

October 9, 1991

Docket No. 50-331

DISTRIBUTION:

Mr. Lee Liu  
Chairman of the Board and  
Chief Executive Officer  
Iowa Electric Light and Power Company  
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OC/LFMB PKreutzer  
CShiraki OGC-WF1  
JZwolinski GPA/PA  
PDIII-3 Gray GHill(4)  
Wanda Jones BBoger  
ACRS(10) DHagan  
CGrimes DRP, Region III

Dear Mr. Liu:

SUBJECT: AMENDMENT NO.178 TO FACILITY OPERATING LICENSE NO. DPR-49  
(TAC NO. 76093)

The Commission has issued the enclosed Amendment No.178 to Facility  
Operating License No. DPR-49 for the Duane Arnold Energy Center. This  
to your application dated February 13, 1990.

The amendment revises the Technical Specifications by adding new limiting  
condition for operation 3.14.E and associated bases. The changes increase  
the limit on the quantity of radioactive material contained in low-level  
liquid radwaste tanks.

A copy of the related Safety Evaluation is also enclosed. Notice of  
issuance will be included in the Commission's next biweekly Federal Register  
notice.

Sincerely,

original signed by

Clyde Y. Shiraki, Sr. Project Manager  
Project Directorate III-3  
Division of Reactor Projects III/IV/V  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Amendment No. 178 to License No. DPR-49
- 2. Safety Evaluation

cc w/enclosures:  
See next page

LA: PDIII-3:DRPW  
PKreutzer  
9/27/91  
10/9

PM: PDIII-3:DRPW  
CShiraki:rc  
10/01/91  
10/9

D: PDIII-3:DRPW  
JHannon  
10/1/91

OGC-WF1  
10/2/91

DOCUMENT NAME: 76093 AMD

*W/changes noted*  
*JFO*

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PDR ADDCK 05000331  
P PDR

Mr. Lee Liu  
Iowa Electric Light and Power Company

Duane Arnold Energy Center

cc:

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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.178  
License No. DPR-49

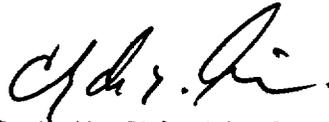
1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Iowa Electric Light and Power Company, et al., dated February 13, 1990, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's 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.178 , 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



Clyde Y. Shiraki, Sr. Project Manager  
Project Directorate III-3  
Division of Reactor Projects III/IV/V  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Technical  
Specifications

Date of issuance: October 9, 1991

ATTACHMENT TO LICENSE AMENDMENT NO.178

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

3.14-4a

3.14-5

3.14-6

3.14-7

3.14-15

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
<p data-bbox="196 233 626 264">3.14.E Liquid Holdup Tanks*</p> <p data-bbox="196 296 812 552">3.14.E.1 The quantity of radioactive material contained in the unprotected outdoor tanks shall be limited to less than or equal to 50 curies, excluding tritium and dissolved or entrained noble gases. (The liquid radwaste storage tanks in the Low-Level Radwaste Processing and Storage Facility are considered unprotected outdoor tanks.)</p> <p data-bbox="196 579 659 611"><u>APPLICABILITY:</u> At all times.</p> <p data-bbox="196 659 310 690"><u>ACTION:</u></p> <p data-bbox="196 716 812 1003">a. With the quantity of radioactive material in the tanks exceeding the above limit, immediately suspend all additions of radioactive material to the tanks, within 48 hours reduce the tank contents to within the limit, and describe the events leading to this condition in the next Semiannual Radioactive Effluent Release Report.</p>	<p data-bbox="862 233 1295 264">4.14.E Liquid Holdup Tanks</p> <p data-bbox="862 296 1479 541">4.14.E.1 The quantity of radioactive material contained in the tanks shall be determined to be within the 50 curie limit by analyzing a representative sample of the tanks' contents at least once per 7 days when radioactive materials are being added to a tank.</p>
<p data-bbox="196 1650 824 1860">* Tanks included in this specification are those outdoor tanks that are not surrounded by liners, dikes, or walls capable of holding the tanks' contents and that do not have tank overflows and surrounding area drains connected to the liquid radwaste treatment system.</p>	

TABLE 3.14-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

<u>INSTRUMENT</u>	<u>MINIMUM CHANNELS OPERABLE</u>	<u>APPLICABILITY#</u>	<u>ACTION</u>
1. Gross Radioactivity Monitors Providing Automatic Termination of Release			
a. Liquid Radwaste Effluent Line	(1)	During releases	18
2. Gross Radioactivity Monitors Not Providing Automatic Termination of Release			
a. RHR Service Water System Effluent Line	(1)	During releases	20
b. General Service Water System	(1)	During releases	20
c. RHR Rupture Disc Effluent Line	(1)	During releases	20
3. Flow Rate Measurement Devices			
a. Liquid Radwaste Effluent Line**	(1)	At all times	21
b. Liquid Radwaste Dilution Line	(1)	During releases	22
4. Tank Level Indicating Devices			
a. LLRPSF Sample Tank	(1)	At all times	23
b. LLRPSF Surge Tank	(1)	At all times	23

# Channel(s) shall be OPERABLE and in service except that channels out of service are permitted for preventive maintenance and required tests, checks, or calibrations.

\*\*Pump curves may be utilized to estimate flow in lieu of flow measurement devices.

TABLE 3.14-1  
(Continued)

TABLE NOTATION

- ACTION 18 With no channel OPERABLE, effluent may be released provided that prior to initiating a release:
1. At least two samples are analyzed in accordance with Specification 4.14.B.1, and
  2. A technically qualified member of the Facility Staff verifies the release rate calculations and discharge valving determined by another technically qualified Facility Staff member.
- Otherwise, suspend release of radioactive effluents via this pathway.
- ACTION 20 With no channel OPERABLE, effluent releases via the affected pathway may continue provided the effluent is sampled and analyzed for either gross beta/gamma or gamma isotopic radioactivity at least once per 8 hours during actual release. The analysis shall be capable of detecting  $10E-7$   $\mu\text{Ci/ml}$  gross beta/gamma or  $5 \times 10E-7$   $\mu\text{Ci/ml}$  for the principal gamma emitters and  $1 \times 10E-6$   $\mu\text{Ci/ml}$  for I-131.
- ACTION 21 With no channel OPERABLE, effluent releases via this pathway may continue provided the flow rate is estimated with pump curves at least once per batch during actual releases.
- ACTION 22 With no channel OPERABLE, suspend release of radioactive effluents via this pathway.
- ACTION 23 With no channel operable, liquid additions to this tank may continue for up to 30 days provided that the tank level is estimated during all liquid additions to the tank.

TABLE 4.14-1  
RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST
1. Gross Beta or Gamma Radioactivity Monitors Providing Alarm and Automatic Isolation				
a. Liquid Radwaste Effluent Line	D*	D(6)	R(3)	Q(1)(2)
2. Gross Beta or Gamma Radioactivity Monitors Providing Alarm But Not Providing Automatic Isolation				
a. RHR Service Water System Effluent Line	D*	M	R(3)	Q(2)
b. General Service Water System Effluent Line	D*	M	R(3)	Q(2)
c. RHR Rupture Disc Effluent Line	D*	M	R(3)	Q(2)
3. Flow Rate Measurement Devices				
a. Liquid Radwaste Effluent Line	D(5)*	N.A.	R	Q
b. Liquid Radwaste Dilution Line	D(5)*	N.A.	R	Q
4. Tank Level Indicating Devices				
a. LLRPSF Sample Tank	D**	N.A.	R	Q
b. LLRPSF Surge Tank	D**	N.A.	R	Q

3/14-7

Amendment No. 109, 128, 178

## DAEC-1

Liquid waste treatment with the evaporator at DAEC has been shown to be neither cost-beneficial nor necessary to comply with 10CFR50 Appendix I, Section II

Consequently, liquid radwaste treatment to achieve an activity concentration below 0.01  $\mu\text{Ci/ml}$  in liquid effluent is not justified.

### 3.14.E and 4.14.E BASES

#### 1. Liquid Hold-Up Tanks

The tanks listed in the specification include all liquid radwaste tanks in the Low-Level Radwaste Processing and Storage Facility (LLRPSF). Because the LLRPSF is not seismically designed, these tanks are considered as outdoor tanks that are not surrounded by liners, dikes, or walls capable of holding the tank contents.

Restricting the quantity of radioactive material contained in the specified tanks provides assurance that in the event of an uncontrolled release of the tanks' contents, the resulting concentrations would be less than the limits of 10 CFR 20, Appendix B, Table II, Column 2, at the nearest potable water supply in an unrestricted area.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 178 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 February 13, 1990, Iowa Electric Light and Power Company requested changes to the Duane Arnold Technical Specifications (TS) which consist of adding new paragraphs 3.14.E and 4.14.E BASES and adding this new information to Tables 3.14-1 and 4.14-1. The changes concern the limit for the quantity of radioactive material contained in low-level liquid radwaste tanks. The proposed changes would allow each radwaste tank to contain up to 50 curies of radioactive material (from 10 curie limit in the current TS) excluding tritium and dissolved or entrained noble gases. The current 10 curie limit was based on the generic limit specified in the Standard Radiological Effluent TS for the outdoor liquid radwaste tanks.

2.0 EVALUATION

To meet anticipated radwaste storage needs, the licensee has constructed an onsite low-level radwaste processing and storage facility (LLRPSF). The LLRPSF will contain 3 liquid radwaste tanks: (1) a 4,000 gallon capacity sample tank (installed), (2) a 7,000 gallon capacity spent resin holdup tank (installed), and (3) a 70,000 gallon capacity radwaste surge tank (to be installed).

The LLRPSF is not designed for the operating basis earthquake in accordance with the guidance provided in Section 5.0 of Regulatory Guide 1.143. Accordingly, the staff treated the tanks in the LLRPSF as outdoor tanks without surrounding liners or walls or area drain collection provisions, as delineated in Section 15.7.3 of the Standard Review Plan (SRP).

The sample tank receives liquid radwaste from the floor drain system in the LLRPSF processing area only. This area is not expected to contain significant levels of radioactivity. The surge tank will receive, among other liquid radwastes, backwash radwaste from the reactor water cleanup

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filter/demineralizers which will contain the highest level of radioactivity. Therefore, the staff selected the future surge tank with 70,000-gallon capacity as the failed component in the LLRPSF for evaluation of the offsite consequences for postulated radioactive releases due to liquid-containing tank failure.

The staff assumed the anticipated radionuclide inventory in the surge tank based on the expected failure fuel fraction that corresponds to 0.025 Ci/sec offgas release rate after a 30-minute delay consistent with the guidelines provided in SRP Section 15.7.3. The staff further assumed that the surge tank in the LLRPSF will fail instantaneously, releasing 56,000 gallons of its entire contents (80 percent of the tank capacity) to the soil, that the released liquids will percolate through the soil into the ground water, and that subsequent movement of the ground water will be directly toward the Cedar River. The licensee has installed the retention basin and sluice gate to prevent any surface runoff of the failed tank contents.

In its evaluation, the staff accepted the licensee's estimated transit time of 1,000 days for the radioactive material to reach the Cedar River from the LLRPSF. The transit time is based on data obtained by the licensee from their well-production studies performed at the Duane Arnold site. The data basis included a permeability of 0.01 cm/sec for the sand and clay soil mixture, an effective porosity of 15 percent, a flow gradient of 5 feet per 650 feet, and a distance of 1500 feet to the river from the LLRPSF. No removal credit for dilution, dispersion, filtration, or ion-exchange of radionuclides was given during intrusion into ground water and ground water transport to the river.

The licensee calculated a dilution factor of 225 in the river using the guidance provided in NUREG-0868, "A Collection of Mathematical Models for Dispersion in Surface Water and Groundwater," dated June 1982. The site-specific parameters used to calculate the dilution factor are 15 miles downstream distance to the municipal water intake from the potential release point, 1.65 feet per second average river water velocity, 400 feet river width and 5 feet river depth.

Using the dilution factor of 225 and the radwaste transit time of 1,000 days, the staff calculated the expected radioactivity concentrations at the Cedar Rapids Municipal Intake in the event of an uncontrolled release of the surge tank contents, and found that the resulting concentrations at the intake will be well below the maximum permissible concentrations specified in 10 CFR Part 20, Appendix B, Column 2. The controlling radionuclide is strontium-90 with the expected concentration of  $1.6 \times 10^{-8}$   $\mu\text{Ci/cc}$  (5 percent of the limit) at the intake. Since an uncontrolled release of the surge tank contents will not result in violation of 10 CFR Part 20 limits, the staff finds the increase in the limit for radioactive materials in the low-level liquid radwaste tanks to be 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 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 or changes in 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 the amendment involves no significant hazards consideration and there has been no public comment on such finding (56 FR 31438). 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

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.

Principal Contributor: Jay Lee

Date: October 9, 1991