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Docket No. 50-331

Iowa Electric Light & Power Company  
 ATTN: Mr. Duane Arnold, President  
 P. O. Box 351  
 Cedar Rapids, Iowa 52406

Gentlemen:

The Commission has issued the enclosed Amendment No. 28 to Facility License No. DPR-49 for the Duane Arnold Energy Center. This amendment consists of changes to the Technical Specifications and is in response to your applications dated April 23, 1976 and June 17, 1976.

This amendment to the Technical Specifications will (1) Revise the Bases portion of the Limiting Safety System Settings related to fuel cladding integrity (specifically the total peaking factor) to be consistent with changes implemented by Amendment No. 19 issued March 19, 1976, (2) Revise the trip level setting for the Reactor Core Isolation Cooling (RCIC) System Turbine High Flow to be consistent with the design criteria for a trip at 300% of design steam flow, and (3) Revise the trip function description for the Suppression Chamber High Level to more accurately describe the function associated with the trip.

Copies of the related Safety Evaluation and the FEDERAL REGISTER Notice are also enclosed.

Sincerely,

Original signed by

George Lear, Chief  
 Operating Reactors Branch #3  
 Division of Operating Reactors

Enclosures:

1. Amendment No. 28
2. Safety Evaluation
3. FEDERAL REGISTER Notice

cc w/enclosures:

See next page

OFFICE →	ORB #3 <i>CP</i>	ORB #3 <i>AV</i>	OELD	ORB #3		
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DATE →	2/3/77	2/3/77	2/9/77	2/10/77		

*R. Conner*

Iowa Electric Light & Power Company -2 -

cc:

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Harold F. Reis, Esquire  
Lowenstein, Newman, Reis and Axelrad  
1025 Connecticut Avenue, N. W.  
Washington, D. C. 20036

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523 East 12th Street  
Des Moines, Iowa 50319

Chairman, Linn County  
Board of Supervisors  
Cedar Rapids, Iowa 52406

Iowa Electric Light & Power Company  
ATTN: Ellery L. Hammond  
P. O. Box 351  
Cedar Rapids, Iowa 52406

Chief, Energy Systems Analysis Branch (AW-459)  
Office of Radiation Programs  
U. S. Environmental Protection Agency  
Room 645, East Tower  
401 M Street, S. W.  
Washington, D. C. 20460

U. S. Environmental Protection Agency  
Region VII  
ATTN: EIS COORDINATOR  
1735 Baltimore Avenue  
Kansas City, Missouri 64108

Cedar Rapids Public Library  
426 Third Avenue, S. E.  
Cedar Rapids, Iowa 52401



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. 28  
License No. DPR-49

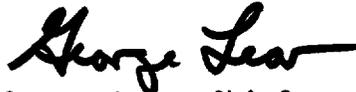
1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The applications for amendment by Iowa Electric Light and Power Company, Central Iowa Power Cooperative, and Corn Belt Power Cooperative (the licensees) dated April 23, 1976 and June 17, 1976, comply with the standards and requirements 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 a change 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 Appendices A and B, as revised through Amendment No. 28, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



George Lear, Chief  
Operating Reactors Branch #3  
Division of Operating Reactors

Attachment:  
Changes to the Technical  
Specifications

Date of Issuance: February 11, 1977

ATTACHMENT TO LICENSE AMENDMENT NO. 28  
TO THE TECHNICAL SPECIFICATIONS  
FACILITY OPERATING LICENSE NO. DPR-49  
DOCKET NO. 50-331

Replace pages 1.1-19 and 3.2-13 with the attached revised pages.

as the flow decreases for the specified trip setting versus flow relationship; therefore the worst case MCPR which could occur during steady-state operation is at 108% of rated thermal power because of the APRM rod block trip setting. The actual power distribution in the core is established by specified control rod sequences and is monitored continuously by the in-core LPRM system. As with the APRM scram trip setting, the APRM rod block trip setting is adjusted downward if the maximum total peaking factor exceeds 2.61 (7x7 array) or 2.43 (8x8 array), thus preserving the APRM rod block safety margin.

#### 4. IRM

The IRM system consists of 6 chambers, 3 in each of the reactor protection system logic channels. The IRM is a 5-decade instrument which covers the range of power level between that covered by the SRM and the APRM. The 5 decades are covered by the IRM by means of a range switch and the 5 decades are broken down into 10 ranges, each being one-half of a decade in size. The IRM scram trip setting of 120 divisions is active in each range of the IRM. For example, if the instrument were on range 1, the scram setting would be 120 divisions for that range; likewise, if the instrument were on range 5, the scram would be 120 divisions on that range. Thus, as the IRM is ranged up to accommodate the increase in power level, the scram trip setting is also ranged up. The most significant sources of reactivity change during the power increase are due to control rod withdrawal. For insequence control rod withdrawal, the rate of change of power is slow enough due to the physical limitation of withdrawing control rods that the heat flux is in equilibrium with the neutron flux, and an IRM scram would result in a reactor shutdown well before any Safety Limit is exceeded.

TABLE 3.2-B (Continued)

## INSTRUMENTATION THAT INITIATES OR CONTROLS THE CORE AND CONTAINMENT COOLING SYSTEMS

Minimum No. of Operable Instrument Channels Per Trip System (1)	Trip Function	Trip Level Setting	Number of Instrument Channels Provided by Design	Remarks
2	Suppression Chamber HPCI Suction Level	$\leq 5''$ above normal water level	2 Inst. Channels	Transfers HPCI pump suction to suppression chamber
1	RCIC Turbine High Flow	$+ 110 \pm 5'' \text{ H}_2\text{O}$ (2)	2 Inst. Channels	
2	RCIC Turbine Equipment Room High Ambient Temperature	$\leq 175 \text{ deg. F}$ (2)	4 Inst.	
2	RCIC Vent High Differential Temperature	$\leq \Delta 50 \text{ deg. F}$ (2)	4 Inst.	
2	RCIC Steam Line Low Pressure	$100 > P > 50 \text{ psig}$ (2)	4 Inst.	
1	HPCI Turbine Steam Line High Flow	$\pm 225'' \text{ H}_2\text{O}$ (3)	2 Inst. Channels	
2	Suppression Pool Area High Ambient Temperature	$150^\circ\text{F}$	4 Inst. Channels	
2	Suppression Pool Area High Diff. Temperature	$50^\circ\text{F}$	4 Inst. Channels	
1	HPCI Leak Detection Time Delay	15 min.	2 Inst.	



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 28 TO LICENSE NO. DPR-49

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

DOCKET NO. 50-331

DUANE ARNOLD ENERGY CENTER

INTRODUCTION

In letters dated April 23, 1976 and June 17, 1976, Iowa Electric Light and Power Company requested changes to the Technical Specifications appended to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center (DAEC). The proposed changes would:

1. Revise the Bases portion of the Limiting Safety System Settings related to fuel cladding integrity, (specifically, the total peaking factor) to be consistent with changed implemented by Amendment No. 19, issued on March 19, 1976;
2. Revise the trip level setting for the Reactor Core Isolation Cooling (RCIC) System Turbine High Flow to be consistent with the design criteria for a trip at 300% of design steam flow; and
3. Revise the trip function description for the Suppression Chamber High Level to more accurately describe the function associated with the trip.

Each of these items is considered in the following evaluation.

EVALUATION

1. Total Peaking Factor

By Amendment No. 19, dated March 19, 1976, the Commission modified the Technical Specifications appended to Operating License No. DPR-49 to permit operation of the DAEC using a partial loading of 8x8 fuel assemblies. A portion of the amendment changed the total peaking factor associated with calculation of the trip setting for the APRM High Flux Scram to "2.61 (7x7 array) or 2.43 (8x8 array)". Through an oversight, one of the six related changes for the maximum total peaking factor associated with calculation of the ARPM Rod Block trip

setting was not changed. The proposed change corrects this error to the bases portion of the Limiting Safety Systems and as previously determined is acceptable.

## 2. RCIC Turbine High Flow Trip Setting

The RCIC system provides makeup water to the reactor vessel following a reactor vessel isolation in order to insure adequate core cooling. The RCIC includes a steam turbine driven pump whose steam supply comes from the reactor vessel. RCIC turbine high steam flow could indicate a break in the RCIC turbine steam line upstream of the RCIC turbine. Thus, the RCIC Turbine High Flow Trip is provided to affect automatic closure of the RCIC steam line valves to prevent excessive loss of reactor coolant and the potential release of radioactive materials from the nuclear system process barrier. The criterion for the setpoint is to provide isolation should the differential pressure instrumentation indicate 300% of rated flow. The initial trip setpoint of +180 inches of water was determined, erroneously, by calculations based on a 3-inch line. The DAEC RCIC system was designed and constructed with a 4-inch line. The licensee has recalculated the setpoint using the correct line size and has performed confirmatory flow tests on the RCIC. In addition, it has been determined that a "negative" setpoint is not consistent with the criterion for high steam flow; only a "positive" differential pressure measurement is necessary. This modification was discussed with the licensee on January 26, 1977 and he agrees. Accordingly, the staff concludes that a revised trip point setting of 100 +5 inches of water is consistent with the criterion for a 300% steam flow trip.

## 3. Suppression Chamber High Level

The licensee proposes to change the nomenclature for the "Suppression Chamber High Level" to "Suppression Chamber HPCI Suction Level." The criterion for the suppression chamber high level trip is to transfer the HPCI suction from the Condensate Storage Tank to the Suppression Chamber while there is still an adequate torus free volume relative to that used in the containment pressure response analysis.<sup>1/</sup> Accordingly, the staff finds the change in nomenclature acceptable; it more clearly describes the function of this trip level setting.

### ENVIRONMENTAL CONSIDERATION

We have determined that the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an

<sup>1/</sup>Safety Evaluation by the Directorate of Licensing, Supporting Amendment No. 4 to License No. DPR-49, November 5, 1974

action which is insignificant from the standpoint of environmental impact and pursuant to 10 CFR §51.5(d)(4) that an environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: February 11, 1977

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NO. 50-331

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

NOTICE OF ISSUANCE OF AMENDMENT TO FACILITY  
OPERATING LICENSE

The U. S. Nuclear Regulatory Commission (the Commission) has issued Amendment No. 28 to Facility Operating License No. DPR-49 issued to Iowa Electric Light and Power Company, Central Iowa Power Cooperative, and Corn Belt Power Cooperative, which revised Technical Specifications for operation of the Duane Arnold Energy Center, located in Linn County, Iowa. The amendment is effective as of its date of issuance.

This amendment to the Technical Specifications will (1) Revise the Bases portion of the Limiting Safety System Settings related to fuel cladding integrity (specifically the total peaking factor) to be consistent with changes implemented by Amendment No. 19 issued on March 19, 1976, (2) Revise the trip level setting for the Reactor Core Isolation Cooling (RCIC) System Turbine High Flow to be consistent with the design criteria for a trip at 300% of design steam flow, and (3) Revise the trip function description for the Suppression Chamber High Level to more accurately describe the function associated with the trip.

The applications for the amendment comply with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations. The Commission has made appropriate

findings as required by the Act and the Commission's rules and regulations in 10 CFR Chapter I, which are set forth in the license amendment. Prior public notice of this amendment was not required since the amendment does not involve a significant hazards consideration.

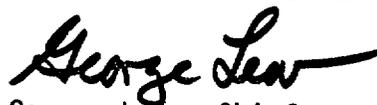
The Commission has determined that the issuance of this amendment will not result in any significant environmental impact and that pursuant to 10 CFR §51.5(d)(4) an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with issuance of this amendment.

For further details with respect to this action, see (1) the applications for amendment dated April 23, 1976 and June 17, 1976, (2) Amendment No. 28 to License No. DPR-49, and (3) the Commission's related Safety Evaluation. All of these items are available for public inspection at the Commission's Public Document Room, 1717 H Street, N. W., Washington, D. C. and at the Cedar Rapids Public Library, 426 Third Avenue, S. E., Cedar Rapids, Iowa 52401.

A copy of items (2) and (3) may be obtained upon request addressed to the U. S. Nuclear Regulatory Commission, Washington, D. C. 20555, Attention: Director, Division of Operating Reactors

Dated at Bethesda, Maryland, this 11th day of February 1977.

FOR THE NUCLEAR REGULATORY COMMISSION



George Lear, Chief  
Operating Reactors Branch #3  
Division of Operating Reactors