March 27, 1986

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. 131 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center. This to your application dated January 3, 1986.

The amendment revises the DAEC Technical Specifications reflecting your proposal to demonstrate feasibility of Hydrogen Water Chemistry Systems as a mitigator of Intergranular Stress Corrosion Cracking of stainless steel piping. The amendment revises the DAEC Technical Specifications to change (a) Main Steam Line high radiation scram setpoint, (b) Main Steam tunnel high radiation setpoint, and (c) the associated bases explaining the rationale for the changes.

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

Sincerely,

Mohan C. Thadani, Project Manager
BWR Project Directorate #2
Division of BWR Licensing

Enclosures:
1. Amendment No. 131 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. 131
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 January 3, 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. 131, 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.

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, 1986

ATTACHMENT TO LICENSE AMENDMENT NO. 131

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

3.1-4
3.1-7a*
3.1-18
3.2-5
3.2-7
3.2-39

*Page added

TABLE 3.1-1 (Continued)

REACTOR PROTECTION SYSTEM (SCRAM) INSTRUMENTATION REQUIREMENT

Minimum No. of Operable Instrument Channels for Trip System (1)	Trip Function	Trip Level Setting	Modes In Which Function Must be Operable			Number of Instrument Channels Provided By Design	Action (1)
			Refuel (6)	Startup	Run		
2	High Drywell Pressure	$\leq$ 2.0 psig	X(7)	X(8)	X	4 Instrument Channels	A
2	Reactor Low Water Level	$\geq$ +170" Indicated Level (15)	X	X	X	4 Instrument Channels	A
2	High Water Level In Scram Discharge Volume	$\leq$ 60 Gallons	X(2)	X	X	4 Instrument Channels	A
2	Main Steam Line High Radiation	$\leq$ 3 x Normal Rated Power Background* (16)	X	X	X	4 Instrument Channels	A
4	Main Steam Line Isolation Valve Closure	$\leq$ 10% Valve Closure	X (3)(13)	X (3)(13)	X(13)	8 Instrument Channels	A or C
2	Turbine Control Valve Fast Closure (Loss of Control Oil Pressure)	Within 30 milliseconds of the Start of Control Valve Fast Closure			X(4)	4 Instrument Channels	A or D
4	Turbine Stop Valve Closure	$\leq$10% Valve Closure			X(4)	8 Instrument Channels	A or D
2	First Stage	Bypass below 165 psig	X	X	X	4 Instrument Channels	A or D

*Alarm setting $\leq$1.5 X Normal Rated Power Background (16)

Amendment No. 115, 131,

16. Within 24 hours prior to the planned start of the hydrogen injection test with the reactor power at greater than 20% rated power, the normal full-power radiation background level and associated trip and alarm setpoints may be changed based on a calculated value of the radiation level expected during the test. The background radiation level and associated trip and alarm setpoints may be adjusted during the test program based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip setpoints shall be set within 24 hours of reestablishing normal radiation levels after completion of the hydrogen injection or within 12 hours of establishing reactor power levels below 20% rated power, while these functions are required to be operable.

High radiation levels in the main steam line tunnel above that due to the normal nitrogen and oxygen radioactivity is an indication of leaking fuel. A scram is initiated whenever such radiation level exceeds three times normal background. For the performance of a Hydrogen Water Chemistry pre-implementation test, the scram setpoint may be changed based on a calculated value of the radiation level expected during the test. Hydrogen addition will result in an approximate one- to five-fold increase in the nitrogen (N-16) activity in the steam due to increased N-16 carryover in the main steam. The purpose of this scram is to reduce the source of such radiation to the extent necessary to limit the amount of radioactivity released due to gross fuel failure. Discharge of excessive amounts of radioactivity to the environs is prevented by the air ejector offgas monitors which cause an isolation of the main condenser offgas line to the main stack.

The MSIV closure scram is set to scram when the isolation valves are 10% closed in 3 out of 4 lines. This scram anticipates the pressure and flux transient which would occur when the valves close. By scramming at this setting, the resultant transient is less severe than either the pressure or flux transient which would otherwise result.

A reactor mode switch is provided which actuates or bypasses the various scram functions appropriate to the particular plant operating status.

The manual scram function is active in all modes, thus providing for a manual means of rapidly inserting control rods during all modes of reactor operation.

TABLE 3.2-A

INSTRUMENTATION THAT INITIATES PRIMARY CONTAINMENT ISOLATION

Minimum No. of Operable Instrument Channels Per Trip System (1)	Instrument	Trip Level Setting	Number of Instrument Channels Provided by Design	Valve Groups Operated by Signal	Action (2)
2 (6)	Reactor Low Water Level	$\geq$ +170" Indicated Level (3)	4	2,3,4,5 (Sec. Cont., 3 E)	A
1	Reactor Low Pressure (Shutdown Cooling Isolation)	$\leq$ 135 psig	2	4	C
2	Reactor Low-Low-Low Water Level	$\geq$ +18.5" indicated level (3)	4	1	A
2 (6)	High Drywell Pressure	$\leq$ 2.0 psig	4	2,3,4,8,9* (Sec. Cont., 3 E)	A
2	High Radiation Main Steam Line Tunnel	$\leq$ 3 X Normal Rated Power Background (8)	4	1	B
2	Low Pressure Main Steam Line	$\geq$ 850 psig (7)	4	1	B
2 (5)	High Flow Main Steam Line	$\leq$ 140% of Rated Steam Flow	4	1	B
2	Main Steam Line Tunnel/Turbine Bldg. High Temperature	$\leq$ 200° F.	4	1	B
1	Reactor Cleanup System High Diff. Flow	$\leq$ 40 gpmd	2	5	D

*Group 9 valves isolate on high drywell pressure combined with reactor steam supply low pressure

5. Two required for each steam line.

6. These signals also start SBGTS and initiate secondary containment isolation.

7. Only required in Run Mode (interlocked with Mode Switch).

8. Within 24 hours prior to the planned start of the hydrogen injection test with the reactor power at greater than 20% rated power, the normal full-power radiation background level and associated trip setpoints may be changed based on a calculated value of the radiation level expected during the test. The background radiation level and associated trip setpoints may be adjusted during the test program based on either calculations or measurements of actual radiation levels resulting from hydrogen injection. The background radiation level shall be determined and associated trip setpoints shall be set within 24 hours of reestablishing normal radiation levels after completion of the hydrogen injection test or within 12 hours of establishing reactor power levels below 20% rated power, while these functions are required to be operable.

Temperature monitoring instrumentation is provided in the main steam line tunnel and turbine building to detect leaks in this area. Trips are provided on this instrumentation and when exceeded, cause closure of isolation valves. See Spec 3.7 for Valve Group. The setting is 200°F for the main steam line tunnel detector. For large breaks, the high steam flow instrumentation is a backup to the temperature instrumentation.

High radiation monitors in the main steam line tunnel have been provided to detect gross fuel failure as in the control rod drop accident. With the established setting of 3 times normal background, and main steam line isolation valve closure, fission product release is limited so that 10 CFR 100 guidelines are not exceeded for this accident. For the performance of a Hydrogen Water Chemistry pre-implementation test, the scram setpoint may be changed based on a calculated value of the radiation level expected during the test. Hydrogen addition will result in an approximate one- to five-fold increase in the nitrogen (N-16) activity in the steam due to increased N-16 carryover in the main steam. Reference Subsection 15.4.7 of the Updated FSAR.

Pressure instrumentation is provided to close the main steam isolation valves in RUN Mode when the main steam line pressure drops below 850 psig. The Reactor Pressure Vessel thermal transient due to an inadvertent opening of the turbine bypass valves when not in the RUN Mode is less severe than the loss of feedwater analyzed in Subsection 15.6.3 of the Updated FSAR, therefore, closure of the Main Steam Isolation valves for thermal transient protection when not in RUN Mode is not required.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 131 TO 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 submittal dated January 3, 1986, the Iowa Electric Light and Power Company proposed a Technical Specification change to permit a Temporary increase in the Duane Arnold Energy Center main steam line high radiation scram and isolation setpoints to facilitate the testing of hydrogen addition water chemistry at their plant. This proposed change is necessary since it is anticipated that main steam line radiation levels may increase during the test by factor of five over the routinely experienced radiation levels.

2.0 EVALUATION

The staff reviewed the proposed Technical Specification change to assure that the licensee has considered the radiological implications of the dose rate increase associated with N-16 equilibrium changes during hydrogen addition. The review also intended to determine that the licensee has adequately considered radiation protection measures for the course of the test, in accordance with 10 CFR 20.1(c) and Regulatory Guide 8.8, "Information relevant to ensuring that Occupational Radiation Exposure at Nuclear Power Stations will be As Low As Is Reasonably Achievable."

An overall objective of the test is to determine general in-plant and site boundary dose rate increases due to hydrogen addition. The licensee has indicated that normal radiation protection ALARA (As Low As Reasonably Achievable) practices and procedures for Duane Arnold Energy Center (DAEC) will be continued throughout the test. Additionally, main steam system dose rates will be monitored by surveys on a routine basis. Also, specific locations where temporary shielding may be needed for long term implementation of hydrogen injection will be identified.

The licensee will preserve the trip function of the main steam line radiation monitors (MSLRM) for the design basis rod drop accident during hydrogen injection. This will be done by adjusting the MSLRM setpoints only when the reactor is at 20% power or above. Fuel defects and failures will be monitored using MSLRM, and the steam jet air ejector off-gas monitor, as well as through routine radiation surveys, and daily primary coolant analysis.

The staff has verified from the licensee the details of the dose control measures and surveillance efforts planned by the licensee for the hydrogen addition test.

Similar tests have been proposed and conducted at other BWRs of design similar to DAEC during their successful hydrogen addition tests. None of these tests involved any significant unanticipated, radiological exposures or releases.

On the basis of the adequacy of the licensee's radiation protection/ALARA program, utilization of special surveys to monitor dose rate increases on site and at the site boundary, capability to monitor for fuel failures, as well as the success of similar efforts at other operating BWRs, the staff finds the licensee's request acceptable. Hence, the staff recommends that the Technical Specification change be approved as requested.

3.0 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. 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. 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.

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

Principal Contributor: M. Lamastra

Dated: March 27, 1986