



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NOS. 109 AND 72 TO FACILITY OPERATING  
LICENSE NOS. NPF-39 AND NPF-85  
PHILADELPHIA ELECTRIC COMPANY  
LIMERICK GENERATING STATION, UNITS 1 AND 2  
DOCKET NOS. 50-352 AND 50-353

1.0 INTRODUCTION

By letter dated July 28, 1995, the Philadelphia Electric Company (the licensee) submitted a request for changes to the Limerick Generating Station, Units 1 and 2, Technical Specifications (TS). The requested changes would modify TS Surveillance Requirements 4.9.1.1, 4.9.1.2, 4.9.3, 4.9.5, and 4.9.8 to delete specific requirements to perform surveillances just prior to beginning or resuming core alterations or control rod withdrawal associated with refueling activities. This proposed TS change also requests that the phrase "incore instrumentation" be deleted from the footnote in TS Section 3/4.9.5, "Communication." These proposed TS changes are consistent with criteria delineated in NUREG-1433, "Standard Technical Specifications, General Electric Plants, BWR/4," dated September 28, 1992.

2.0 EVALUATION

The current LGS TS, Units 1 and 2, require that during refueling operations, certain surveillance tests be performed just prior to beginning or resuming core alterations or control rod withdrawal, in addition to other periodic surveillance requirements. The surveillance tests were required because the industry had limited operational experience regarding the reliability of the interlocks. Operating experience has demonstrated that these circuits are very reliable and not prone to failure, thus, the surveillances can be reduced. The proposed TS amendments delete specific requirements to perform surveillances just prior to beginning or resuming core alterations or control rod withdrawal associated with refueling activities. Specifically, the current TS require that the following surveillances be performed:

- 1) The reactor mode switch is verified locked in the refuel or shutdown position within 2 hours prior to beginning core alterations and at least once per 12 hours.
- 2) Each of the required reactor mode switch refuel position interlocks shall be demonstrated operable by performance of a channel functional test within 24 hours prior to the start of core alteration or control rod withdrawal.

- 3) All control rods are verified inserted within 2 hours prior to the start of core alterations and at least once per 12 hours.
- 4) Direct communications between the control room and refuel floor personnel shall be demonstrated within 1 hour prior to the start of and at least once per 12 hours during core alterations.
- 5) The reactor vessel water level shall be determined to be at least the minimum depth within 2 hours prior to the start of and at least once per 24 hours during handling of fuel assemblies or control rods within the reactor pressure vessel;
- 6) The reactor mode switch refuel position interlocks shall be demonstrated operable by performance of a channel functional test within 24 hours prior to the start of and at least once per 7 days during control rod withdrawal or core alteration and
- 7) Direct communication shall be maintained between the control room and refueling floor personnel during core alterations except as indicated in the footnote i.e., "Except the movement of incore instrumentation and control rods with their normal drive system."

The fuel handling system is designed to provide a safe and effective method for transporting and handling fuel from the time it reaches the plant until it leaves the plant after post irradiation cooling. Safe handling of fuel includes design considerations for maintaining occupational radiation exposures as low as reasonably achievable (ALARA) during transportation and handling. Most of the refueling and servicing equipment is manually operated and controlled by the operator's visual observations.

Refueling interlocks are provided for use during planned refueling operations. Criticality is prevented during fuel insertion, provided that control rods in the vicinity of the vacant fuel space are fully inserted during fuel insertion. The interlock systems accomplish this by the following mechanisms:

- a. Preventing operation of fuel-loaded refueling equipment over the core whenever any control rod is withdrawn.
- b. Preventing control rod withdrawal whenever fuel loading equipment is over the core.
- c. Preventing withdrawal of more than one control rod when the mode switch is in the REFUEL position.

The refueling interlocks have been designed utilizing redundancy of sensors and circuitry to provide a high level of reliability and assurance that the design bases are met. Each of the individual refueling interlocks considered need not meet the single failure criteria, since the four (4) essentially independent levels (including procedural control) of protection ensure that the design basis is met. Section 7.7 of the LGS Updated Final Safety Analysis

Report (UFSAR) shows that a single interlock failure does not cause an accident, result in potential physical damage to fuel, or result in radiation exposure to personnel during fuel handling operations.

The rod block interlocks and refueling platform interlocks provide two (2) independent levels of interlock action. The interlocks that restrict operation of the platform hoist and grapple provide a third level of interlock action because they would be required only after a failure of a rod block and refueling platform interlock. The strict procedural control exercised during refueling operations is a fourth level of backup, even though this is actually the primary means of control.

The proposed TS change does not make any physical modifications to any fuel handling equipment, nor does it eliminate any refueling interlocks or procedural controls. Therefore, the potential for an inadvertent criticality as discussed in UFSAR Section 15.4.1.1, "Control Rod Withdrawal Error During Refueling," is not altered. The probability of the initial causes of this transient alone are considered low enough to warrant its being categorized as an infrequent incident, since there is no postulated set of circumstances that results in an inadvertent rod withdrawal error while in the refueling mode. The refueling interlock system combined with strict procedural controls provide sufficient barriers to preclude an inadvertent criticality. In addition, the potential for a Fuel Handling Accident as discussed in Section 15.7.4 of the UFSAR is not increased since this proposed TS does not support any physical modifications to plant equipment, and this accident is assumed to occur as a consequence of the failure of the fuel handling mechanism resulting in a dropped fuel bundle.

The periodic surveillance test frequencies provide adequate assurance that the equipment will remain in an operable condition. The normal periodic surveillance intervals bound those surveillance intervals for the tests that are being altered by this proposed TS change. In the event that one of the periodic surveillances has not been performed within the specified time interval, entry into the specified condition (i.e., performance of core alterations, control rod withdrawal, or handling of fuel or control rods) is not permitted as required by TS 4.0.4 until the surveillance has been satisfactorily completed.

The licensee has also proposed to delete the words "incore instrumentation" from the footnote for TS 3.9.5. It requires that direct communication be maintained between the control room and refueling floor during core alterations. The footnote presently states that this communication is not required during movement of control rods or incore instrumentation. There is no need to include the latter because movement of the incore instrumentation cannot affect criticality.

The staff concludes that these TS revisions are acceptable because the interlocks have been demonstrated reliable during the term of the license and routine surveillance is therefore sufficient. In addition, the TS changes

reflect the criteria contained in NUREG-1433, "Standard Technical Specifications, General Electric Plants, BWR/4," dated September 28, 1992. Therefore, the staff considers the deletion of TS Surveillance Requirements 4.9.1.1, 4.9.1.2, 4.9.3, 4.9.5, and 4.9.8 to perform surveillances just prior to beginning or resuming core alterations or control rod withdrawal associated with refueling activities, and deletion of the phrase "incore instrumentation" from the footnote in TS Section 3/4.9.5, "Communication," to be acceptable.

### 3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Pennsylvania State official was notified of the proposed issuance of the amendments. The State official had no comments.

### 4.0 ENVIRONMENTAL CONSIDERATION

The amendments change the surveillance requirements. The NRC staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding (60 FR 49943). Accordingly, the amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

### 5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendments will not be inimical to the common defense and security or to the health and safety of the public.

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