input then available. Bernsen/Lopez, ff. Tr. 13441, at 85-86.

D.83 With regard to the use of design verification checklists, these are not required by Appendix B. Bernsen/Lopez, ff. Tr. 13441, at 89-90. As to the Quadrex statement that errors were not detected by design verifiers, the Bechtel witnesses testified that this Quadrex conclusion was based upon the same question that supported a similar statement in finding 3.1(b) and that, for the same reasons discussed with respect to finding 3.1(b), this statement was not sufficient to indicate that there was a significant breakdown in the QA program for STP. Id. at 88-89. See supra Findings D.12-20.

D.84 Mr. Taylor and The Bechtel witnesses all concluded that this generic finding, 3.1(j), was not reportable to the NRC under 10 C.F.R. 50.55(e). Taylor, ff. Tr. 14846, at 34-35; Bernsen/Lopez, ff. Tr. 13441, at 89-91.

D.85 The Board finds that using preliminary data up to the point of fuel loading is not violative of Appendix B so long as it is recognized as preliminary data and finally verified before licensing, that Appendix B does not require the formal establishment of minimum qualifications for design verifiers or the use of design verification checklists, and that the information in the Quadrex Report regarding the existence of calculational errors was not sufficient to indicate a significant breakdown in the design verification process. The Board concludes that finding 3.1(j) was not reportable or potentially reportable under 10 C.F.R. 50.55(e).

E. Reportability under 10 C.F.R. 50.55(e) of the Quadrex Report as a Whole

E.1 Intervenor contends, and this Board set as an issue for hearing, that the Quadrex report, in its entirety, should have been reported under 10 C.F.R. 50.55(e). Memorandum and Order, LBP-85-6, 21 NRC 447, at 462-63 (1985).

E.2 The NRC Staff witnesses and the Applicants offered direct testimony on this issue. Messrs. Eric Johnson and Les Constable of the Staff stated that the Quadrex Report was an important document in that it contained separate findings that identified problems which could have impacted the design of the South Texas Project and, hence, its ability to be operated safely. Johnson/Constable, ff. Tr. 14846, at 4. When first read by the NRC Staff, after being made available in its entirety in August 1981, the Staff was concerned over the implications contained in the findings. Id. They concluded that the report was deserving of a systematic, detailed evaluation. Id. This importance, nevertheless, does not automatically lead one to the conclusion that it should have been reported under 50.55(e). Id. at 8.

E.3 According to the Staff witnesses testifying with regard to reportability, at issue is whether -- and to what extent -- the report represented deficiencies that were significant in whole or in part and whether this represented a QA breakdown. Johnson/Constable, ff. Tr. 14846, at 8. A deficiency must have the potential to affect adversely the safe operation of the facility. Id. Whether this

potential existed had to be evaluated by technical experts who reviewed the details of the Report. Id.

E.4 The current staff review in preparation for the hearing concluded that the findings in the Quadrex Report that were not reported under 50.55(e) did not demonstrate technical significance or did not provide sufficient detail to indicate that a deficiency could exist or that a significant QA breakdown had occurred. Id. at 8-9. This Staff review, however, did not lead to the conclusion that the Quadrex Report was of no importance. See Johnson/Constable, ff. Tr. 14846, at 9.

E.5 The Staff conclusion comports with the detailed systematic review concluded by the NRC from mid-September to early October 1982. That review's findings were released as NUREG-0948 (Staff Ex. 146). See Johnson/Constable, ff. Tr. 14846, at 4. This Board's Memorandum and Order, LBP-85-6, 21 NRC 447 (1985), raised questions about this Staff review process. See id. NRC Region IV managers testified that the Region recognizes that a significant breakdown in any portion of the QA program for design would be reportable to the extent that a deficiency was found as described in 10 CFR 50.55(e). Id. The Staff has indicated to us that it did consider whether a significant breakdown in QA had occurred in their evaluation of each Quadrex finding in NUREG-0948 and that the information in the Quadrex Report was not sufficiently detailed to conclude that a significant QA breakdown had occurred. Id.

E.6 With these aforementioned Board concerns in mind, and in order to ensure that these matters have been properly reviewed within the limits described by the Board, Region IV management (Mr. E. Johnson and Mr. Constable) assigned a project inspector (Robert G. Taylor) with many years of experience involving nuclear plant design and construction and 50.55(e) reports to review those Quadrex items specified for hearing by the Board. Johnson/Constable ff. Tr. 14846, at 4-5. Management witnesses reviewed Mr. Taylor's testimony and agreed with same. Id. at 5.

E.7 Mr. Taylor perceived that the design development process of B&R had progressed far less than Quadrex thought was reasonable for the construction status of the project. Taylor, ff. Tr. 14846, at 53. The impression he gained from reading the Report was that Quadrex found the design in such areas as HVAC, piping and pipe supports, and electrical had not yet started through the iterations necessary to make it final. Id. Apparently what Quadrex expected to see was a mature engineering project and its comments are reflective of this condition. Id. Tending to support this conclusion are many instances where the B&R response to the Quadrex questions are phrased in the future tense, which implies that the engineering effort at that time had not culminated in a substantially complete design. Id. Mr. E. Johnson and Mr. Constable of the Staff agreed with Mr. Taylor's assessment. Johnson/Constable, ff. Tr. 14846, at 5.

E.8 Mr. Taylor concluded as to the reportability of the Quadrex Report as a whole that he perceived that the primary thrust of the Quadrex comments was that B&R had little documented design guidance for a group of engineers (B&R) that Quadrex considered to be inexperienced and that B&R was subject to fairly high turnover rates. Taylor, ff. Tr. 14846 at 52. There was a concern that newly hired engineers would have difficulty in determining what the design basis was without these higher level design guidance documents. Id. Most of the engineering firms that Mr. Taylor had knowledge of have had design manuals that are generally promulgated by the immediate staff of each engineering discipline's chief engineer for the use of engineers assigned to a project staff. Id. The most important purpose of these manuals has been to provide a consistent design basis from project to project, particularly when several design projects are going forward at the same time. Id. at 52-53. For a one project A/E, such as B&R here, these manuals might be seen as unnecessary, since the chief engineers could provide such guidance on a day-to-day basis. Id. at 53. There is no NRC requirement that such manuals must exist as a prerequisite to performing design work. Id.

E.9 Mr. Taylor went on to testify that on the basis of these perceptions, the Quadrex report as a whole was not reportable under 10 C.F.R. 50.55(e). Taylor, ff. Tr. 14846, at 53. A deficiency within the context of 50.55(e) does not exist simply because the design work is substantially incomplete. Id. In Mr. Taylor's view, if the reverse logic were applied, it would then follow that the day the construction

permit issued, the licensee would immediately have to report that it had deficiencies in the design because virtually all of the design work would not have started at a detail level. Id. at 53-54.

E.10 Mr. Taylor stated that his testimony was entirely independent of the Staff review of Quadrex in 1982, as reported in NUREG-0948 (Staff Ex. 136), since he did not review NUREG-0948 until after preparation of his analysis. Taylor, ff. Tr. 14846 at 54-55. He sought to analyze the Quadrex Report as if he were an NRC inspector reviewing the licensee's actions regarding the Quadrex Report and its reportability immediately after the licensee had completed its review of the Report. Id. at 55. After preparing his testimony, Mr. Taylor reviewed NUREG-0948. Id. He stated that given what information existed at the time the Quadrex Report was originally presented, his views as to its reportability under 50.55(e) remain the same after reviewing NUREG-0948. Id. at 55.

E.11 The Staff also offered testimony as to the NRC guidance on the subject of 10 C.F.R. 50.55(e) and how the HL&P response to the Quadrex Report adhered to this guidance. Mr. Robert F. Heishman, the Chief of the Reactor Construction Programs Branch, Division of Inspection Programs, Office of Inspection and Enforcement, Nuclear Regulatory Commission, testified that reportability of significant construction deficiencies under 10 CFR 50.55(e) has historically been subject to various interpretations. Heishman, ff. Tr. 14846, at 2. To address these differences, the Office of Inspection and Enforcement (IE) has issued guidance for use by inspectors and supervisors as a part of the IE

Manual (Staff Exs. 137, 139). Id. This guidance has been changed from time to time with the latest change issued in 1980 (Staff Ex. 137). Id. This guidance does allow for the application of judgment as to the reportability of construction deficiencies and this fact is exemplified by the current review of 10 CFR 50.55(e) and 10 CFR 21 to indicate more clearly the intent of these rules. Id.

E.12 The aforementioned guidance was made available to NRC applicants generally. Johnson/Constable, ff. Tr. 14846, at 5. The guidance was given to HL&P and discussed with them, in draft form, in a meeting in March 1980. Id.; see Staff Ex. 137.

E.13 The Staff guidance issued in April, 1980 (Staff Ex. 137) differed from the previous version, dated July 1, 1976, mainly in the inclusion, for the first time, of a new category of items: the potentially reportable deficiency. Johnson/Constable, ff. Tr. 14846, at 5. Since the intent of 10 CFR 50.55(e) is to provide the NRC with a basis for evaluating safety consequences of significant deficiencies and for determining the need for further action by NRC, it is clear that the NRC Staff would like this information as soon as possible. Id. Since the determination as to whether an item is significant might be time consuming, this guidance set up the new category of item and suggested reasonable time limits for the evaluation process. Id. In doing so it was recognized that some items called potentially reportable would eventually be evaluated as not meeting the criteria of 10 CFR 50.55(e) and, hence, a report would not be issued. Id. Given such an ultimate

evaluation of nonreportability, the initial prompt notification (within 24 hours) would not have been necessary in the first place. Id. at 5-6. Significant problems are surfaced in a timely manner by this mechanism at the expense of having to deal with problems that will subsequently be determined not to be significant. Id. at 6.

E.14 Messrs. E. Johnson and Constable of the NRC Staff concluded that HL&P adequately applied the IE guidance regarding reportability, with the exception of two items identified in 82-02 (Staff Ex. 140) for which a violation was issued for untimely reporting. Johnson and Constable, ff. Tr. 14846, at 8. In the Staff's investigation of the handling of the Quadrex Report, Insp. No. 82-02 (Staff Ex. 140), the Staff determined that the applicant apparently had sufficient information available to it on two items identified in the Quadrex Report before the final Quadrex Report was reviewed and the 50.55(e) reports made on May 8, 1981. Staff Ex. 140; see Johnson/Constable, ff. Tr. 14846 at 7. With those specific exceptions, HL&P was not required to report the Quadrex Report as a potential deficiency. Johnson/Constable, ff. Tr. 14846, at 9. The fact that the report identified potential problem areas that were further evaluated and which resulted in action by the utility to avoid significant deficiencies is a credit to the utility. Id. This reflects favorably on its character. Id. The utility did discuss the matter with NRR. See e.g., Staff Ex. 140. NRC Region IV would have preferred that the utility have approached Region IV staff with this same information. Johnson/Constable, ff. Tr. 14846, at 9. The fact that the utility seemed to perceive design matters to be more within the domain of NRR is an

understandable condition. See id. NRC Investigation Report 82-02 (Staff Ex. 140, at 4) reflected this perception. Id.

E.15 Mr. Constable of the NRC Staff further testified, in his view as of 1981, it was not clear to him (as a senior resident inspector) what agency-wide policy was appropriate with respect to studies and reports, not required by regulations, that were initiated by the utilities in order to get a third-party view of construction and management effectiveness. Johnson/Constable, ff. Tr. 14846, at 10. It was conveyed to him, by NRC Region IV managers, in general, that NRC actions, if any, should avoid any "chilling" effect on the conduct of these types of studies (like Quadrex) since these were viewed as being both useful and necessary. Id. HL&P had informed the NRC of the Quadrex Report while the study was going on and promptly after the report was issued. See supra Findings B.1, B.11. Thus, in the Staff view, no negative conclusions can be drawn with regard to the character and competence of HL&P with respect to its candor in keeping the NRC informed by the fact that it did not submit a formal 50.55(e) report on the Quadrex Report a whole. Id.

E.16 The Staff witnesses testified that licensees should use judgment and screen matters being reported to the NRC in order to avoid flooding the NRC with too much information. Tr. 15048, 15062-65 (Johnson, Heishman, Constable).

E.17 Mr. Collins of the NRC Staff, the then-Deputy Administrator of Region IV at the time of the Quadrex Report, testified that on the basis of the original descriptions of the Quadrex Report he received from NRC inspectors, he suggested to HL&P that the Quadrex Report as a whole should be reported pursuant to 10 C.F.R. §50.55(e). See supra Finding B.38. Tr. 15292, 15345-47 (Collins). Based on the subsequent detailed reviews performed by the NRC Staff, however, he now believes the Report as a whole was not reportable. He also pointed out that the Applicants had the benefit of more information than did the NRC at the time he thought a 50.55(e) report should have been made on the Quadrex Report as a whole. Tr. 15347-49 (Collins).

E.18 The Applicants offered the direct testimony of Mr. Goldberg and the Bechtel witnesses on the reportability of the Quadrex Report as a whole. See Goldberg, ff. Tr. 11491, at 48-49; Bernsen/Lopez, ff. Tr. 13441, at 107.

E.19 Mr. Goldberg testified that, in his judgment, the Quadrex Report, as a whole, was not reportable because it did not identify any widespread breakdown in QA or suggest that a significant amount of the safety-related design was flawed. Goldberg, ff. Tr. 11491, at 48-49. He identified two scenarios under which such a report might have been reportable as a whole: (1) if there were a large number of reportable deficiencies, such that taken together they suggested an extensive problem which could not be bounded; or (2) if a limited number of observations projected a broad concern about the engineering practices

that could reach into many areas. Tr. 12539-41 (Goldberg). On first reading the Quadrex Report on May 7, 1980, Mr. Goldberg felt the Report did suggest such a broad concern. Tr. 12536-38, 12604-05 (Goldberg). However, within a day after more closely scrutinizing the Report, and with the benefit of the detailed review of the Report by Mr. Robertson, Dr. Sumpter, and the B&R engineering team, Mr. Goldberg found that the Report did not present a technical basis for a broad scale indictment of B&R engineering as to require a 50.55(e) report on the Quadrex Report as a whole. Id.

E.20 The applicant is not required under 10 C.F.R. 50.55(e) to identify for, or provide to, the NRC every report in which a deficiency is discovered. See Tr. 12832-33 (Sumpter). It is only the deficiencies that are required to be reported under the regulation. See id. In addition, as the Bechtel witnesses' testimony pointed out, the Quadrex Report was not organized or structured in such a manner to address the reporting requirements of Section 50.55(e), and that it would be more appropriate to submit a 50.55(e) report for each individual reportable deficiency. Tr. 14023-26 (Bernsen/Lopez).

E.21 None of the documents adduced and none of the witnesses presented by CCANP concluded that any matters in the Quadrex Report were reportable beyond those actually reported to the NRC by HL&P.

E.22 In light of our findings as to the technical and qualitative significance of each of the discipline and generic findings of Quadrex in

issue in this proceeding (see Sections C. and D. herein), the Board finds that the Quadrex Report as a whole did not identify a significant breakdown in the B&R design QA program and 10 C.F.R. §50.55(e) did not require Applicants to submit the entire Report to the NRC. Hence, the Board finds no adverse inference with regard to HL&P's character or competence to be drawn from the fact that the Quadrex Report as a whole was not reported to the Staff.

F. Contention 10: The McGuire Doctrine and the Quadrex Report

F.1 Under Contention 10 (See supra Finding A.15) the Board must consider whether the fact that the Quadrex Report (issued May 7, 1981) was not submitted to the Board until late September 1981 reflects adversely upon the character and competence of the Applicants.

F.2 This Board first requested the views of the parties on whether the Quadrex Report should have been supplied to the Board under the McGuire doctrine (Duke Power Co. (McGuire Station, Units 1 & 2), ALAB-143, 6 AEC 623, 625-26 (1973)) in its Memorandum and Order, issued June 22, 1983, at 7 (unpublished). In the "NRC Staff Response to Licensing Board Memorandum and Order Regarding the Reportability of the Quadrex Report" (filed August 24, 1984), the Staff took the position (at 8) that the Quadrex Report should have been provided to the Board in May of 1981. The Staff maintains that position. Intervenor CCANP took essentially the same position with respect to whether McGuire required turning over the Report to the Board. See "CCANP Brief in Response to Licensing Board

Memorandum and Order Regarding the Requirements Applicable to the Applicants to Notify and Report to the NRC about the Quadrex Report at its Filings," dated October 1, 1984, at 26-28.

F.3 The NRC Staff first took the position when its counsel learned of the Quadrex Report, restated it in its August 24, 1984 brief (see Finding F.2 supra), and continues to maintain, that the Quadrex Report was relevant and material to the issues addressed in Phase I and should have been provided to the Licensing Board in May of 1981.

F.4 The Applicant took the position that the McGuire doctrine was not violated, maintaining that the issues and contentions in Phase I related to construction QA and construction activities and that design-related matters were discussed only peripherally in Phase I. Applicants' Response to NRC Staff Brief, dated September 28, 1984, at 7-14. Applicants stated that the identification of design concerns, or design QA concerns, in the Quadrex Report would not necessarily suggest any relationship to construction or construction related QA matters. Id.

F.5 This Board held in our Memorandum and Order of February 26, 1985, that "the Quadrex Report was relevant and material to matters before the Board [during the Phase I hearings] and, as a matter of law, should have been turned over under the McGuire doctrine shortly after its receipt by HL&P." LBP-85-6, 21 NRC at 461-62. The Board noted in so holding that "[c]onstruction and design QA are not so disparate as to be considered unrelated subjects." Id. at 462.

F.6 Mr. Goldberg testified that he did not view the Report as a report on QA. He acknowledged that some quality concerns were noted in the Report, such as the three items that HL&P identified as potentially reportable, but he viewed the Report as focusing on the efficiency of B&R's engineering activities, not its QA program. Goldberg, ff. Tr. 11491, at 55. Mr. Stanley testified that the purpose of the Quadrex review was to evaluate B&R's engineering activities as they reflected on B&R's ability to complete the design of STP in an efficient and orderly way. Stanley, ff. Tr. 13047, at 3; Tr. 13073 (Stanley).

F.7 With regard to Contention 10 and the failure to report promptly the existence of the Quadrex Report to the Licensing Board, CCANP relies on its purported proof with respect to what it views as the improper process established by Applicant for review of the Report and concludes that this evidences the conspiracy and nothing further be said with regard to the failure to supply the Quadrex Report to the Board. Intervenor's Proposed Finding III.159. CCANP does not attempt to demonstrate, beyond that assumption, that Applicants' failure to meet its McGuire obligations to give the Report to the Board is an independent basis for disqualification on character or competence grounds. See id; see also II.28. Given our findings with regard to the reportability "conspiracy" allegations of CCANP, we are constrained to find no support for a disqualification of applicants on this aspect of Contention 10 for the reasons explained below, since no evidence of defective character or competence has been adduced by intervenor or pointed to in its Proposed Findings. The mere failure to report is an insufficient basis. See infra Finding F.11-F.12.

F.8 The only evidence on the McGuire issue (Contention 10) adduced through Staff testimony was through Mr. Collins. Mr. Collins testified that in a telephone conversation with Mr. Oprea on or about August 27, 1981, he advised Mr. Oprea that HL&P should seriously consider making the Quadrex Report available to the Licensing Board. Tr. 15288 (Collins); see CCANP Ex. 138. Mr. Collins reached this judgment on the basis of information received from Mr. Philips of the NRC Staff. Tr. 15342 (Collins). Mr. Oprea testified, however, that he had no recollection of such a statement by Mr. Collins. Tr. 14300-04 (Oprea). Mr. Collins had no specific recollection of bringing the subject up again at a later time with Mr. Oprea (or Mr. Goldberg). Tr. 15343 (Collins).

F.9 It is unclear from the testimony whether Mr. Oprea misunderstood or misinterpreted the advice offered by Mr. Collins regarding making the Quadrex Report available to the Board. Irrespective of the discrepancy in the testimony regarding what was said in the telephone conversation between Mr. Collins and Mr. Oprea, it is clear that the decision not to turn the Quadrex Report over to the Board was made by HL&P long before that conversation occurred. This is evident by virtue of the fact that almost four months had elapsed since the Report was received by HL&P and Phase I hearings had been held during that time. Although we agree with the Staff that this decision by HL&P did not meet its obligations under the McGuire doctrine, we do not find this to be a sufficient independent basis to hold that the applicants lack the requisite character and competence to operate a nuclear plant.

F.10 With regard to Mr. Collins' testimony as to his telephone conversation with Mr. Oprea, Intervenor conjures up a charge that "[i]t is possible a cover story was created" by Mr. Collins with respect to his request of Mr. Oprea that the NRC Staff be given unrestricted review of the Quadrex Report and his suggestion that the Licensing Board be advised of the existence of the Report. Intervenor's Proposed Finding III.97. Again, CCANP oversteps the bounds of propriety. See supra Finding B.34, 40. Absolutely no evidence of such action, or motive for such action, exists in the record; indeed, CCANP makes no effort to supply such support. This Board is unwilling to accept intervenor's unfounded allegations as fact.

F.11 In Metropolitan Edison Company (Three Mile Island Station, Unit 1), ALAB-774, 19 NRC 1350 (1984), the Appeal Board addressed a contention that a licensee's failure to submit certain reports earlier showed a lack of integrity on the part of its management. In that case, the Appeal Board found that although the information should have been reported to the adjudicatory boards earlier, the licensee had voluntarily revealed the existence of the document to NRC personnel previously; consequently, there was no basis to support an assertion that the licensee had intentionally acted to conceal the information. Three Mile Island supra, 19 NRC 1350, at 1357-59. The Appeal Board also stated that "[i]n such cases of reasonable doubt [as to whether to notify the Board]. . . The information should be disclosed for the board to decide its true worth. [citing] McGuire, supra, 6 AEC at 625 n. 15; Midland, ALAB-691, supra note 6, 16 NRC at 914." 19 NRC at 1358.

F.12 On the basis of Three Mile Island, supra, the Board finds that while the applicant here did not meet their McGuire obligations in turning over the Quadrex Report to the adjudicatory boards, there is no direct evidence that this Report was intentionally concealed from the Board by applicant. The Quadrex Report was made known to and available to NRC Staff personnel. See supra Findings B.33-37. In light of that availability, there is inadequate evidence to conclude that HL&P willfully violated its obligations to provide the Quadrex Report to this Board. The failure to meet that specific McGuire obligation, given the facts and circumstances surrounding this case, is not a sufficient basis to draw adverse inferences with respect to HL&P's character and competence to operate a nuclear plant.

G. Contention 10: Replacement of B&R and Notification of that Decision to the Board under the McGuire Doctrine

G.1 In our Memorandum and Order of June 18, 1985 (LBP-85-19, 21 NRC 1707) we denied a CCANP motion to reopen the Phase I record to receive evidence regarding the timeliness of HL&P's replacement of B&R and HL&P's not promptly advising the Board of that potential replacement. In that Order we noted that Contention 10 is broad enough to include the replacement of B&R as an outgrowth of the Quadrex Report. 21 NRC at 1715.

G.2 In Phase I testimony in June 1982, Mr. Goldberg testified that HL&P had concluded by early summer of 1981, that B&R lacked the necessary engineering experience and expertise to complete STP in an economic and

orderly fashion. Goldberg et al., ff. Tr. 10403, at 5-7. Before that HL&P conclusion was reached, Mr. Goldberg testified in Phase I that he had suggested in January 1981 (shortly after his arrival on site) that HL&P explore any alternative to completing the STP without B&R as architect-engineer. Tr. 10518-20 (Goldberg). HL&P chose not to do so at that time. Id; see Jordan, ff. Tr. 11908, at 8-9. At a STP Management Committee Meeting on June 26, 1981, HL&P received further information on how far behind in projected engineering completion B&R actually was, and, at that point, decided to see if an alternative to B&R existed; this was done, on Mr. Jordan's decision, after an HL&P management officials meeting on June 29, 1981. See Jordan, ff. Tr. 11908, at 9-10; Tr. 12176-77 (Jordan); Oprea, ff. Tr. 14095, at 10-11; Goldberg, ff. Tr. 11491, at 56.

G.3 In July 1981, HL&P undertook, by making a request for proposals, to examine the feasibility of replacing B&R as A/E and construction manager with an organization with more nuclear experience and resources. HL&P received and evaluated those proposals during August and early September, and selected Bechtel. Tr. 10419 (Goldberg). HL&P was able to reach agreement in principle with Bechtel by September 24, 1981, and promptly informed the Board. Goldberg, ff. Tr. 11491, at 57.

G.4 To address the Board's concerns with respect to the notification to it of the imminent replacement of B&R during Phase I hearings (See LBP-85-19, 21 NRC 1707, at 1728-29, 1730), Applicants presented in the Phase II hearings the testimony of the three HL&P officials who had

principal responsibility for the Project during 1981: Mr. Jordan (then President and Chief Executive Officer), Mr. Oprea (then Executive Vice President-Nuclear) and Mr. Goldberg (then Vice President, Nuclear Engineering and Construction).

G.5 Beginning with his arrival in October 1980, Mr. Goldberg questioned the strength of B&R's engineering organization. Goldberg, ff. Tr. 11491, at 4. While Mr. Goldberg suggested the search for an alternative to B&R as early as January 1981, both Mr. Jordan and Mr. Oprea felt the best option was to improve B&R's performance. Oprea, ff. Tr. 14095, at 8-10; Jordan, ff. Tr. 11908, at 8; Tr. 11970-71, 11999-12000 (Jordan). When B&R resisted Mr. Goldberg's suggestion that it hire a senior nuclear executive who would report directly to the President of B&R, Mr. Goldberg urged more strongly that HL&P ascertain whether an alternative was available. Goldberg, ff. Tr. 11491, at 59-60; Jordan, ff. Tr. 11908, at 8; Tr. 11973-74 (Jordan). At that point, however, Mr. Jordan had not yet reached the conclusion that B&R could not complete the STP. See Jordan, ff. Tr. 11908, at 8-9.

G.6 It was not until the owners of STP met with B&R on June 26, 1981, that they became convinced that B&R would not be able to perform engineering services in a fashion that would support the STP construction schedule and that it would take an extensive period before engineering could achieve the desired level of productivity. Oprea, ff. Tr. 14095, at 10; Jordan, ff. Tr. 11908, at 9; Tr. 11951-52 (Jordan). B&R informed the owners that only nine percent progress could be expected during the

subsequent 18 months. Tr. 12004-5, 12147-48 (Jordan); see also CCANP Ex. 79. Mr. Jordan convened a meeting with Messrs. Oprea, Goldberg and Barker on June 29, 1981, and each of them expressed the view that B&R would be unable to complete the engineering for STP in an orderly, timely and cost effective manner. Oprea, ff. Tr. 14095, at 11; Tr. 12010-12, 12177 (Jordan); Tr. 12607 (Goldberg); CCANP Ex. 79. Mr. Jordan then decided that HL&P should explore whether there was an alternative to continuing with B&R. Tr. 11970-71 (Jordan); Goldberg, ff. Tr. 114911, at 56; Tr. 12613-14 (Goldberg); see also Jordan, ff. Tr. 11908, at 9-10.

G.7 After describing to this Board his recommendation that HL&P should explore an alternative to B&R, Mr. Goldberg testified that he did not view that suggestion as tantamount to discussion of removal of B&R. Tr. 10519 (Goldberg); Goldberg, ff. Tr. 11491, at 67; see Oprea, ff. Tr. 14095, at 22-23. Both Messrs. Oprea and Goldberg stated that removal was not specifically discussed until June 29, 1981. Oprea, ff. Tr. 14095, at 23; Goldberg, ff. Tr. 11491, at 66-67. Replacement of B&R was considered a last resort. Goldberg, id. at 56, 66; Oprea, id. at 10-11; Jordan, ff. Tr. 11908, at 9; Tr. 11974, 12005-06 (Jordan). Mr. Goldberg's PUCT testimony is consistent with this scenario outlined in Phase I and Phase II testimony before this Board. See Ex. A to "CCANP Motion to Reopen the Phase I Record" (filed April 15, 1985).

G.8 The Board finds no violation of McGuire obligations with respect to the notification to it of the HL&P decision to replace B&R. Before June 29, 1981, there was simply no definitive relevant and material

information that could have meaningfully been disclosed to the Board regarding the replacement of B&R. See e.g., CCANP Exs. 76, 78. CCANP's apparent position that the preliminary discussion or suggestions by Mr. Goldberg should have been disclosed are unrealistic and impractical given the nature of the disclosure to be made and would have had little, if any, effect on the deliberations or actions of the Board prior to the time of the actual decision to replace B&R. While CCANP's Proposed Opinion (see supra Finding B.34), at 29, states that "significant information" could have been obtained in Phase I if the HL&P discussions regarding an alternative to B&R had been disclosed to the Board earlier and that the "entire approach" to those hearings "might have been altered," CCANP fails to state what that information was and how it was material to Phase I issues or how the Phase I proceedings would have changed.

G.9 Once the decision to replace B&R was made, HL&P acted promptly to notify the Board of the decision and thereby fulfilled its obligations under McGuire and related cases. Similarly, there is no evidence of any attempt to "manipulate" this Board's Phase I hearing by applicants' counsel. HL&P witnesses testified that Mr. Newman's and other counsel's advice pertained to licensing and contractual matters and that counsel acted in the role of an attorney and not management. See e.g., Tr. 11982 (Jordan); Tr. 12464-66, 12615 (Goldberg); Tr. 14324-25 (Oprea). The Board finds that Mr. Newman acted solely in the role of an attorney with respect to this involvement in the replacement of B&R. The Board, moreover, sees no evidence of an attempt at "manipulation" of the hearing in this proceeding by applicants' counsel.

H. HL&P's Current Competence: 50.55(e) Reporting Practice

H.1 An issue set for hearing in Phase II was the current competence of HL&P considering its current methodology for evaluating 10 C.F.R. §50.55(e) deficiencies. As this Board stated, if the Applicant's current methodology for evaluating 10 C.F.R. §50.55(e) deficiencies reflects the methodology used in 1981, that methodology may well represent a defect in competence. Memorandum and Order (Phase II Hearings on Quadrex Report Issues), LBP-85-6, 21 NRC 447, at 460 (1985). The material factual questions to be resolved on this issue include the level and competence of the persons charged with responsibility for ascertaining 50.55(e) deficiencies, changes (if any) since 1981 in the system, and HL&P's current method for trending QA violations or deficiencies to determine their significance. Id. at 460.

H.2 Applicants offered the testimony of Mark R. Wisenburg on the issue of the current 50.55(e) reporting practices of HL&P. Wisenburg, ff. Tr. 14514. Mr. Wisenburg is currently Manager, Nuclear Licensing for Houston Lighting & Power Company. Id. at 1. Mr. Wisenburg has 10 years of commercial nuclear licensing experience with the Tennessee Valley Authority (TVA) and HL&P, as well as 10 years of naval nuclear experience. Id. at 2-3. During his tenure at TVA, he was involved in evaluating numerous matters for reportability and prepared or supervised the preparation of written Section 50.55(e) reports for the Yellow Creek, Bellefonte, Watts Bar and Sequoyah nuclear plants. Id. In his current

position, he reviews all Section 50.55(e) determinations by the STP Incident Review Committee (IRC) and often participates in technical reviews of individual matters. Id. at 2. He prepared the first revision of HL&P's current reporting procedure (see Staff Exs. 143, 145), supervised the preparation of subsequent revisions, and has trained HL&P Engineering and QA personnel in applicable reporting procedures and requirements. Id. at 3.

H.3 Mr. Donald L. Garrison, the current NRC Resident Construction Inspector at STP, offered direct testimony on this issue for the NRC Staff. Garrison, ff. Tr. 15110. Mr. Garrison has evaluated the procedural requirements for processing deficient items through the existing system at STP. Garrison, ff. Tr. 15110, at 1. Mr. Garrison testified that the A/E (Bechtel) processes all deficient items (other than HL&P items) generated on site in a standard format that is outlined in Bechtel procedures 2.20 entitled, "General Project Requirement - Reporting Significant Deficiencies - Federal Registration 10 C.F.R. Part 50.55(e)" (Staff Ex. 143) and procedure 5.3 entitled, "Review of Nonconformance Reports for Deficiency Evaluation" (Staff Ex. 144). Mr. Garrison summarized these procedures (Garrison, ff. Tr. 15110, at 2-4) and testified that this process meets the requirement of 10 C.F.R. §50.55(e) and comports with the NRC's current guidance on reporting deficient items (Staff Ex. 137). Garrison, ff. Tr. 15110, at 4-5. There have been no deficiencies in the HL&P reporting system identified since 1983. Id.

H.4 Mr. H. Shannon Phillips, NRC Senior Resident Inspector at STP from September 1979 to January 1982, also testified on direct with respect to HL&P's "current" competence (up until he left the site) of reporting 50.55(e) deficiencies. Phillips, ff. Tr. 15116, at 3. Mr. Phillips testified that his experience with HL&P was that it was forthright in identifying deficiencies to the NRC when these were found to be reportable. Id. The utility also reported a large number of deficiencies when it could have taken a more conservative approach and reported fewer. Id. Mr. Phillips was impressed by the utility's sincere desire to do a good job even though its inexperience or oversight had occasionally resulted in violations of 10 CFR 50.55(e) reporting requirements (during the time he was on site). Id. at 3-4; but see Garrison supra, ff. Tr. 15110, at 4-5 (no violations in reporting system since 1983).

H.5 Mr. Garrison also testified as to HL&P's current method for trending 50.55(e) violations. Garrison, ff. Tr. 15110, at 5. While the procedure has since changed somewhat, HL&P began trend analysis in 1980 (See Staff Ex. 146). Garrison ff. Tr. 15110, at 5. The utility trends fourteen types of documents that generally report deficiencies. Id. Information is gleaned from these reports which are originated throughout the project by HL&P, Bechtel, and Ebasco and include deviation reports and deficiency notices. Id. Copies of deficiency reports are sent to the HL&P QA/ADM group after they are validated. Id. The items are processed into the computer base in five categories: company, organization, discipline, group activity, and

deficiency type -- each of which have numerous subgroups. Id. at 5-6. The analysis portion of the program separates the items by deficiency type: hardware, systems, supplier, and engineering design, with a sort performed monthly for evaluation. Id. For trends noted, a trend investigation request (TIR) is initiated and processed. This document specifies trend, investigation results, root cause, corrective action and recurrence control and verification of results. Id. at 6. The Group Vice President for Nuclear and other management receive a quarterly report of trends. Id. Review of the procedure indicates that the program is satisfactory and broad enough to identify occurring trends. Id. HL&P's trending program provides for the review of all deficiency documents generated at STP (including DEFs and DERs) against the criteria of 10 CFR 50.55(e) through the evaluation of identified trends for reportability. Wisenburg, ff. Tr. 14514, at 16-18.

H.6 The current STP procedure governing reportability reviews pursuant to Section 50.55(e) (App. Exs. 66 and 66A), places the responsibility for evaluating and reporting conditions pursuant to Section 50.55(e) with HL&P. Procedures are also in effect defining the responsibilities of Bechtel and Ebasco personnel for the identification and evaluation of deficiencies and the notification of HL&P. Wisenburg, ff. Tr. 14514, at 3-4; see Garrison, ff. Tr. 15110, at 2-4.

H.7 Any HL&P employee who becomes aware of a condition which they believe may constitute a significant deficiency (within the meaning of Section 50.55(e)) is required to prepare promptly a Deficiency Evaluation

Form (DEF) describing the condition. Wisenburg, ff. Tr. 14514, at 4. Regular training is conducted for HL&P employees covering the requirements of Section 50.55(e), applicable Staff guidance, and the provisions of the applicable procedure. Tr. 14569-71 (Wisenburg). The DEF is promptly reviewed by HL&P Engineering personnel and, if it is determined that a significant deficiency exists, the DEF is provided to the IRC for evaluation of reportability. Wisenburg, ff. Tr. 14514, at 4. Even where HL&P Engineering concludes that no such deficiency exists, the basis for that determination is documented and the DEF is forwarded to the IRC Chairman for his review. Id. at 4-5.

H.8 A similar process is in place for Bechtel employees (Ebasco employees must bring the situation to the attention of Bechtel) whenever a possible significant deficiency is identified. A Deficiency Evaluation Report is indicated and HL&P is notified if Bechtel concludes that such a deficiency exist. Wisenburg, ff. Tr. 14514, at 4-5; Tr. 14516-17 (Wisenburg); 14572-74 (Wisenburg).

H.9 The Incident Review Committee (IRC) of HL&P is chaired by HL&P's Supervisory Engineer, South Texas Project Licensing, Mr. Michael Powell. Wisenburg, ff. Tr. 14514, at 5. Mr. Powell did not testify; however, Mr. Wisenburg stated Mr. Powell's background and qualification as including a Bachelor of Electrical Engineering degree, a Masters of Science in Nuclear Engineering, and seven years of nuclear licensing experience. Id. at 6. Absent any evidence to the contrary, the Board finds Mr. Powell qualified and competent to chair the IRC for HL&P. See 21 NRC 460. Mr. Paul Ratter, HL&P's Project QA Supervisor, also sat on

the IRC. Wisenburg, ff. Tr. 14514, at 5. Mr. Ratter has fourteen years of commercial nuclear QA/QC experience, has participated as a utility representative in the development of the Institute of Nuclear Power Operations (INPO) Performance Objectives and Criteria for Construction Project Evaluations, and holds certificates as an ANSI Level III Inspector in Procurement, a Lead Auditor, a Quality Specialist Mechanical and a Level II Inspector for a number of non-destructive examination techniques. Id. at 7. Mr. Ratter, like Mr. Powell, is qualified and competent to be charged with the responsibility for ascertaining 50.55(e) deficiencies.

H.10 The IRC also includes an Engineering representative cognizant in the discipline affected by the particular condition being evaluated and other individuals, designated on a case by case basis by the Chairman, who are familiar with the matters to be evaluated. Id. at 5. The Group Vice President, Nuclear (Mr. Goldberg) may also convene a committee to perform an evaluation under Section 50.55(e). Id. at 6; Tr. 14518-19 (Wisenburg); App. Ex. 66 at section 4.3.4. Such a committee could be formed in special circumstances requiring individuals with more specialized knowledge or experience than the standing IRC. Tr. 14522-23 (Wisenburg).

H.11 Once the IRC is notified of a significant deficiency, it is required to conduct an initial evaluation to determine if the condition is reportable or potentially reportable and, if so, to report it to the NRC within 24 hours of that notification. Wisenburg, ff. Tr. 14514, at

7-8. The Manager of Nuclear Licensing concurs with the IRC determination and ensures that sufficient information is being provided to the NRC. Id.; Tr. 14552-53 (Wisenburg). Mr. Wisenburg (as well as Mr. Goldberg and Mr. Robertson, HL&P's prior Licensing Manager) testified that in no case had he ever overruled an IRC determination to notify the NRC of a condition the IRC deemed reportable or potentially reportable. Tr. 14553-54 (Wisenburg); Tr. 12288 (Goldberg); Tr. 14721-24 (Robertson). HL&P management is informed of items reported to the NRC. Wisenburg, ff. Tr. 14514, at 7.

H.12 After the Nuclear Regulatory Commission has been notified of the potential deficiency, a technical evaluation is conducted and, if the initial determination of reportability is confirmed, a written report is forwarded to the NRC within 30 days of the initial notification of the NRC. Id. at 9. Mr. Wisenburg reviews the NRC's completed evaluations, and Mr. Goldberg reviews and signs the written reports to the NRC. Id. at 8-9. If the technical evaluation indicates that the condition is not, in fact, reportable, the IRC confirms and documents the non-reportability determination and then informs the NRC of same. Id. at 9; see Tr. 15128 (Garrison). When the technical evaluation cannot be completed in 30 days, the situation being evaluated is considered reportable and an interim report is submitted to the NRC. Wisenburg, id. at 9-10.

H.13 In connection with the issue of HL&P's current competence in §50.55(e) reporting, the Board stated in its Sixth Prehearing Conference Order, issued May 17, 1985, at 8 (unpublished), that it would expect the

witnesses to be able to explain in some detail the operation of procedures with regard to one or more incidents that presented "close questions" as to reportability (particularly where an incident was found to be not potentially reportable and hence was not reported). In this regard, the Board indicated it might have question at the hearing about open item 83-12-01 (I&R Report 83-12, at 10, 97). The NRC Staff presented the testimony of Messrs. E. Johnson and Constable on this subject (ff. Tr. 14846, at 12-13) and the applicant offered Mr. Wisenburg (ff. Tr. 14514, at 13-16).

H.14 The particular matter addressed in open item 83-12-01 which was evaluated for reportability, concerned the apparent omission of references to specific QA standards in three Bechtel procurement specifications, and had been identified in two HL&P audits of Bechtel engineering. Wisenburg, ff. Tr. 14514 at 13-14. The initial observation by the NRC inspector documented in Inspection Report 83-12 was based solely on a review of HL&P audit reports D06-201 and C10-301. Johnson/Constable ff. Tr. 14846, at 12-13. The applicant representative at that time indicated that additional information was available, but the NRC inspector was unable to review those documents at that time. Id. at 13. A subsequent review of those documents by the NRC staff has been conducted which indicates there was no breakdown in the Bechtel QA program. Id. In response to the NRC inspector's concern that the item may have been indicative of a reportable breakdown in the STP QA Program, a DEF was initiated and forwarded to the IRC. Id. at 15. The IRC reviewed the matter and concluded that there had been no significant QA

breakdown, and that it did not meet the Section 50.55(e) reportability criteria. Id.; Johnson and Constable, ff. Tr. 14846, at 13. We concur with HL&P's assessment of the reportability of the condition described in open item 83-12-01, and conclude that the requirements of Section 50.55(e) (particularly the requirements of Section 50.55(e)(1)(i) relating to significant QA breakdowns), were correctly applied.

H.15 CCANP adduced no evidence to the contrary on this issue. It limits its proposed findings as well to a questioning of Mr. Goldberg's competence and experience (see Intervenor's Proposed Finding III.215-216) and the statement that confidence in the current system cannot exist because of the handling of the Quadrex Report (see id. III.213). The Intervenor's Proposed Findings make no mention or attempt to analyze the testimony of the Staff on this issue (see Johnson/Constable, ff. Tr. 14846, at 12-13; Garrison, ff. Tr. 15110; Phillips, ff. Tr. 15116, at 3) or that of Mr. Wisenburg (see ff. Tr. 14514).

H.16 The Board concludes that HL&P's current system for ascertaining 50.55(e) deficiencies, including the level of competence of the persons charged with that responsibility and its methodology for trending those deficiencies, is competent and comports with the requirements of the regulations and with the NRC guidance; further, there is reasonable assurance that this competence will continue throughout the period of construction of the plant.

I. HL&P's Current Competence: Adequacy of Backfill Placed by Ebasco (Issue B/D-1)

I.1 As a subpart of Issues B and D (see LBP-84-13, 19 NRC 659, at 694-697, 699-700), the Board admitted Issue B/D-1 in the Sixth Prehearing Conference Order, at 8 (May 17, 1985) (unpublished). Issue B/D-1 states:

Is there reasonable assurance that the backfill placed at STP by Ebasco is in conformity with the construction permits and the provisions of Commission regulations in light of the two violations in the area of "soils and foundation" discussed in I&E Report 83-26 (dated April 20, 1984) [see Notice of Violation 83-24-02 and Unresolved Item 83-24-01] and findings 23 and 24 in the programmatic audit filed by HL&P on May 25, 1984 (ST-HL-AE-1095)?

I.2 Applicants and the NRC Staff each presented witnesses on Issue B/D-1. Intervenor offered no direct evidence or testimony on this issue, and its Proposed Findings of Fact offer no findings as to the soils issue either. In light of CCANP's failure to contest the conclusions of the Staff and Applicants' expert witnesses, the Board finds no basis to question in any way their testimony.

I.3 The NRC Staff presented the testimony of Mr. Joseph I. Tapia, an NRC Reactor Inspector and a soils expert (see Tr. 9126, ff. p. 64). Tapia, ff. Tr. 13752. Mr. Tapia testified that he was responsible for identifying and documenting the two violations described in NRC Report 83-26. Tapia ff. Tr. 13752, at 2. He was also responsible for evaluating findings 23 and 24 of the programmatic audit filed by HL&P on May 25, 1984. Id.

I.4 Mr. Tapia stated as to the safety significance of the first violation noted in Issue B/D-1 (83-24-02) that it relates to a deviation from the American Society for Testing and Materials (ASTM) standard for determining the minimum density of backfill. Tapia ff. Tr. 13752, at 2-3. ASTM standard D2049-69, "Relative Density of Cohesionless Soils," requires that a funnel pouring device be used in the minimum density test for backfill samples having a maximum size of soil particle of 3/8 inch. Id. at 3. The backfill size used at STP meets this requirement; however, Bechtel, by letter dated April 6, 1983, directed Pittsburgh Testing Laboratories (PTL) to modify its test procedure to implement the use of a scoop in lieu of the required funnel pouring device. Id. The change to the scoop resulted in lower values of minimum density which in turn made it easier to satisfy the field requirement for minimum percent compaction. Id. Due to the mechanics of using a scoop rather than a funnel-pouring device, less density occurs in the test sample. Id.

I.5 In response to this inspection finding, Mr. Tapia further testified that the effects on relative density measurements of both techniques for determining minimum density were quantified. Id. at 3. It was determined that the funnel method yielded relative density measurements that were from 4 to 6 percent lower than the scoop method. Id. All affected relative density test values were reevaluated after incorporating the reduction in relative densities which would have resulted from the use of the more conservative funnel method. Id. Of 1135 test values, 185 were found to be below the 80 percent minimum relative density criteria for Category I structural backfill and four

were found to be below 70 percent. Id. One of the lower than specified test values was located directly below a Category I structure. Id.

I.6 As Mr. Tapia testified, for backfill which is not beneath a building, the most important consideration is whether the material may liquify during a seismic event and potentially adopt a fluid behavior. Tapia, ff. Tr. 13752, at 4. The four tests below 70 percent are located near the surface and away from any structure. Id. These represent the lowest density measurements. The minimum factor of safety against liquefaction after correction for the scoop method was found to be above 1.7 for all test locations. Id. This is an acceptable margin of safety against liquefaction. Id. The lower than specified relative densities are randomly located and contained within denser material. Id. Based on these factors, Mr. Tapia stated his belief that the deviation from the ASTM standard does not represent a significant degradation in the quality of the backfill material and therefore does not represent a reduction in the safety of the plant. Id.

I.7 As to the second violation, ^{3/} Mr. Tapia testified that it pertained to the Ebasco Quality Control procedure for the inspection of backfill. Tapia, ff. Tr. 13752, at 4. The procedure only required the monitoring of backfilling operations on a daily basis. Id. Based on his review of the number of in-place density tests which had to be rerun, he felt that

^{3/} The second "violation" in Issue B/D-1 is not in fact a violation but was issued by the Staff as an unresolved item (83-24-01).

the monitoring requirement was weak because such a monitoring frequency did not result in sufficient compactive effort prior to in-place density testing. Id. In addition, as a result of daily basis monitoring, only one inspection form was generated each day and it was found to be inadequate in that the specific locations of the QC inspections could not be determined. Id. Although the written procedure required only daily monitoring, Ebasco QC had, in fact, been inspecting virtually every significant lift on every workshift since safety-related backfill operations began, and was adequately monitoring placement activities. Jordan et al., ff. Tr. 13645, at 19; Tr. 13653, 13689-93 (T. Jordan). In response to the unresolved item, the procedure was modified to reflect Ebasco's actual practice (Jordan, et al., ff. Tr. 13645, at 19). No question was raised as to the adequacy of the backfill resulting from this item. Jordan et al., ff. Tr. 13645, at 19-20; Tapia, ff. Tr. 13752, at 5.

I.8 In response to Mr. Tapia's observation, the QC procedure was changed to provide increased inspection verification and documentation. Tapia, ff. Tr. 13752, at 4-5. The NRC resident inspector reviewed this item and closed it in Inspection Report No. 85-04. Id. at 4-5. Mr. Tapia stated that the technical significance of his observation was minor in that, although the procedure was weak, QC inspection was occurring. Id. at 5. More importantly, however, the acceptance of the backfill material was based on the in-situ testing of the compacted backfill. Id. Test locations were selected in an unbiased manner and gave a representative sample of field conditions. Id. Mr. Tapia stated that he believed that

the backfill placement was systematic as interpreted with engineering judgment that considers the properties of the backfill material, the construction process, and the in-place density test results. Id.

I.9 In assessing the safety significance of findings 23 and 24 of the programmatic audit, Mr. Tapia testified that: Finding 23 states that the soils inspection procedure did not provide criteria for density testing depth and finding 24 notes that the procedure did not require the test elevation to be recorded. Tapia, ff. Tr. 13752, at 5. In response to these findings, the procedure was revised to adopt depth criteria and to require that test elevations be recorded. Id. The FSAR was revised in Amendment 38 to indicate that "tests are selected such that they give representative density information for all lifts within the fill." Id. These findings are repetitions of Noncompliance No. 4 in NRC Report No. 79-19. Id. The test of backfill left the selection of the depth to the judgment of the inspector who usually removed loose material until a level, smooth, firm surface was obtained. Id. Such a testing technique was found to be satisfactory. Id. The fact that depth criteria did not exist and documentation was not occurring is of minor significance, as Mr. Tapia had previously determined in his review of the response to Noncompliance No. 4 (closed out in NRC Report No. 80-17). Id. at 5-6. Both findings have since been incorporated into the test procedure. Id. at 6. In sum, the subject violations and audit findings represent minor conditions that have not impacted the adequacy of the backfill material at STP. Id. The backfill matters addressed on this issue neither reflect an unwillingness or inability to meet regulatory requirements nor

do these matters indicate an abdication of, or refusal to accept, the responsibility for the public health and safety. Tr. 13796-97 (Tapia).

I.10 The applicants' witnesses' testimony indicated that, since variations in density with depth within lifts are small at STP, the determination of in-place density at any depth within a lift will be representative of that lift (Tr. 137325-26 (Ferris)), and that QC Inspectors vary the depth at which in-place density tests are performed, providing further assurance that representative information is being obtained (Jordan et al., ff. Tr. 13645, at 22-23). Since the judgment as to the adequacy of the STP Category I backfill is based on the overall distribution of test sample locations, rather than density variations within individual lifts, lack of information regarding the depth of samples within each lift would not cast doubt on the adequacy of the STP Category I backfill. Id. at 23; see Tr. 13793-95 (Tapia).

I.11 Ebasco had been recording lift elevations in which tests were taken. Jordan et al., ff. Tr. 13645, at 24. In any event, the applicable specification and procedure were modified to require that test depths be recorded, and the specification was modified to require Ebasco to provide test depth information to PTL. Id. at 25.

I.12 Applicants presented a panel of witnesses on Issue B/D-1 comprised of Mr. Thomas J. Jordan, HL&P's Project Qa Manager, Mr. Alfredo Lopez, Bechtel's Civil/Structural Engineering Group Supervisor for STP, and Mr. Walter R. Ferris, a geotechnical consultant to Bechtel Civil &

Minerals, Inc. Jordan et al., ff. Tr. 13645. All three applicant witnesses are qualified experts to testify on Issue B/D-1. See id. at 1-6.

I.13 Applicants' witness panel described the functions of the four organizations currently performing Category I backfill placement, testing, and inspection activities at STP. Jordan et al. ff. Tr. 13645, at 7-8. HL&P, as the licensee, is responsible for ensuring that applicable requirements are met. Id. at 7. It carries out that responsibility by providing programmatic direction and overview to Project contractors, and by performing audits, surveillance and inspections. Id. Bechtel issues design documents, approves contractors' work procedures, conducts audits and surveillance, and verifies testing of backfill material upon receipt. Id. at 8. Ebasco (Ebasco Constructors, Inc. and Ebasco Services, Inc.) places and inspects backfill and coordinates the work of the testing contractor by supervising construction work, auditing, inspection, surveillance, and through direction of testing and acceptance of testing results. Id. Pittsburgh Testing Laboratory (PTL), the testing contractor, performs the field and laboratory testing of the backfill. Id.

I.14 The applicants' soils witnesses testified that approximately 2,200,000 cubic yards of Category I backfill have been placed for STP to date. Jordan et al., ff. Tr. 13645, at 9. Of that total, almost 2,000,000 cubic yards were placed by B&R and about 200,000 cubic yards were placed by Ebasco. Id. The backfill which has been placed by Ebasco

is essentially limited to the ECW pipe trench, localized areas around the ECW intake and discharge structures, and small excavations for piping connections into buildings and for miscellaneous facilities (e.g., ductbanks, manholes, equipment) within the power block. Id. The backfill for Category I buildings within the power block of both units was placed by the previous contractor. Id. Only about 106,000 cubic yards of Category I backfill remain to be placed by Ebasco, most of which is beyond the power block. Id.

I.15 The first violative procedure referred to in Issue B/D-1 (see supra Finding I.4), relating to the use of the scoop rather than funnel, had been authorized by Bechtel to allow Pittsburgh Testing Labs (PTL) to use the method regardless of the maximum size of the particles present in the sample. Bechtel did not, however, utilize formal specification change procedures in authorizing the change. Jordan et al., ff. Tr. 13645, at 10; see App. Ex. 67, at 1.

I.16 Applicants' panel testified that in response to the Notice of Violation, PTL was directed to perform future minimum density testing in strict conformance with the ASTM standard. A review of the technical adequacy of the scoop method was initiated in order to determine the acceptability of the backfill placed during the period in which the scoop was exclusively utilized. Jordan et al., ff. Tr. 13645 at 11; see supra Finding I.5. That review demonstrated that the scoop was, in fact, a representative and consistent method for determining the minimum density of STP Category I backfill, and that the actual relative density of such

soil is more than adequate to perform its structural function, even if conservative adjustments are made to account for the lower minimum density measurements anticipated from the scoop method. Jordan et al., ff. Tr. 13645, at 11; Tapia, ff. Tr. 13752, at 3-4 (see supra Finding I.5); App. Ex. 67 at 2-5; see Tr. 13773-74 (Tapia).

I.17 In addition to HL&P's actions in direct response to the specific violation, HL&P management also initiated a comprehensive programmatic/technical audit of STP Category I backfill activities in order to ensure that such activities are being carried out in accordance with applicable requirements. Jordan et al., ff. Tr. 13645, at 11-12; App. Ex. 67 at 6.

I.18 Mr. Ferris of the applicants' panel conducted an additional analysis of the scoop method testing data using conservative assumptions to confirm the adequacy of the Category I backfill. Jordan et al., ff. Tr. 13645, at 15-16; Tr. 13700 (Ferris). Even the lowest adjusted values represented relative densities that could provide an ample margin against liquefaction; in the case of STP, there is no chance of liquefaction. Jordan et al., ff. Tr. 13645, at 16-18; Tr. 13695 (Ferris); Tr. 13718-19 (A. Lopez); Tr. 13669-72, 13695-96, 13717-18 (Ferris); See Tr. 13772-75 (Tapia).

I.19 Applicants' Exhibit 67 is an amended version of its original response to Notice of Violation 83-24-02. Tr. 13647 (T. Jordan). The principal amendment relates to the identification of six relative density values which, after adjustment for use of the scoop rather than the

funnel, fell below the 80% minimum relative density criterion and were located in areas where structures were or will be constructed. Id. Five of the adjusted test values were located in an area where the Unit 2 MEAB truck loading bay will be constructed, and one adjusted test value was located below the Unit 2 Auxiliary Feedwater (AFW) Storage Tank. Tr. 13641 (Ferris); App. Ex. 67, cover letter at 1, Attachment at 2-3. With respect to the area where the Unit 2 MEAB truck loading bay will be constructed, all five values are at elevations above the foundation of that structure, not in a distinct concentration, and have no effect on the ability of the backfill to support the bay. Tr. 13641, 13696-97 (Ferris); Tr. 13720 (Lopez); Tr. 13774, 13780-81, 13782-84 (Tapia). Furthermore, Mr. Ferris testified that the actual relative densities of two of the five points (without the application of conservative assumptions regarding differences between scoop and funnel values) meet the 80% design criteria, and that the other three are actually 75% relative density. Tr. 13704 (Ferris). Mr. Tapia concurred that even 75% relative density is satisfactory. Tr. 13777 (Tapia). With respect to the single adjusted value below the Unit 2 AFW Storage Tank, the adjusted relative density value was 78.7%. App. Ex. 67, at Attachment, p.3; Tr. 13775 (Tapia). That value was determined to pose no problem of differential settlement, bearing failure, or cracking of the tank, and did not affect the witnesses' conclusions regarding the adequacy of the backfill. Tr. 13726-29 (Ferris, Lopez); Tr. 13775-78 (Tapia).

I.20 On the basis of the above findings of fact on Issue B/D-1, and in the absence of any evidence to the contrary adduced by CCANP, the Board

concludes that there is reasonable assurance that the backfill placed at STP by Ebasco is in conformity with the construction permit and the Commission regulations.

J. Current Competence: Update of Conclusions in Staff's and Applicants' Affidavits/Motions for Summary Disposition

J.1 In the Phase I Partial Initial Decision, the Board noted that because of the recent replacement of B&R by Bechtel and Ebasco, the favorable findings therein with regard to the competence of HL&P and its new contractors could only be preliminary. LBP-84-13, 19 NRC 659, at 697 (1984). To enhance the record concerning the on-the-job performance of the new contractors, as well as the up-to-date performance of HL&P, this Board required a report to it by the Staff concerning the performance of HL&P, Bechtel, and Ebasco at STP since the close of the Phase I record. Id. The other parties were also invited to supplement or comment upon that Staff report or provide their own reports. Id.

J.2 The Staff filed a joint affidavit of William A. Crossman, Johns P. Jaudon, and Dan P. Tomlinson on December 21, 1984 (corrected on January 24, 1985) in response to the aforementioned Board directive. The Applicants filed a joint affidavit of Mark R. Wisenburg and James E. Geiger on February 22, 1985. Intervenor CCANP filed only a response to the Staff affidavit on February 25, 1985.

J.3 The CCANP response failed to identify specific issues regarding the purported competence of HL&P or its contractors. In that response,

however, Intervenor also stated that certain Staff documents had not been made available to it. In light of these statements and in order to be sure that intervenor understood its obligation to identify issues for hearing, a telephone conference call was held among the Board members and parties on April 4, 1985. In that call, the Board ordered that the Staff and Applicants' affidavits be deemed motions for summary disposition and CCANP was given a further opportunity to raise genuine issues of material fact on this aspect of the current competence issue for Phase II. CCANP filed its response on April 25, 1985 and oral argument on the designated motions (affidavits) was held at the Prehearing Conference on April 30 - May 1, 1985. See Tr. 10866 et. seq.

J.4 In the Sixth Prehearing Conference Order of May 17, 1985, at 7-9, (unpublished), the Board ruled that CCANP had not set forth any particular matters that raised material questions of fact about the conclusions set forth in either of the affidavits. The Board concluded that the particular deficiencies or questions raised by CCANP, either collectively or individually, would not present significant questions concerning the competence of HL&P or its new contractors. The Staff was directed, however, that its witnesses were expected to be able to evaluate (generally) the competence of HL&P and its new contractors (as compared to September, 1981) and to update its previous conclusions contained in the SALP Report (I&E Report 83-26) and the Regional

Administrator's letter of June 22, 1984. Sixth Prehearing Conference Order, at 9. ^{4/}

J.5 In response to this updating directive, the Staff offered the testimony of Eric Johnson, George L. Constable, Claude Johnson, Dan Paul Tomlinson, Donald L. Garrison, and Danny R. Carpenter. Mr. Eric Johnson is Acting Deputy Director of the Division of Reactor Safety and Projects, NRC Region IV. He is responsible for managing the NRC inspection program at STP through Mr. Constable, the Chief, Reactor Project Section, Region IV. Johnson and Constable, ff. Tr. 14846, at 2-3. Mr. Claude Johnson, Mr. Garrison and Mr. Carpenter are the NRC Resident Inspectors at STP. Johnson, ff. Tr. 15118, at 1; Garrison, ff. Tr. 15110, at 1; Carpenter, ff. Tr. 15114, at 1. Mr. Tomlinson was the NRC Senior Resident Inspector at STP from September 1983 to February 1985. Tomlinson, ff. Tr. 15112, at 1.

J.6 Pursuant to the Board's Order, the NRC Region IV management witnesses provided their testimony as an update to the general conclusion of the SALP Report (83-26) and the Regional Administrator's letter of June 22, 1984. Johnson/Constable, ff. Tr. 14846, at 11-12. The Regional Administrator's letter of June 22, 1984 had stated that "the overall regulatory performance by Houston Power and Lighting Company at the South

^{4/} The original reference to the Administrator's letter on page 9 of the Sixth Prehearing Conference Order was corrected by the Board in its Errata, issued June 14, 1985 (unpublished).

Texas Project has been satisfactory" for the period December 1, 1982 through November 30, 1983. Id. at 12. The current views of the NRC Region IV staff indicate that the applicant continues to improve in performance since the last SALP period, and the performance is indicative of a high degree of management involvement in all site activities. Id. Messrs. Johnson and Constable cited the testimony of Senior Resident Inspector Claude Johnson, Resident Inspector Danny R. Carpenter, and past Senior Resident Inspector Dan Tomlinson in support of this view. Id. (See infra Finding J.7.) The witnesses testified that the NRC Staff is currently preparing a SALP Report for the period of December 1, 1983 to June 30, 1985. Id. Preliminary discussions with the inspectors involved in this effort support the above general conclusion. Id. This SALP Report (No. 85-12) has since been issued, on September 12, 1985.

J.7 There has been observed by the NRC Staff resident inspectors at STP a steady increase in the involvement of HL&P in most of the activities associated with design, construction, and preparation for start-up and operation of STP. Carpenter, ff. Tr. 15114, at 3; Tomlinson, ff. Tr. 15112, at 2-3. Key people have been added to the management and supervision team who bring extensive experience to the project. Id. Within HL&P and its contractors, there has been an ongoing effort to assure an effective management and supervisory cadre, through reassignment, so that the project is completed in a quality manner. Id.; Tomlinson, ff. Tr. 15112, at 2-3; Tr. 15175 (C. Johnson). Mr. Carpenter testified that he had observed numerous meetings of both upper management

and supervision to address safety and/or quality concerns. Id. These concerns, whether raised by the NRC inspectors, craftsman, supervisors, or through industry information, appear to receive the same acceptable level of attention. Id.; Tomlinson, ff. Tr. 15112, at 2-3; C. Johnson, ff. Tr. 15118, at 2-3; Tr. 15165 (Tomlinson).

J.8 On April 1, 1985, HL&P established a Project Compliance Group (PCG) comprised of multidiscipline individuals from both HL&P and its contractors. Carpenter, ff. Tr. 15114, at 3; C. Johnson, ff. Tr. 15118, at 2. The function of this group is to be the primary interface with resident and visiting NRC inspectors. Carpenter, id. Its goal is to close all NRC staff open items related to the construction and start-up of STP, Unit 1, prior to issuance of the operating license, per the project schedule. Id. The PCG is designed to ensure that closure documentation packages are developed, verified, and presented to the NRC in a timely manner. Id. The PCG will interface with responsible groups and individuals within HL&P, Bechtel, Ebasco, and Westinghouse to obtain required information and documentation and it will keep project management apprised of the status of all open items, including closure progress and potential problem areas as they arise. Id. at 3-4. The development of the PCG and its performance to date is an example of the commitment and increased attention to the construction and safety of the STP. Carpenter, ff. Tr. 15114, at 4; see C. Johnson, ff. Tr. 15118, at 2; 15179-80 (Johnson).

J.9 The Board questioned the Staff panel specifically about the materials control area, which had been rated a "3" in the SALP Report. Mr. Carpenter testified that corrective actions had been taken by Applicants in the areas of marking of materials, control of materials and the warehouse area, and expressed the opinion that Applicants have taken appropriate corrective action. Tr. 15177-78 (Carpenter). Mr. Garrison also expressed the view that Applicants have an acceptable level of competence. Tr. 15164 (Garrison). In response to Board questions, Mr. C. Johnson indicated that there were no additional specific areas in which improvements were needed. Tr. 15174-75 (C. Johnson); see Tr. 15180 (Carpenter). Mr. C. Johnson stated that if he had to assign a SALP rating to HL&P's current overall level of performance, he would assign a high rating, between "1" and "2". Tr. 15174, 15185 (C. Johnson).

J.10 Intervenor makes no attempt in its Phase II Proposed Opinion or Findings to challenge the testimony of the Staff witnesses on these specific current competence matters which the Board had directed the Staff to update. CCANP's arguments on the current competence issue focus on different aspects of that issue and have been addressed herein elsewhere. See Intervenor's Proposed Opinion, at 50 (II.80) and Proposed Findings III.213-216.

J.11 On the basis of the Staff's report and the uncontradicted testimony of the NRC Staff Witnesses, the views expressed in our Phase I PID of March 14, 1984, LBP-84-13, 19 NRC 659, at 694-697, need no longer be considered to be preliminary. Accordingly, based on the total record in

Phase I and Phase II, we now conclude that the HL&P, Bechtel and Ebasco QA/QA organizations and practices meet the requirements of 10 C.F.R. Part 50, Appendix B, and that there is reasonable assurance that the QA program for STP will be implemented so that construction of the STP will be completed in conformance with the construction permits and other applicable requirements.

II. CONCLUSIONS OF LAW

On the basis of the Findings of Fact made herein and upon consideration of all the testimony and documentary evidence of record adduced at the Phase I and Phase II hearings in this proceeding as well as the consideration of the proposed findings submitted by the parties, this Board reaches the following conclusions of law:

(1) There is no basis for concluding that HL&P lacks the requisite managerial competence or character, as those terms are used in the Atomic Energy Act, as amended (42 U.S.C. § 2232(a)), and the Rules and Regulations of the Commission, to preclude the eventual award of operating licenses for STP;

(2) The commissioning, reviewing, and reporting by HL&P of the 1981 study performed for HL&P by Quadrex Corporation, "Design Review of Brown and Root Engineering Work for the South Texas Project" (the Quadrex Report), was in accord with Commission regulations (10 C.F.R. § 50.55(e)) (with the isolated exceptions of two deficiencies reported late) and provides no basis for finding a defect in managerial character or competence on the part of applicants;

(3) While the applicants did not meet their obligation under the relevant Commission case law to bring the Quadrex Report to the attention of the adjudicatory boards promptly (Duke Power Co. (McGuire Station, Units 1 & 2), ALAB-143, 6 EAC 623 (1973); see Metropolitan Edison Company (Three Mile Island, Unit 1), ALAB-774, 19 NRC 1350 (1984); Tennessee Valley Authority (Browns Ferry Plant, Units 1, 2, and 3), ALAB-677, 15 NRC 1387 (1982); Georgia Power Company (Vogtle Plant, Units 1 & 2), ALAB-291, 2 NRC 404 (1975)), this failure forms an inadequate basis upon which to disqualify applicant from receiving an operating license;

(4) The applicants' notification to this Board of its decision to replace the architect-engineer and constructor at STP was made promptly and in accordance with its obligations under the McGuire doctrine;

(5) The competence of HL&P and its present architect-engineer and constructor to design and construct a safe nuclear plant has now been established in the record (see LBP-84-13, 19 NRC 659, at 697) and no deficiencies have been identified which preclude this Board from making the findings required by 10 C.F.R. § 50.57(a)(1) and (2);

(6) The Conclusions of Law reached by this Board in our Phase I PID (LBP-84-13, 19 NRC 659, at 831-32) are further supported by the record in Phase II and no basis exists for any change in those Conclusions.

III. ORDER

WHEREFORE, IT IS ORDERED, in accordance with 10 C.F.R. §§ 2.760, 2.762, 2.785, and 2.786, that this Partial Initial Decision shall become effective and shall constitute, with respect to matters covered herein, the final action of the Commission thirty (30) days after the date of issuance hereof, subject to any review pursuant to the above cited rules.

Exceptions to this Partial Initial Decision may be filed by any party within ten (10) days after service of this Partial Initial Decision. Within thirty (30) days thereafter (forty (40) days in the case of the Staff) any party filing such exceptions shall file a brief in support thereof. Within thirty (30) days of the filing and service of the brief of the appellant (forty (40) days in the case of the Staff), any other party may file a brief in support of, or in opposition to, the exceptions.

IT IS SO ORDERED.

FOR THE ATOMIC SAFETY AND LICENSING
BOARD

Charles Bechhoefer, Chairman,
Administrative Judge

Dr. James C. Lamb, Administrative
Judge

Frederick J. Shon, Administrative
Judge

Dated at Bethesda, Maryland
this _____ day of _____ 198__

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

DOCKETED
USNRC

'85 NOV 21 P3:48

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
HOUSTON LIGHTING AND POWER COMPANY,)
ET AL.)
(South Texas Project, Units 1 & 2))

Docket Nos. 50-498
50-499

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF'S PROPOSED FINDINGS OF FACT AND CONCLUSIONS OF LAW" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 19th day of November, 1985.

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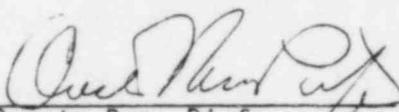
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