

April 23, 1990

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

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Dear Mr. Liu:

SUBJECT: AMENDMENT NO. 164 TO FACILITY OPERATING LICENSE NO. DPR-49
(TAC NO. 68484)

The Commission has issued the enclosed Amendment No. 164 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center. This amendment revises the license in response to your application dated June 10, 1988.

The amendment revises the expiration date for Facility Operating License No. DPR-49 for the Duane Arnold Energy Center from June 21, 2010 to February 21, 2014.

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 Timothy G. Colburn for:

James R. Hall, Project Manager
Project Directorate III-3
Division of Reactor Projects - III,
IV, V & Special Projects
Office of Nuclear Reactor Regulation

Enclosures:

- Amendment No.164 to License No. DPR-49
- Safety Evaluation

cc w/enclosures:
See next page

Office: LA/PDIII-3
Surname: PKreutzer
Date: 4/15/89

Office: SPLB/DEST
Surname: CMCracken
Date: 8/18/89

Office: RE/PDIII-3
Surname: LKokajko/tg
Date: 8/15/89

Office: RRPB/DREP
Surname: LCunningham
Date: 8/24/89

Office: PM/PDIII-3
Surname: RHall
Date: 8/15/89

Office: PD/PDIII-3
Surname: JHannon
Date: 8/25/89

Office: SRXB/DEST
Surname: WHodges
Date: 8/15/89

Office: OGC (CW)
Surname: SBarrish
Date: 8/26/89

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JLA for LEK 3/14/90

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

April 23, 1990

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Chairman of the Board and
Chief Executive Officer
Iowa Electric Light and Power Company
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Sincerely,

A handwritten signature in cursive script, appearing to read "James R. Hall".

James R. Hall, Project Manager
Project Directorate III-3
Division of Reactor Projects - III,
IV, V & Special Projects
Office of Nuclear Reactor Regulation

Enclosures:

1. Amendment No. 164 to License No. DPR-49
2. Safety Evaluation

cc w/enclosures:
See next page

Mr. Lee Liu
Iowa Electric Light and Power Company

Duane Arnold Energy Center

cc:

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Kathleen H. Shea, Esquire
Newman and Holtzinger
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Washington, D.C. 20036

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

Iowa Electric Light and Power Company
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U.S. Nuclear Regulatory Commission
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Regional Administrator, Region III
U.S. Nuclear Regulatory Commission
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Mr. John A. Eure
Assistant to the Division Director
for Environmental Health
Iowa Department of Public Health
Lucas State Office Building
Des Moines, Iowa 50319



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. 164
License No. DPR-49

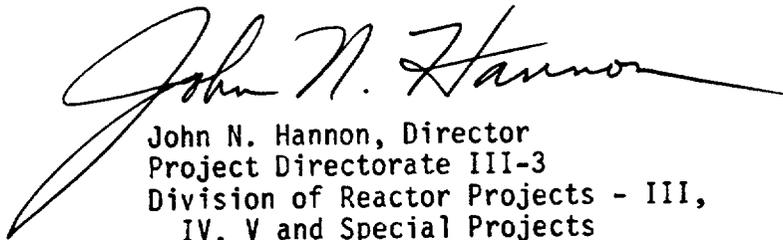
1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Iowa Electric Light and Power Company, et al., dated June 10, 1988 complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules 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, paragraph 2.D of Facility Operating License No. DPR-49 is hereby amended to read as follows:

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D. This license is effective as of the date of issuance and shall expire at midnight February 21, 2014.

3. The license amendment is effective as of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

A handwritten signature in black ink, reading "John N. Hannon". The signature is fluid and cursive, with a long, sweeping underline that extends to the left and then curves back under the name.

John N. Hannon, Director
Project Directorate III-3
Division of Reactor Projects - III,
IV, V and Special Projects
Office of Nuclear Reactor Regulation

Date of Issuance: April 23, 1990



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 164 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 June 10, 1988, Iowa Electric Light and Power Company, et al., (the licensee) submitted an application for an amendment to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center (DAEC). The proposed amendment would revise the expiration date for Facility Operating License No. DPR-49 from June 21, 2010 to February 21, 2014.

2.0 DISCUSSION

Section 103.c of the Atomic Energy Act of 1954 provides that the facility operating license is to be issued for a specified period not exceeding 40 years. The Code of Federal Regulations (CFR) at 10 CFR 50.51 specifies that each license will be issued for a fixed period of time, to be specified in the license, not to exceed 40 years from the date of issuance. Section 50.57 of 10 CFR allows the issuance of an operating license pursuant to 10 CFR 50.56 for the period specified in 10 CFR 50.51 after the construction of the facility has been substantially completed, in conformity with the construction permit and when other provisions specified in 10 CFR 50.57 are met. The current term of the license for the DAEC is 40 years commencing with the issuance of the construction permit. Accounting for the time that was required for plant construction, this represents an effective operating term of approximately 36 years. Consistent with Section 103.c of the Atomic Energy Act of 1954 and 10 CFR Parts 50.51, 50.56, and 50.57 of the Commission's regulations, the licensee, by its application dated June 10, 1988, requested an extension of the operating license term for the Duane Arnold Energy Center such that the fixed period of the license would be 40 years from the date of issuance of the operating license (February 22, 1974) rather than the construction permit (June 22, 1970). The amendment would not involve any changes in the design or operation of the facility.

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3.0 EVALUATION

3.1 Facility

The licensee's request for extension of the DAEC Facility Operating License is based upon the fact that a 40-year service life was considered during the design and construction of the plant as discussed in the DAEC Final Safety Analysis Report (FSAR). The 40-year design life was based on operation at a thermal power of 1658 megawatts with a cumulative lifetime capacity factor of 80%, or 32 effective full power years (EFPY). This does not mean that equipment or components will not wear out or require replacement during plant lifetime. As a result, DAEC employs an ongoing program of testing, inspection, and preventative/corrective maintenance on plant structures, systems, and components. The DAEC Technical Specifications (TS) contain requirements for periodic surveillance, as well as inservice inspection and inservice testing, to ensure that degradation in systems or equipment will be identified and corrected in a timely manner.

The design of the DAEC reactor pressure vessel and its internals considered the effects of 40 years of operation. Therefore, a comprehensive vessel material surveillance program is conducted in accordance with 10 CFR Part 50, Appendix H, which additionally ensures that the fracture toughness requirements of 10 CFR Part 50, Appendix G, are met. Analysis of reactor vessel test specimens thus far has indicated that the expected cumulative neutron fluence of the vessel at the 32 EFPY service life will not be exceeded.

Aging analysis of safety-related electrical equipment at DAEC to determine environmental qualification has been performed in accordance with IE Bulletin 79-01B and 10 CFR 50.49. Aging analysis data have been incorporated into plant maintenance and equipment replacement practices. This will ensure that all safety-related electrical equipment remains qualified and available to perform its safety-related function regardless of the overall age of the facility. In a letter dated January 10, 1985, the staff found the licensee's environmental qualification program acceptable.

Advancements in fuel design have allowed DAEC to use higher enrichment fuel, which has led to 18-month, rather than 12-month, fuel cycles. While this has reduced the number of refuel outages necessary during the lifetime of the facility, and reduced the number of fuel bundles discharged throughout the 40-year operating life, DAEC spent fuel pool capacity will be challenged. With an exchange of fuel racks to accommodate additional spent fuel assemblies, the capacity of the spent fuel pool will be reached at the end of fuel cycle 16 (June 1999). By allowing the license extension, an additional 360 fuel assemblies will have to be accommodated. The licensee is currently considering three different courses of action to ensure that the spent fuel pool meets the needs of the DAEC beyond fuel cycle 16. These actions are: 1) offsite storage, 2) onsite storage, and 3) rod consolidation.

DAEC processes liquid, gaseous, and solid radioactive wastes. The liquid radwaste systems are designed to process and solidify when appropriate, the collected liquid streams. Gaseous wastes are processed through a recombiner/charcoal delay system, monitored, and released to the atmosphere via the offgas stack. Both liquid and gaseous effluents from the waste treatment systems are continuously monitored, and discharges terminated if the effluents exceed preset radioactivity levels. Solid wastes are packaged in suitable containers, monitored, and transported offsite for burial. DAEC has adequate facilities to process radioactive waste and to limit the radioactive releases to the environment within the limits of 10 CFR Part 20 throughout the license extension period.

While changes have been made to the plant design since the original plant construction was completed, each of these changes involving a safety-related component has been reviewed and approved by the staff with the details being documented in a related Safety Evaluation. Further, as required by 10 CFR 50.71(e), these changes and their effect on accident analyses, if any, are routinely updated in the FSAR. The staff's review of the original Safety Evaluation Report, with its supplements, and the updated DAEC FSAR has not identified any concerns associated with approval of the proposed license extension that have not already been addressed by licensee commitments, operating procedures, and/or license requirements.

3.2 Environment

Extending the DAEC Facility Operating License will not significantly impact the environmental information presented in the DAEC FSAR and Environmental Report as evaluated in the staff's Safety Evaluation Report (January 23, 1973) and Final Environmental Statement (March 1973). Both the DAEC Environmental Report and the staff's Final Environmental Statement (FES) were written on the basis of a plant operating life of 40 years. The assessed impact to the public is basically unchanged, since: 1) the land uses within the low population zone, which is rural and sparsely populated, have remained constant and are expected to remain so throughout the life of the DAEC; and 2) the actual rate of population growth from 1970 to 1980 for the area within a 50-mile radius of the plant was much lower than the FES projected growth rate (4.7% versus 12.7%). In addition, revised growth estimates by the U. S. Department of Commerce, Bureau of Economic Analysis, project the population in the area to be approximately 670,000 by 2014, the last year of the license extension. This is much lower than the 2010 population predicted in the FES of 952,106. Moreover, the recent expansion of the DAEC emergency planning zone and compliance with the new Federal Emergency Management Agency requirements have improved the ability of the licensee, State, and local authorities to notify and assist the public in the event of an emergency. Further details of the staff's review are contained in the associated Environmental Assessment dated April 13, 1990.

Accordingly, the Commission's conclusions in the January 23, 1973 Safety Evaluation regarding 10 CFR Part 100 siting criteria for the DAEC facility (i.e., that the exclusion area, low population zone, and population center distances meet the guidelines of 10 CFR Part 100) are not changed by the proposed license extension, and the DAEC site continues to be acceptable.

3.3 ALARA (As Low As Reasonably Achievable)

The licensee has implemented a comprehensive ALARA program. The policy of the licensee is that they are committed to limiting occupational radiation exposures as low as reasonably achievable and within the requirements of 10 CFR Part 20. This policy is implemented by personnel training, administrative dose control, maximum permissible concentration per hour control, radiation work permits, and engineering reviews.

Additionally, the licensee has implemented operational considerations to achieve and maintain the goals of the ALARA policy. The first operational consideration is the leakage reduction program, which is described in the FSAR. The licensee has implemented this program in response to NUREG-0578, to reduce leakage from systems outside containment that would or could contain highly radioactive fluids during a serious accident. The second operational consideration is access control. This program posts and controls radiation areas dependent upon the dose rate in the area. These controls may include signs, barricades, locked doors, radiation work permits and special radiation work permits (if the potential dose rate is in excess of 10 R/hr.).

As reported in NUREG-0713, the average dose equivalent (rem/worker) at the DAEC has been lower than the average for all U. S. boiling water reactors (BWR's) for 8 of the 13 years that the DAEC has been in operation. Over the last five year period, DAEC's annual average dose was 20% less than the national average dose per reactor for BWR's. Continued implementation of the ALARA program, radiation protection procedures, individual radiation monitoring, and preventative maintenance are expected to maintain average annual dose equivalents at DAEC at or below the previous levels through the present license term as well as the proposed extension. The fewer number of refueling outages required during the lifetime of the DAEC due to improvements in fuel design will contribute to lower the average of annual dose equivalents for workers. Assuming that the DAEC incurs an annual average dose of 557 person-rems (the average annual dose at the DAEC over its 13-year lifetime) for each additional year of operation, the total projected dose for the nearly 4 years of additional operation would be 2228 person-rems. This additional dose is only a small fraction (i.e., 1%) of the 167,105 person-rems accumulated by all operating reactors over a similar 4 year period (1985-1988). The staff expects that increased doses from increased maintenance and corrosion product build-up will be offset by a continually improving ALARA program, dose-saving plant modifications, and reduced requirements for TMI-related modifications.

3.4 Summary

The extension of the DAEC facility operating license to allow a 40-year service life is consistent with the licensing basis in that the appropriate issues relating to the facility, plant aging, the environment, and population changes have been addressed. In the Environmental Assessment related to this action, it was concluded that the annual radiological effects during the proposed license extension are not more than were previously estimated in the Final

Environmental Statement, and are acceptable. The extension to allow a 40-year service life is consistent with the FSAR, Safety Evaluation Report, and submittals made by the licensee, and there is reasonable assurance that the plant will continue to operate safely for the additional period authorized by this amendment.

Therefore, based upon the information presented, the staff concludes that the proposed extension to the DAEC facility operating license is acceptable.

4.0 ENVIRONMENTAL CONSIDERATION

Pursuant to 10 CFR 51.21, 51.32, and 51.35, an environmental assessment and finding of no significant impact has been prepared and published in the Federal Register on April 20, 1990 (55 FR 15046). Accordingly, based upon the environmental assessment, the Commission has determined that the issuance of this amendment will not have a significant effect on the quality of the human environment.

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, 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: Lawrence E. Kokajko

Dated: April 23, 1990