Docket No. 50-331

Mr. Lee Liu
Chairman of the Board and
Chief Executive Officer
Iowa Electric Light and Power Company
Post Office Box 351
Cedar Rapids, Iowa 52406

Dear Mr. Liu:

The Commission has issued the enclosed Amendment No. 141 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center. This to your application dated August 29, 1986.

The amendment revises the current Technical Specifications (TS) to change the control rod (CR) scram time basis from a percentage insertion to a CR position basis. This will more accurately determine CR scram times based on directly obtainable plant data. Administrative changes are also being approved which will improve consistency in nomenclature throughout the TS.

A copy of the related Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's Bi-Weekly Federal Register Notice.

Sincerely,

Original Signed by

Robert A. Gilbert, Project Manager
BWR Project Directorate #2
Division of BWR Licensing

Enclosures:
1. Amendment No. 141 to License No. DPR-49
2. Safety Evaluation

cc w/enclosures:
See next page

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

IOWA ELECTRIC LIGHT AND POWER COMPANY
CENTRAL IOWA POWER COOPERATIVE
CORN BELT POWER COOPERATIVE

DOCKET NO. 50-331

DUANE ARNOLD ENERGY CENTER

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 141
License No. DPR-49

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Iowa Electric Light and Power Company, et al, dated August 29, 1986 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-49 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 141, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective as of the date of issuance and shall be implemented within 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Daniel R. Muller, Director
BWR Project Directorate #2
Division of BWR Licensing

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 27, 1987

ATTACHMENT TO LICENSE AMENDMENT NO. 141

FACILITY OPERATING LICENSE NO. DPR-49

DOCKET NO. 50-331

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised areas are indicated by marginal lines.

Pages

3.3-6
3.3-8
3.3-12
3.3-18
3.3-19

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT

C. Scram Insertion Times

1. The average scram insertion time, based on the de-energization of the scram pilot valve at time zero, of all OPERABLE control rods in the reactor power operation condition shall be no greater than:

Rod Position	Average Scram Insertion Times (Sec)
46	0.35
38	0.937
26	1.86
06	3.41

2. The average scram insertion times for the three fastest control rods of all groups of four control rods in a 2 x 2 array shall be no greater than:

Rod Position	Average Scram Insertion Times (Sec)
46	0.37
38	1.01
26	1.97
06	3.62

3. Maximum scram insertion time to rod position 04 of any OPERABLE control rod should not exceed 7.00 seconds.

C. Scram Insertion Times

1. After each refueling outage all OPERABLE rods shall be scram time tested from the fully withdrawn position to the drop-out of the reed switch at the rod position required by Specification 3.3.C. The nuclear system pressure shall be above 950 psig (with saturation temperature) and the requirements of Specification 3.3.B.3.a met. This testing shall be completed prior to exceeding 40% power. Below 30% power, only rods in those sequences (A_{12} and A_{34} or B_{12} and B_{34}) which are fully withdrawn in the region from 100% rod density to 50% rod density shall be scram time tested. During all scram time testing below 30% power, the Rod Worth Minimizer shall be OPERABLE or a second licensed operator shall verify that the operator at the reactor console is following the control rod program.

3.3 and 4.3 BASES

A. Reactivity Limitation

1. The requirements for the control rod drive system have been identified by evaluating the need for reactivity control via control rod movement over the full spectrum of plant conditions and events. As discussed in Subsection 4.6.1 of the Updated FSAR, the control rod system design is intended to provide sufficient control of core reactivity that the core could be made subcritical with the strongest rod fully withdrawn. This reactivity characteristic has been a basic assumption in the analysis of plant performance. Compliance with this requirement can be demonstrated conveniently only at the time of initial fuel loading or refueling. Therefore, the demonstration must be such that it will apply to the entire subsequent fuel cycle. The demonstration shall be performed with the reactor core in the cold, xenon-free condition and will show that the reactor is subcritical by at least R + 0.38% Δ k/k with the analytically determined strongest control rod fully withdrawn.

B. Control Rod Withdrawal

1. Control rod drop accidents as discussed in the Updated FSAR can lead to significant core damage. If coupling integrity is maintained, the possibility of a rod drop accident is eliminated. The overtravel position feature provides a positive check as only uncoupled drives may reach this position. Neutron instrumentation response to rod movement provides a verification that the rod is following its drive. Absence of such response to drive movement could indicate an uncoupled condition. Rod position indication is required for proper function of the rod sequence control system and the rod worth minimizer (RWM).

2. The control rod housing support restricts the outward movement of a control rod to less than 3 inches in the extremely remote event of a housing failure. The amount of reactivity which could be added by this small amount of rod withdrawal, which is less than a normal single withdrawal increment, will not contribute to any damage to the primary coolant system. The design basis is given in Subsection 4.6.1 of the Updated FSAR and the safety evaluation is given in Subsection 4.6.2 of the Updated FSAR. This support is not required if the reactor coolant system is at atmospheric pressure since there would then be no driving force to rapidly eject a drive housing. Additionally, the support is not required if all control rods are fully inserted and if an adequate shutdown margin with one control rod withdrawn has been demonstrated,

During the use of such patterns, it is judged that testing of the RBM system prior to withdrawal of such rods to assure its operability will assure that improper withdrawal does not occur. It is the responsibility of the Reactor Engineer to identify these limiting patterns and the designated rods either when the patterns are initially established or as they develop due to the occurrence of inoperable control rods in other than limiting patterns. Other personnel qualified to perform this function may be designated by the Plant Superintendent, Nuclear.

C. Scram Insertion Times

The control rod system is designed to bring the reactor subcritical at a rate fast enough to prevent fuel damage; i.e., to prevent the MCPR from becoming less than the safety limit.

After initial fuel loading and subsequent refuelings when operating above 950 psig, all control rods shall be scram tested within the constraints imposed by the Technical Specifications and before the 40% power level is reached. The requirements for the various scram time measurements ensure that any indication of systematic problems with rod drives will be investigated on a timely basis.

D. Reactivity Anomalies

During each fuel cycle excess operative reactivity varies as fuel depletes and as any burnable poison in supplementary control is burned. The magnitude of this excess reactivity may be inferred from the critical rod configuration. As fuel burnup progresses, anomalous behavior in the excess reactivity may be detected by comparison of the critical rod pattern at selected base states to the predicted rod inventory at that state. Power operating base conditions provide the most sensitive and directly interpretable data relative to core reactivity. Furthermore, using power operating base conditions permits frequent reactivity comparisons.

Requiring a reactivity comparison at the specified frequency assures that a comparison will be made before the core reactivity change exceeds 1% ΔK/K. Deviations in core reactivity greater than 1% ΔK/K are not expected and require thorough evaluation. One percent reactivity limit is considered safe since an insertion of the reactivity into the core would not lead to transients exceeding design conditions of the reactor system.

E. Recirculation Pumps

APRM and/or LPRM oscillations in excess of those specified in section 3.3.E could be an indication that a condition of thermal hydraulic instability exists and that appropriate remedial action should be taken. These specifications are based upon the guidance of GE SIL #380, Rev. 1, 2/10/84.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 141 TO FACILITY OPERATING LICENSE NO. DPR-49

IOWA ELECTRIC LIGHT AND POWER COMPANY
CENTRAL IOWA POWER COOPERATIVE
CORN BELT POWER COOPERATIVE

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

1.0 INTRODUCTION

By letter dated August 29, 1986, Iowa Electric Light and Power Company (IELP/licensee) proposed to change the Technical Specifications (TS) for the Duane Arnold Energy Center (DAEC). The changes to TS 3.3.C.1/.2/.3 and TS 4.3.C are concerned with control rod scram testing. Revisions were also proposed for the Bases 3.3 and 4.3.

The rapid insertion of control rods during a scram is required to bring the reactor subcritical at a rate fast enough to prevent fuel damage. After initial fuel loading and subsequent refuelings, all control rods are required to be scram tested within the constraint of the TS.

The existing scram insertion times of TS 3.3.C.1/.2/.3 are based on the time required to insert control rod(s) from a fully withdrawn position to a percentage of the fully inserted distance. Percent inserted, however, is not directly measurable at DAEC while even rod positions are. For measurement purposes, the percent inserted was given a conservative correspondence to the closest even numbered rod position. For example, to represent 5% insertion, rod position 44, corresponding to 8.33% inserted was chosen to represent 5% inserted rather than rod position 46, which corresponds to 4.17% inserted.

During the beginning of cycle scram time tests for Cycle 8, the licensee could not meet the scram time for 5% insertion using rod position 44. Therefore, the licensee proposed to change the rod scram time basis from a percentage insertion bases to a rod position basis. This would allow a more accurate determination of rod scram times based on directly obtainable plant data.

2.0 EVALUATION

° Average scram insertion time

Rod position is linearly related to percentage inserted. The staff compared the proposed average scram insertion time versus rod position (percentage inserted) with the existing TS. We find the proposed average scram insertion time acceptable since there is no significant change to the previously accepted scram rate.

° Maximum Scram Insertion Time

The existing TS relates to a maximum scram insertion time for 90% insertion. The proposed TS relates to a rod position (04) which corresponds to about 91.6% insertion for the same maximum scram insertion time. We find this acceptable since this scram rate will be higher than that required for the 90% insertion and thus will not adversely affect previously accepted safety analyses.

3.0 TECHNICAL SPECIFICATION CHANGES

The licensee has proposed the following TS changes:

a) TS Sections 3.C.1/.2/.3

The column "% Inserted from Fully Withdrawn" has been deleted. Revised rod scram insertion times for new-rod positions have been included. Rod position "04" has replaced "90% insertion."

b) TS Section 4.3.C.1

The surveillance requirement has been changed to clarify rod scram time testing based on rod position rather than percent insertion.

The licensee also proposed editorial changes for TS Section 3.C.1/.3 and 4.3.C.1 and Bases 3.3 and 4.3.

We find the proposed TS changes acceptable since they will result in administrative changes which will allow more accurate monitoring of scram insertion rates based on directly obtainable plant data. Previous safety analyses will not be adversely affected.

We find the proposed Bases acceptable since the changes are editorial.

4.0 ENVIRONMENTAL CONSIDERATIONS

This amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes to the surveillance requirements. The staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the typed, of any effluents that may be released offsite, and that there is not significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, the 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 the amendment.

5.0 CONCLUSION

We have 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: D. Katze

Dated: March 27, 1987