



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20565

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 186 TO FACILITY OPERATING LICENSE NO. DPR-49

IOWA ELECTRIC LIGHT AND POWER COMPANY  
CENTRAL IOWA POWER COOPERATIVE  
CORNWELL POWER COOPERATIVE

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

1.0 INTRODUCTION

By letter dated November 15, 1991, Iowa Electric Light and Power Company (IEL&P), the licensee for the Duane Arnold Energy Center (DAEC), transmitted an application for amendment to Operating License DPR-49 regarding proposed changes to Appendix A of the DAEC Technical Specifications (TS). The proposed TS changes are primarily revisions regarding "CORE ALTERATIONS" for the TS Section 3.9 "Limiting Conditions for Operation" (LCO) and the TS Section 4.9 "Surveillance Requirements" (SR), and the associated Bases.

The proposed license amendment would (1) revise the requirements applicable to the loading of fuel assemblies adjacent to a Source Range Monitor (SRM) when establishing the required minimum SRM count rate prior to spiral reloading of the core; (2) add LCO and SR statements which incorporate requirements that are currently specified in DAEC procedures, and/or other TS sections and provide consistency with the General Electric (GE) Boiling Water Reactor (BWR) Standard Technical Specifications (STS), NUREG-0123, Revision 3; and (3) make administrative and minor editorial changes, including reorganization, page renumbering, and the denoting of defined terms, to clarify meaning and provide consistency with other DAEC TS sections, recently docketed TS submittals and the GE BWR STS.

2.0 EVALUATION

The evaluation of the requested TS changes was performed using the three categories outlined above.

SRM Fuel Assembly Loading Requirement

The DAEC TS Section 3.9 "Core Alterations" section specifies the LCO and SR items to be met during refueling operations. Current TS requirements state that, prior to the spiral reloading of the core, two diagonally adjacent fuel assemblies with exposure accumulated in the previous operating cycle must be reloaded into their former core positions next to each of the four SRMs. This is specified to establish the required minimum SRM count rate of 3 counts per second (cps). Since this fuel assembly configuration was known to be

subcritical prior to removal from the core, it will be subcritical when reloaded in the core. This requirement is intended to ensure that an inadvertent criticality event does not occur before the required minimum SRM count rate is established. However, these previous core positions are, in general, not the required fuel locations of these assemblies for the next operating cycle. This leads to additional fuel handling (up to 16 moves) to establish the final fuel configuration.

Results of an analysis by General Electric, the current fuel vendor, were provided to DAEC, to demonstrate that an isolated two-by-two array loaded with two to four fuel assemblies will be subcritical. This analysis was performed using the GESTAR methodology, previously reviewed and approved by the staff. The GE analysis concluded that any uncontrolled, square two-by-two array of fuel assemblies will have a maximum K-effective of less than 0.95 at a moderator temperature of 20°C provided that:

- (1) 12 inches of water exists between the two-by-two array and any other surrounding fuel assemblies, and
- (2) their maximum reactivity corresponds to individual values of K-infinity not in excess of 1.31.

Condition 1 will exist when fuel assemblies are being initially loaded adjacent to each of the four SRMs and Condition 2 is a GE fuel design criterion currently required for both fresh and depleted fuel storage.

#### Additional Limiting Conditions for Operation and Surveillance Requirements

Current TS Section 3.9 contains the Surveillance Requirements for testing of the refueling interlock functions; however, there are no specific LCOs regarding the interlocks other than an Operability requirement. The testing conditions are currently specified by DAEC procedures and administrative controls.

The proposed TS LCO addition allows the reactor mode switch to be placed in the RUN, STARTUP/HOT STANDBY and SHUTDOWN positions to test the refueling interlock functions provided that:

- (1) control rods remain fully inserted in all core control cells which contain one or more fuel assemblies (except the rod being used to test the interlock), and
- (2) no other CORE ALTERATIONS are in progress.

The refueling control rod coupling/re-coupling requirement (TS 4.3.B.1.c) will be moved to the SR TS 4.9 section to be consistent with another recent TS revision request. Changes will also be made to current TSs 3.9.A.5 and 4.9.A.2 to clarify when the LCOs and SRs need to be "verified" versus "demonstrated" to be consistent with License Amendment 174.

The current TS LCOs allow either withdrawal of one or two control rods (TS 3.9.A.5) or multiple control rod withdrawal (TS 3.9.A.6). The proposed

changes regroup the LCOs into single and multiple control rod withdrawal specifications for clarity and consistency with the BWR STS 3/4.9.

An additional LCO is proposed to require that the LCOs for all core and containment cooling systems applicable to refueling (TS 3.5.G) be met whenever work is being performed that has the potential to drain the reactor vessel. This change is consistent with current DAEC procedures. Additional action statements are proposed to require that movement of irradiated fuel be suspended and that the integrity of the secondary containment be established if the spent fuel pool (SFP) water level falls below the required height of 36 feet. This is consistent with DAEC procedures and with current TS 3.5.G and 3.7.C.

#### Administrative and Editorial Changes

The current TS 1.0 Definition of CORE ALTERATIONS is proposed to be revised to clarify that routine replacement of incore detector strings that are not required to be operable does not constitute an alteration of the reactor core. A Definition of SHUTDOWN MARGIN is proposed to be added to be consistent with another recent TS revision request. Other minor editorial changes will also be made at the same time, including the use of capital letters to denote defined terms to improve clarity and for consistency with other TS submittals and the BWR STS formats.

The required surveillances for the grapple load switch settings will be relocated from the LCO Section 3.9 to the SR Section 4.9 for clarity and consistency with the STS. The TS 3/4.9 Bases section will be revised to reflect the LCO and SR changes. It is also proposed to revise the applicability statement, the references and the page numbering of TS 3.9 to improve clarity and reflect the revised subsections.

The staff has reviewed the licensee's submittal proposing changes to TS 3/4.9 to revise the requirements for loading fuel adjacent to SRMs prior to spiral reloading and to provide consistency with the GE Boiling Water Reactor Standard Technical Specifications (NUREG-0123) and with existing DAEC procedures. Based on the above safety evaluation, the staff concludes that the requested changes are supported by the licensee's analyses or clarify existing requirements. Therefore, the proposed changes are acceptable.

#### 3.0 STATE CONSULTATION

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

#### 4.0 ENVIRONMENTAL CONSIDERATIONS

This amendment involves a change to a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or a change to a surveillance requirement. The staff has determined that the amendment involves 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 this amendment involves no significant hazards consideration and there has been no public comment on such finding (56 FR 64654). Accordingly, this amendment meets 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 this amendment.

#### 5.0 CONCLUSION

The staff 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 amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date: August 25, 1992