MAY 8 1974

Docket No. 50-331

Iowa Electric Light and Power Company
ATTN: Duane Arnold, President
Security Building
P. O. Box 351
Cedar Rapids, Iowa 52406

Change No. 3
Amendment No. 2
License No. DPR-49

Gentlemen:

By your letter dated May 6, 1974, you submitted a proposed change to the Radiological Technical Specifications for the Duane Arnold Energy Center (DAEC). The proposed change to the Technical Specifications involves an increase in the coolant conductivity for the purpose of facilitating demineralizer resin removal from the reactor pressure vessel. You propose to remove the resin by decomposing it in situ by a combination of radiation and thermal energy.

Since the decomposition process produces sulfuric acid, and therefore a lowered pH and an increased corrosiveness of the coolant, we believe that steps should be taken during this decomposition process to control the pH in order to minimize any significant corrosion or stress corrosion of the reactor internals. Neutralization by injection of trisodium phosphate, as described by the licensee, is a satisfactory method for controlling the pH. The selection of pH 4.6 as an acceptable minimum is based on over 7 years of successful operation of the BNL-HFBR with oxygenated coolant acidified to a pH of approximately this level.

Based on our review, we conclude that this change to the DAEC Technical Specifications does not involve significant hazards consideration and that there is reasonable assurance that the health and safety of the public will not be endangered by operation of the DAEC in accordance with this change.

Accordingly, Technical Specification 3.6.B.2.a is modified by adding at the end thereof the following:

"provided, however, that until the first occasion on which the reactor coolant water temperature, as a result of nuclear heat-up, reaches

C/P LB

OFFICE➤						
SURNAME➤						
DATE➤						

375°F, the limiting condition on conductivity shall not exceed 30 micromhos/cm. Thereafter, the limiting condition on conductivity shall be as stated above (5 micromhos/cm). At all times when the conductivity exceeds 5 micromhos/cm, the pH shall not be less than 4.6, except that short-term spikes of up to two hours duration each are permissible in the pH range 4.0 to 4.5 and of up to four hours duration each, in the range 4.5 to 4.6. The total time in which the conductivity exceeds 5 micromhos/cm shall not exceed 720 hours."

Sincerely,

Original Signed by
R. C. DeYoung

R. C. DeYoung, Assistant Director
for Light Water Reactors Group 1
Directorate of Licensing

Enclosures:
1. Amendment No. 2 - DPR-49
2. Safety Evaluation
3. Federal Register Notice

RETYPED PER OGC REQUEST - 5/8/74

(See previous yellow for concurrences)

cc w/enclosures:

Jack R. Newman, Esq.
Harold F. Reis, Esq.
Newman, Reis & Axelrad
1025 Connecticut Avenue, N.W.
Washington, D. C. 20036

Director
Office for Planning and Programming
523 East 12th Street
Des Moines, Iowa 50319

Mr. Dudley Henderson
Chairman, Linn County
Board of Supervisors
Cedar Rapids, Iowa 52406

Mr. Ed Vest
Environmental Protection Agency
1735 Baltimore Avenue
Kansas City, Missouri 64108

Chief, TIRB
Technology Assessment Division
Office of Radiation Programs
Environmental Protection Agency
Room 647A East Tower
Waterside Mall
401 "M" Street, S.W.
Washington, D. C. 20460

Mr. J. R. Buchanan
Assistant Director
NSIC
Oak Ridge National Lab
P. O. Box Y
Oak Ridge, Tennessee 37830

Mr. T. B. Abernathy
U. S. AEC-DTIE
Document Management Branch
P. O. Box 62
Oak Ridge, Tennessee

OFFICE	L:LWR1-2				AD/LWR-1	
SURNAME	MMalgret				RCDeYoung	
DATE	5/8/74				5/8/74	

Form AEC-318 (Rev. 9-53) AECM 0240 GPO C43 16 81465-1 445-676

Distribution
Docket 50-331
AEC/PDR
L/PDR
LWR 1-2 File
WPaton, OGC
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RO (3)
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A. Rosenthal, ASLAB
NHGoodrich, ASLBP

OFFICE ➤						
SURNAME ➤						
DATE ➤						

Docket No. 50-331

Iowa Electric Light and Power Company
ATTN: Duane Arnold, President
Security Building
P. O. Box 351
Cedar Rapids, Iowa 52406

Change No. 3
Amendment No. 2
License No. DPR-49

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Since the decomposition process produces sulfuric acid, and therefore a lowered pH and an increased corrosiveness of the coolant, we believe that steps should be taken during this decomposition process to maintain the pH greater than 5.0 in order to minimize any possible corrosion or stress corrosion of the reactor internals. Neutralization by injection of trisodium phosphate, as described by the licensee, is a satisfactory method for controlling the pH. The selection of pH 5.0 as an acceptable minimum is based on over 7 years of successful operation of the BNL-HFBR with oxygenated coolant acidified to pH 5.0-5.2.

Based on our review, we conclude that this change to the DAEC Technical Specifications does not involve significant hazards consideration and that there is reasonable assurance that the health and safety of the public will not be endangered by operation of the DAEC in accordance with this change.

Accordingly, Technical Specification 3.6.B.2.a is modified by adding at the end thereof the following:

"provided, however, that until the first occasion on which the reactor coolant water temperature, as a result of nuclear heat-up, reaches

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SURNAME➔						
DATE➔						

Docket No. 50-331

Iowa Electric Light and Power Company
ATTN: Duane Arnold, President
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P. O. Box 351
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License No. DPR-49

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Since the decomposition process produces sulfuric acid, and therefore a lowered pH and an increased corrosiveness of the coolant, we believe that steps should be taken during this decomposition process to maintain the pH greater than 5.0 in order to minimize any possible corrosion or stress corrosion of the reactor internals. Neutralization by injection of trisodium phosphate, as described by the licensee, is a satisfactory method for controlling the pH. The selection of pH 5.0 as an acceptable minimum is based on over 7 years of successful operation of the BNL-HFBR with oxygenated coolant acidified to pH 5.0-5.2.

Based on our review, we conclude that this change to the DAEC Technical Specifications does not involve significant hazards consideration and that there is reasonable assurance that the health and safety of the public will not be endangered by operation of the DAEC in accordance with this change.

Accordingly, Technical Specification 3.6.B.2.a is modified by adding at the end thereof the following:

"provided, however, that until the reactor coolant water temperature, as a result of nuclear heat-up, first reaches

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Form AEC-318 (Rev. 9-53) AECM 0240 GPO C43 16 81465-1 445-678

375°F, the limiting condition on conductivity shall not exceed 30 micromho/cm. Thereafter, the limiting condition on conductivity shall be as stated above (5 micromho/cm). At all times when the conductivity exceeds 5 micromho/cm, the pH shall not be less than 5.0. The total time that the conductivity exceeds 5 micromhos/cm shall not exceed 30 days."

Sincerely,

R. C. DeYoung, Assistant Director
for Light Water Reactors Group 1
Directorate of Licensing

Enclosures:
1. Amendment No. 2 - DPR-49
2. Safety Evaluation
3. Federal Register Notice

cc: w/enclosures

Jack R. Newman, Esq.
Harold F. Reis, Esq.
Newman, Reis & Axelrad
1025 Connecticut Avenue, N.W.
Washington, D. C. 20036

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Office for Planning and Programming
523 East 12th Street
Des Moines, Iowa 50319

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Chairman, Linn County
Board of Supervisors
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Chief, TIRB
Technology Assessment Division
Office of Radiation Programs
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Room 647A East Tower
Waterside Mall
401 "M" Street, S.W.
Washington, D. C. 20460

Mr. J. R. Buchanan
Assistant Director
NSIC
Oak Ridge National Lab
P. O. Box Y
Oak Ridge, Tennessee 37830

Mr. T. B. Abernathy
U. S. AEC-DTIE
Document Management Branch
P. O. Box 62
Oak Ridge, Tennessee 37830

M. Maigret

OFFICE	L:LWR 1-2	L:LWR 1-2	L:LWR 1-2	[illegible]	AD/LWR-1	
SURNAME	MMaigret:mhp	GFOwsley	WRButler	W. MASSAR	RCDeYoung	
DATE	5/8/74	5/8/74	5/8/74	5/8/74	5/ /74	

Enclosure 7

CHECKLIST FOR ISSUANCE OF AMENDMENT TO FACILITY OPERATING LICENSE

APPLICANT Iowa Electric Light & Power Company DOCKET NO. 50-331

FACILITY Duane Arnold Energy Center

PROJECT MANAGER Gerry Owsley

LICENSING ASSISTANT Madelyn J. Maigret

	DATE
Notice of Proposed Issuance Published In FEDERAL REGISTER Action Date	NOT APPLICABLE
Issuance Package: OGC Concurrence	MAY 8 1974
1. License Amendment	MAY 8 1974
2. FEDERAL REGISTER Notice	MAY 8 1974
3. Staff Evaluation	MAY 7 1974
4. Letter to applicant	MAY 8 1974
NEPA Determination: Required/Not Required	NOT REQUIRED
For ~~Amendments~~ Affecting Power Level:	
RO Notification and/~~or~~ Concurrence	
OAI Notification and/~~or~~ Concurrence [1]	
Bus. Mgmt-OA Notification and/or Concurrence	
~~OIS~~ Notification	

[1] Informed them, they [illegible]

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

IOWA ELECTRIC LIGHT AND POWER COMPANY

CENTRAL IOWA POWER COOPERATIVE

CORN BELT POWER COOPERATIVE

DOCKET NO. 50-331

AMENDMENT TO FACILITY OPERATING LICENSE

AMENDMENT NO. 2
LICENSE NO. DPR-49

1. The Atomic Energy Commission (the Commission) having found that:

   A. The application for amendment by Iowa Electric Light and Power Company, Central Iowa Power Cooperative and Corn Belt Power Cooperative (the licensees) dated May 6, 1974, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended, and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the license, 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. Prior public notice of this amendment is not required since the amendment does not involve a significant hazards consideration.

2. Accordingly, Facility Operating License No. DPR-49 issued to Iowa Electric Light and Power Company, Central Iowa Power Cooperative and Corn Belt Power Cooperative is hereby amended by adding at the end of technical specification 3.6.B.2.a the following:

"provided, however, that until the first occasion on which the reactor coolant water temperature, as a result of nuclear heat-up, reaches 375°F, the limiting condition on conductivity shall not exceed 30 micromhos/cm. Thereafter, the limiting condition on conductivity shall be as stated above (5 micromhos/cm). At all times when the conductivity exceeds 5 micromhos/cm, the pH shall not be less than 4.6, except that short-term spikes of up to two hours duration each are permissible in the pH range 4.0 to 4.5 and of up to four hours duration each, in the range 4.5 to 4.6. The total time in which the conductivity exceeds 5 micromhos/cm shall not exceed 720 hours."

This amendment is effective as of the date of issuance.

FOR THE ATOMIC ENERGY COMMISSION

R. C. DeYoung, Assistant Director
for Light Water Reactors Group 1
Directorate of Licensing

Attachment:
Change No. 3 to Appendix A
Technical Specifications

Date of Issuance: MAY 8 1974

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
b. The reactor coolant water shall not exceed the following limits with steaming rates greater than or equal to 100,000 pounds per hour: Conductivity 10 μmho/cm >5 μmho/cm 2 weeks/year Chloride ion 0.5 ppm >0.2 ppm 2 weeks/year	b. At least every 4 days when fuel is in the reactor vessel for conductivity and chloride ion content.
c. Every effort will be made to keep the conductivity below 1 μmho/cm at all times.	
d. pH During power operation if the conductivity exceeds 1.0 μmho/cm, pH shall be measured and brought within the range of 5.6 to 8.6 within 24 hours. If the pH cannot be corrected, or if the pH remains outside the range of 4 to 10 the reactor coolant tmeperature shall be reduced to <212°F.	
3.a Reactor coolant water shall not exceed the limit specified in 3.6.B.2 above.	3.a Conductivity is to be continuously monitored in three places: Reactor Water Cleanup System, between the hot well and the demineralizer beds, and at the outlet of the demineralizer beds.
b. If one of the three monitors is inoperable for a period greater than 30 days, the plant will be shut down in an orderly manner.	b. In the event that one of the three monitors becomes inoperable, conductivity is to be measured and recorded with a temporary instream monitor.
4. If Specification 3.6.B is not met, an orderly shutdown shall be initiated.	

MAY 7 1974

SAFETY EVALUATION BY THE DIRECTORATE OF LICENSING

SUPPORTING AMENDMENT NO. 2 TO DPR-49

(CHANGE NO. 3 TO APPENDIX A OF TECHNICAL SPECIFICATIONS)

IOWA ELECTRIC LIGHT AND POWER COMPANY

CENTRAL IOWA POWER COOPERATIVE

CORN BELT POWER COOPERATIVE

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

Introduction

By letter dated May 6, 1974, 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 change involves a temporary increase on allowable conductivity of the reactor coolant. This increase in conductivity permits heat-up of the reactor coolant so that inadvertently injected demineralizer resin can be decomposed in situ and subsequently removed from the system.

Discussion

During the initial phase of a nuclear heat-up of DAEC on 4/26/74 conductivity was seen to rise in the primary coolant. This phenomenon was due to an earlier inadvertent injection of a small amount of demineralizer resin into the reactor vessel. The chloride ion continued to remain below the detectable limit of 0.01 ppm. Since the resin injection, a continuous flow of water through the control rod drives and recirculation pump seals into the reactor vessel was maintained to ensure against any damage to these components from the resin. Since the initial conductivity rise, continuous efforts were made by the licensee to remove the resin, by the combined efforts of filtering the reactor water and by removing (by ion exchange) that resin which broke down as a result of radiation. The efforts resulted in the apparent gradual removal of the resin. However, the increases in conductivity due to the decomposition of the resin from the combined effects of radiation and thermal environment results in increased coolant conductivity beyond the values permitted by the Technical Specifications. To control pH, periodic injections of small amounts of tri-sodium-phosphate have been made to the reactor water. This method satisfactorily allows pH control during continued resin breakdown. Frequent analyses for the chloride ion are made to assure free chlorine does not exceed Technical Specifications limits.

We have reviewed the proposed temporary change to the Technical Specifications for the DAEC. We agree that the most effective method for removing the inadvertently injected demineralizer resin from the reactor coolant is to decompose it in situ by a combination of radiation exposure and thermal energy additions as proposed by the licensee. We also conclude that this operation should not have significant deleterious effects on the reactor pressure vessel, piping, internal components, and reactor fuel.

Since the decomposition process produces sulfuric acid, and therefore a lowered pH and an increased corrosiveness of the coolant, we believe that steps should be taken during this decomposition process to control the pH in order to minimize any significant corrosion or stress corrosion of the reactor internals. Neutralization by injection of trisodium-phosphate, as described by the licensee, is a satisfactory method for controlling the pH. The selection of pH 4.6 as an acceptable minimum is based on several years of successful operation of BNL-HFBR with an oxygenated coolant acidified to a pH of approximately this level and recognition that pH measurements in high purity water can readily vary by a few tenths of a pH unit. Thus, operation with an acid solution (pH 4.6) for up to 30 days and short-term spikes to a pH value of 4.0 should not cause substantial corrosion or stress corrosion of reactor internals.

Based on our review, having found that the proposed temporary change to Technical Specification 3.6.B.2.a, as modified by the Regulatory staff and as appearing in our May 8, 1974, letter to the licensee, does not involve a safety consideration of a type or magnitude not considered by any previous staff safety review of that facility, substantial increase in the probability or consequences of an accident considered in any previous staff safety review or a substantial decrease in the margin of safety during normal plant operation, anticipated operational occurrences or postulated accidents considered in any previous staff safety review, we conclude that this change to the DAEC Technical Specifications does not involve significant hazards consideration and that there is reasonable assurance that the health and safety of the public will not be endangered by operation of the DAEC in accordance with this change.

G. F. Owsley, L-PM
LWR 1 - 2

W. R. Butler, Branch Chief
LWR 1 - 2

UNITED STATES ATOMIC ENERGY COMMISSION

DOCKET NO. 50-331

IOWA ELECTRIC LIGHT AND POWER COMPANY

CENTRAL IOWA POWER COOPERATIVE

CORN BELT POWER COOPERATIVE

NOTICE OF ISSUANCE OF FACILITY LICENSE AMENDMENT

Notice is hereby given that the U. S. Atomic Energy Commission (the Commission) has issued Amendment No. 2 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 near Palo in Linn County, Iowa. The amendment is effective as of its date of issuance.

The amendment permits a temporary increase in allowable conductivity of the reactor coolant.

The application for the amendment complies with the standards and requirements of the Act and the Commission's rules and regulations and the Commission has made appropriate findings as required by the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations in 10 CFR Chapter 1, which are set forth in the license amendment.

For further details with respect to this action, see (1) the application for amendment, dated May 6, 1974, (2) Amendment No. 2 to License No. DPR-49, with attachments, and (3) the Commission's related Safety Evaluation, dated May 7, 1974. All of these are available for public

inspection at the Commission's Public Document Room, 1717 'H' Street, N.W., Washington, D. C. and at the Reference Service, 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 United States Atomic Energy Commission, Washington, D.C., 20545, Attention: Deputy Director for Reactor Projects, Directorate of Licensing - Regulation.

Dated at Bethesda, Maryland, this 8th day of May, 1974.

FOR THE ATOMIC ENERGY COMMISSION

Walter R. Butler

Walter R. Butler, Chief
Light Water Reactors Projects Branch 1-2
Directorate of Licensing