

and precriticality testing, (2) the status of procedures to be used in conducting the fuel load and precriticality testing activities, and (3) the K_{eff} to be permitted during precriticality testing, as well as the projected K_{eff} if all control rods were inadvertently removed.

II. BACKGROUND

On August 7, 1984 Applicants filed their "Motion for Authorization to Issue a License to Load Fuel and Conduct Certain Precriticality Testing" ("Applicants' Motion"), together with the supporting affidavit of Edward Alarcon ("First Alarcon Affidavit"), which described how fuel will be loaded at CPSES, the testing to be conducted, and the safeguards at CPSES to prevent inadvertent criticality. The Staff and Intervenor CASE subsequently filed responses to the Applicants' Motion. See NRC Staff Response to Applicants' Motion for Authorization to Issue License to Conduct Fuel Load and Precriticality Testing (August 22, 1984); CASE's Partial Answer in Opposition to Applicants' Motion for Authorization to Issue a License to Load Fuel and Conduct Certain Precriticality Testing (August 18, 1984). Shortly thereafter, the Board issued its "Memorandum (Request for Evidence Relevant to Fuel Loading)" (August 24, 1984) ("Fuel Load Order"), in which the Board stated that 10 C.F.R. § 50.57(c) required the Board to make the findings listed in 10 C.F.R. § 50.57(a) "with respect to the contested activity sought to be authorized." Fuel Load Order, p.1. Four plant systems were identified by the Board as

relevant to the proposed fuel load and testing activities. ^{2/} Fuel Load Order, pp. 1-2. The Board indicated that in light of the broad scope of Contention 5, it would require evidence on:

-the current status of QA/QC oversight of these systems, including evidence that documentation is adequate to assure that unsatisfactory or non-conforming conditions have been corrected and evidence concerning whether or not there are allegations known to the Applicants or Staff about the intimidation of QA/QC personnel who were working on these systems.

Fuel Load Order, p.2.

Evidence that "QA/QC procedures" have been completed for all phases of the fuel load and precriticality testing activities was also identified by the Board as being necessary for its consideration of Applicants' Motion. Finally, the Board stated it would need evidence concerning the maximum K_{eff} to be permitted during testing, the predicted K_{eff} if all control rods were removed while boron was maintained in the reactor at 2000 ppm, and the safeguards to ensure that non-borated water would not be injected into the reactor core, thereby substantially diluting the boron below 2000 ppm. Fuel Load Order, p. 2.

In response to the Board's Fuel Load Order, Applicants submitted their September 13, 1984 Supplement.

^{2/} The four plant systems identified by the Board are: (1) boron addition and monitoring equipment; (2) neutron monitoring equipment sufficient to detect significant increases in K_{eff} above 0.95; (3) fuel handling equipment; and (4) reactor protection systems.

III. DISCUSSION

A. Risk to Public Health and Safety Posed by the Proposed Fuel Load and Precriticality Testing Activities

Applicants state that the proposed fuel load and precriticality testing activities which they seek authorization to conduct ^{3/} will not present a significant risk to public health and safety, since such risk can only occur when fission products can be released to the environment. Applicants point out that fission products, which are the by-products of the fission process in the reactor core following criticality, are produced in hazardous amounts only after critical operation at "significant power levels." Applicants' Motion, p. 7; First Alarcon Affidavit, pp. 13-14. Since CPSES Unit 1 will not be allowed to reach criticality, no "significant radioactive fission products will be contained in the reactor core or systems at CPSES during the contemplated activity." Id. Accordingly, Applicants conclude that "systems to prevent or mitigate the consequences of postulated accidents, while operable and available, need not be called upon to function." First Alarcon Affidavit, pp. 13-14; Applicants' Motion, p. 7. Decay heat removal is not required, in the Applicants' view, since no decaying fission products will exist to generate heat. First Alarcon Affidavit, p. 14. Finally, Applicants state that if cooling were lost, "plant safety and pressure boundary integrity will not be compromised." Id. On the basis of these factors,

^{3/} These activities are described in some detail in the First Alarcon Affidavit, pp. 2-9.

Applicants conclude that initial fuel loading and precriticality testing do not pose a threat to the health and safety of the public. First Alarcon Affidavit, p.14; Applicants' Motion, pp. 7-8.

The Staff agrees with Applicants that the accidental release of fission products to the environment is the primary risk to the health and safety of the public. See Pacific Gas and Electric Co. (Diablo Canyon Nuclear Power Plant, Units 1 and 2), CLI-83-27, 18 NRC 1146, 1149 (1983). The Staff also agrees with Applicants ^{4/} that critical operation of the reactor core at significant power levels is required to generate fission products in hazardous amounts. If criticality is not attained for the CPSES Unit 1 reactor core, there will be no production of fission products, and consequently a major component of the risk to public health and safety will not exist. Id.

In response to questions posed by the Board in its Fuel Load Order, Applicants offered additional affidavits: (1) demonstrating that the reactor would be substantially subcritical with 2000 ppm soluble boron in the primary system, even if all control rods were withdrawn, (2) indicating why a boron dilution event is unlikely, and (3) indicating that all needed startup procedures are or will be properly ready for use in time for fuel loading and precritical testing.

Applicants stated that the maximum K_{eff} is established by the Technical Specifications as .990 during cold shutdown (coolant temperature less than or equal to 200°F), and .894 at temperatures greater than

^{4/} First Alarcon Affidavit, p. 13.

200°F. ^{5/} Applicants also stated that during refueling, the proposed Technical Specifications require maintenance of boron concentration to assure the more restrictive of the following two conditions: (1) K_{eff} of .950 or less, or (2) boron concentration equal to or greater than 2000 ppm. Second Alarcon Affidavit, pp. 2-3. Applicants also calculate that K_{eff} would be 0.932 at a worst-case coolant temperature of 69°F and a 2000 ppm boron concentration, even if all control rods were fully withdrawn. ^{6/} Second Alarcon Affidavit, pp. 3-4.

Applicants also provide an explanation of how boron concentrations are maintained in the Reactor Cooling System ("RCS"), and why it is unlikely that the boron dilution event would be "initiated and continue until a K_{eff} of .990 is exceeded." See First Alarcon Affidavit, pp. 9-12; Second Alarcon Affidavit, pp. 4-9.

As set forth in the "Affidavit of Walton L. Jensen, Jr." ("Jensen Affidavit") the Staff agrees that the only potential safety concern is accidental criticality associated with boron dilution events. Jensen Affidavit, Paragraph 4. To ensure that inadvertent criticality during initial fuel loading will not occur, the Staff will require that the more restrictive of the following conditions be met: (1) K_{eff} of .950 or less; (2) boron concentration of 2000 ppm or greater. Affidavit of Marvin Duenefeld Regarding Maintenance of Subcriticality ("Duenefeld Affidavit"),

^{5/} The Second Alarcon Affidavit referenced a K_{eff} of .984. On September 25, 1984, Mr. Alarcon submitted an affidavit which stated that the proper K_{eff} should be .894.

^{6/} Applicants set forth several reasons why withdrawal of all control rods during precriticality testing would be unlikely. Second Alarcon Affidavit, pp. 3-4.

Paragraph 3. At CPSES, the 2000 ppm boron concentration requirement is more restrictive. Id. The 2000 ppm boron concentration will prevent criticality even if all the control rods were withdrawn, and the coolant was at a 68°F temperature (K_{eff} increases and temperature decreases). Even in this circumstance, Applicants predict a K_{eff} of .932. Dunenfeld Affidavit, Paragraph 4. Mr. Jensen points out only five systems/components are necessary to prevent or mitigate the effects of an inadvertent boron dilution event. These are: (1) the chemical and volume control system suction valving, (2) the Refueling Water Storage Tank, (3) the source range instrumentation, (4) certain portions of the reactor protection system, and (5) the electrical power system. Jensen Affidavit, Paragraph 8.

Twenty-one initial startup procedures ("ISU procedures") have been identified by the Applicants as the basic procedures which will govern the conduct of fuel loading and precriticality testing.^{7/} Deviney Affidavit, pp. 1-2; Applicants' Supplement, pp. 5-6. By Applicants' count, all but two of the ISU procedures (viz., ISU-008A, Thermal Expansion; ISU-009A, Simulated Rod Control System Test) have been prepared, received, and have received final approval. The remaining two procedures have been prepared, are currently undergoing final review, and must be approved prior to fuel load. Deviney Affidavit, pp. 1-2. Applicants state that ISU procedures are prepared by test engineers in coordination with operations and QA personnel, and are independently reviewed by the Station Operations Review Committee ("SORC"), and the NRC Staff, as well

^{7/} The twenty-one (21) ISU procedures are listed by number and title in Attachment B to the affidavit of Mr. Deviney.

as Westinghouse (only for those procedures involving the nuclear steam supply system). Id., p. 2.

Applicants also represent that other plant procedures which are referenced in, or provide support to, the ISU procedures have undergone review and have been approved. These support procedures include System Operations Procedures, Nuclear Engineering Procedures, and Maintenance and Surveillance Procedures. Deviney Affidavit, p. 2.

Finally, Applicants state that QC inspection and QA surveillance and audit procedures have been prepared, reviewed, and approved, and are "currently in service." Deviney Affidavit, p. 2. Based upon their review, Applicants conclude that "virtually all QA/QC procedures relating to fuel load and precriticality testing are currently available for use. The remaining few are currently in the approval cycle and will be available in time to support fuel load and precriticality testing activities." Deviney Affidavit, p. 3.

As set forth in the Affidavit of Dennis L. Kelley ("Kelley Affidavit"), the Staff agrees that Applicants' list of ISUs represents a complete list of ISUs relevant to fuel load and precriticality testing, with the addition of the following procedures: ISU-282A, Shielding and Penetration Cooling System Performance; and ISU-300A, Prefuel Load Initial Startup Test Sequence. Kelley Affidavit, Paragraph 3. The Staff has conducted selected inspections of these procedures and has not identified any significant deficiencies. Id.

With regard to the Applicants' QA Program for Operations, and their preoperational testing activities, the Staff has completed an inspection in accordance with the NRC inspection program. While several

deficiencies were identified, none were in the initial startup testing program. Kelley Affidavit, Paragraph 4. With respect to preoperational testing of equipment and systems identified in Appendix B to Mr. Vega's affidavit, the Staff has completed its review and has identified no major deficiencies. Staff review of the preoperational test results are currently in progress. The Staff has begun its inspection of some of the support procedures. Kelley Affidavit, Paragraphs 4-6.

The Licensing Board has requested the Staff to respond to five concerns relating to quality assurance during startup testing. Memorandum (Request for Evidence Relevant to Fuel Loading), October 1, 1984). The Staff has begun to look into the Board's questions. Until its review is complete, the Staff cannot state with assurance that these matters may not reflect adversely on Applicants' startup quality assurance and thus reflect on Applicants' quality assurance for operations during fuel loading and precritical testing activities.

B. Findings Required to Authorize Fuel Loading and Precritical Testing Pursuant to 10 CFR 50.57(c)

Although the Applicants have made a substantial showing (certain aspects of which are still being considered by the Staff) that fuel loading and precritical testing may be authorized without endangering public health and safety, that does not automatically satisfy the procedural requirements for authorization of a low power license pursuant to 10 C.F.R. 50.57(c). ^{8/}

^{8/} The Staff's earlier response, dated August 22, 1984 briefly described the procedural provisions of 10 CFR 50.57(c).

In the Shoreham proceeding, applicant requested a low power license pursuant to 10 C.F.R. 50.57(c), although there were issues in controversy about the adequacy of its onsite power supply system. The presiding Licensing Board had set up a hearing schedule based on a ruling that "[i]f the evidence shows that the protection afforded to the public at low power levels without the diesel generators required for full power operations, is equivalent to (or greater than) the protection afforded to the public at full power operations with approved generators, then LILCO'S motion should be granted". ^{9/} After reviewing of this order, the Commission directed the parties to address a number of questions including the "legal basis for holding that General Design Criterion 17 is not applicable for low power operation." ^{10/} The Commission subsequently held that "10 C.F.R. 50.57(c) should not be read to make General Design Criterion 17 inapplicable to low power operation". The Commission went on to discuss the requirements for exemptions under 10 CFR 50.12(a). ^{11/}

Although LILCO's motion encompassed a four phase program of activities ranging from fuel loading, precritical testing, through low power testing operation, CLI-84-8 addressed only low power operation without distinguishing among the four phases in the applicant's

^{9/} Memorandum and Order Scheduling Hearing on LILCO's Supplemental Motion for Low Power Operating License, p. 7, Long Island Lighting Co. (Shoreham Nuclear Generating Plant, Unit No. 1) Docket 50-322-OL-4 (April 6, 1984).

^{10/} Long Island Lighting Co. (Shoreham Nuclear Generating Plant, Unit No. 1) Docket 50-322-OL-4, (April 30, 1984) (Commission Order).

^{11/} Long Island Lighting Co. (Shoreham Nuclear Generating Plant, Unit No. 1), CLI-84-8, May 16, 1984.

program. ^{12/} The Staff has subsequently taken the position that the Commission holding in CLI-84-8, requiring compliance with applicable Commission regulations or requests for exemptions, was applicable to earlier phases in low power activities, including fuel loading and precritical testing (Phase I activities). ^{13/}

In part relying on the Staff position, the presiding Atomic Safety and Licensing Board granted Summary Disposition on certain statements of fact, but denied LILCO's motion for summary disposition with respect to ultimate issue authorizing fuel loading and critical testing. ^{14/} The applicant subsequently requested the Commission to order directed certification to provide further clarification of whether CLI-84-8 was intended to apply to fuel loading, precritical testing, and to cold critical testing. ^{15/} In its response the Staff agreed with LILCO that further

^{12/} Further, it should be noted that CLI-84-8 did not explicitly address regulations other than GDC 17; however, the Staff has applied the holding of CLI-84-8, requiring compliance with applicable regulations or requests for exemptions, to other provisions of 10 C.F.R. Part 50, including 10 C.F.R. Part 50, Appendix J.

^{13/} NRC Staff Response to LILCO Motions for Summary Disposition of Phases I and II. Long Island Lighting Co. (Shoreham Nuclear Generating Plant) Docket 50-433-OL-4 (June 13, 1984). See also NRC Staff Response (August 17, 1984), cited in note 16 below.

^{14/} Order Granting in Part and Denying in Part LILCO's Motions for Summary Disposition on Phase I and Phase II Low Power Testing, Long Island Lighting Co. (Shoreham Nuclear Generating Plant) Docket 50-322-91-4 (July 24, 1984).

^{15/} LILCO's Motion for Directed Certification of the Licensing Board's July 24, 1984 Order Granting in Part and Denying in Part LILCO'S Motions for Summary Disposition on Phase I and Phase II low Power Testing, Long Island Lighting Co. (Shoreham Nuclear Generating Plant) Docket 50-322-OL-4 (August 2, 1984).

Commission guidance would be beneficial and supported LILCO's requests for Commission consideration of these matters. ^{16/} That request is still pending before the Commission.

The Licensing Board in Shoreham subsequently reconsidered its July 24, 1984 Order and decided to grant Summary Disposition authorizing fuel loading and cold critical testing (phases I and II) "because no onsite or offsite AC power is necessary to perform the safety functions needed to protect the public health and safety." The Licensing Board interpreted CLI-84-8 as implicitly containing a "rule of reason." ^{17/} Recently, on October 29, 1984 the Licensing Board in Shoreham issued an Initial Decision authorizing the exemption from GDC-17 requested by LILCO for all four phases of LILCO's fuel loading, critical testing and low power testing program. In the Initial Decision, the Board indicated that with respect to its Summary Disposition of Phases I and II, the Board "simply took the original requirements on GDC-17 as set forth in the regulations and applied a rule of reason in its interpretation as a matter of simple logic and common sense. ^{18/}

^{16/} NRC Staff Response to LILCO'S Motion for Directed Certification of Licensing Board's Order Ruling on LILCO's Motion for Summary Disposition of Phases I and II, p.4, Long Island Lighting Co. (Shoreham Nuclear Generating Plant, Unit No. 1) Docket 50-322-OL-4, (August 17, 1984). See also p.5, n.4 relating to a similar position taken by the Staff in connection with Catawba.

^{17/} Order Reconsidering Summary Disposition of Phase I and Phase II Low Power Testing, Long Island Lighting Co. (Shoreham Nuclear Generating Plant) Docket 50-322-OL-4 (September 5, 1984), pp. 8-10.

^{18/} Initial Decision, Long Island Lighting Co. (Shoreham Nuclear Generating Plant) Docket 50-433-OL-4, ASLBP 77-347-OIC-OL (October 29, 1984), p.17.

This is the only adjudicatory interpretation of CLI-84-8. However, as noted above LILCO's earlier request for further Commission guidance on this matter is still pending before the Commission. If the Commission guidance warrants a different Staff position, the Staff will promptly notify the Board and the parties.

C. Status of Record With Respect to Required Findings

In response to the Board's Fuel Load Order, Applicants have identified ten systems/equipment groupings that may be called upon to function to protect public health and safety during fuel load and precriticality testing. ^{19/}

Applicants state that they reviewed the status of QA/QC oversight on the ten systems, and found that QC inspections (including in-process, final, as-built verification, and ANI inspections) were performed on "the

^{19/} The ten systems/equipment groupings, as listed in Attachment B to the affidavit of Mr. Antonio Vega, are:

- ° Boron Addition and Monitoring
 1. Process Sampling System
 2. Chemical and Volume Control System and Refueling Water Storage Tank
 3. Reactor Coolant System
 4. Residual Heat Removal
- ° Reactor Monitoring
 1. Nuclear Instrumentation
- ° Fuel Loading Equipment
 1. Fuel Handling and Vessel Servicing Equipment
 2. Cranes and Hoists
- ° Reactor Protection System
 1. Reactor Protection System
 2. Analog Control System
 3. Rod Control Equipment

necessary mechanical, electrical and instrumentation components of these systems." Vega Affidavit, p. 2; Applicants' Supplement, pp. 2-3. Extensive testing, including (as applicable) hydrostatic tests, prerequisite and preoperational tests ^{20/}, were conducted on the ten systems, according to Applicants. Non-conforming and unsatisfactory conditions identified during these inspection and testing activities have been documented in an appropriate manner (e.g., through the use of NCRs, IRs, or TDRs), and are included in a computerized tracking system which is administered by the Applicants' startup organization. Vega Affidavit, p. 3. Applicants' review of the Startup Testing System indicated that all outstanding nonconformances and unsatisfactory conditions are scheduled to be completed prior to fuel load. Id., pp. 3-4. Thus, Applicants conclude that these outstanding items will be satisfactorily resolved "on a schedule to support fuel load and precritical testing activities in a manner which assures the health and safety of the public." Id., p. 4. Applicants contend that there are no "specific allegation[s]" about intimidation of QA/QC personnel related to any of the ten systems based upon a review of Quality Assurance Investigation files, QA Hotline files, a review of the record on intimidation, and discussions between Mr. Antonio Vega, the Site QA Manager, and personnel in the QC organization. Id., pp. 4-5.

Attachment B to Mr. Vega's affidavit lists the major systems/equipment groupings which will be operated during fuel loading and precriticality testing. While not all of these systems are essential to prevent

^{20/} The preoperational tests that have were conducted are listed in Attachment C of Mr. Vega's affidavit.

accidental boron dilution (Jensen Affidavit, Paragraph 8), the systems identified by Mr. Vega may be called on to function during the proposed fuel loading and testing activity. Id. Moreover, a large number of other system equipment groups and components which will be operated during the proposed activities as backup and as required support systems. Mr. Jensen identifies 14 equipment groups that support the 4 systems identified by the Board's Order of August 24, 1984. Jensen Affidavit, Paragraph 9.

Further perspective on systems "relevant" to the proposed precritical testing is provided by the Technical Specifications governing such testing. As indicated in the "Affidavit of Spottswood B. Burwell," the proposed precritical testing would be covered by the provisions applicable to Mode 3. ^{21/} The current draft of the Technical Specifications would require a larger number of systems to be operable in Mode 3 than the number discussed by Messrs. Vega and Jensen. (Mr. Burwell notes that the current draft of the Technical Specifications is subject to modification). Mr. Deviney also notes that "appropriate Technical Specification requirements must be met for applicable plant operational mode." Deviney Affidavit, p.2.

Even for the more limited scope of systems identified by Messrs. Vega and Jensen, the Staff points out that there are factual matters in controversy with respect to many of these relevant systems, such as the Walsh-Doyle

^{21/} As indicated in Mr. Burwell's affidavit, the Mode 3 specifications would govern the hot precritical testing activities under the proposed fuel loading and precritical testing license, but a license limitation of .950 k_{eff} or 2000 ppm minimum boron concentration would supersede the proposed Technical Specification limit of .990 k_{eff} in Mode 3. Burwell Affidavit, Paragraph 5.

issues with respect to pipe supports. These matters also raise questions with respect to basic design quality assurance. Burwell Affidavit, Paragraphs 3-4. Similarly, the Cygna IAP Report is relevant to some of these systems as well as to the basic design quality control and assurance issues. The CAT Report issues, as to which the evidence has been completed but there has yet been no Board decision, also involved certain relevant systems, including the electrical and instrumentation cabling. There are also many issues under review by the TRT which affect systems relevant to fuel loading and precritical testing. Moreover, considering this broad scope of relevant systems, there are a number of intimidation issues which must be considered for the Board to determine compliance with Commission regulations. ^{22/}

Even if consideration were limited to only the systems identified by Mr. Vega, there are matters of factual dispute among the parties, at least with respect to some of these systems, which are currently open in the proceeding. For example, the Walsh/Doyle concerns regarding piping and piping support design appear to bear on the adequacy of the CVCS, RCS and RHR systems. Burwell Affidavit, Paragraph 3. The Cygna IAP Report identified concerns relating to cable tray supports, which may affect consideration of the adequacy of electrical circuits associated with the nuclear instrumentation, reactor protection, analog control, and rod control systems. For these matters the Board must make findings that

^{22/} The Staff also notes that there was a Board inquiry into the Applicants' follow-up of the polar crane shims, as well as an allegation about a nonconforming condition on the polar crane rail which was raised by Mrs. Stiner.

the relevant systems comply with Commission regulations with respect to the design and QA issues in contention.

The Board has already established a procedure for resolving the design and quality assurance issues as expeditiously as Staff evidence becomes available. Applicants have filed summary disposition motions and have recently provided further supplementary materials. The Staff responses are now in the process of preparation and will be provided over the next three month period, with CASE's response to be completed within the same time frame. See NRC Staff Report to the Licensing Board on Status and Schedule for Addressing Hearing Issues (October 19, 1984), pp. 5-6.

In view of the foregoing, the Staff concludes that it would be more expeditious to continue to complete the ongoing evidentiary presentation of design and quality assurance issues, and make any necessary full power or low power findings on the basis of such evidence, rather than to undertake another separate and parallel evidentiary consideration of these same design and quality assurance issues, but limited to fuel loading and precritical testing.

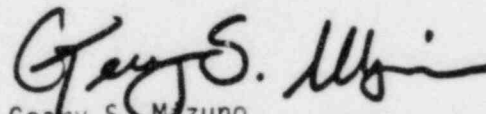
IV. CONCLUSION

Although the Staff would not object to Applicant's request for a fuel loading and precriticality testing license, upon completion of necessary evidentiary presentations to enable the Board to determine that the activity will be conducted safely and complies with applicable Commission regulations with respect to all systems relevant to the requested

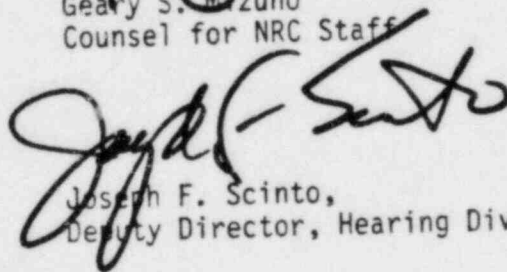
activity, we believe that the Board already has established procedures for resolution of these issues for the hearing as a whole.

In view of the wide scope of relevant systems and the need to determine that these systems comply with Commission regulations, the Board should proceed with the resolution of the factual issues now in dispute in the proceeding, rather than to attempt to interject new separate consideration of the systems relevant to fuel loading and precritical testing only. The Staff is proceeding as rapidly as possible to complete its review of the outstanding issues in this proceeding and is opposed to actions which would tend to delay or to divert resources from the ultimate resolution of the issues in this proceeding. To attempt to separately resolve the issues raised by the Applicants' Motion could have this effect.

Respectfully submitted,



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Dated at Bethesda, Maryland
this 2nd day of November, 1984