April 28, 1989

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Docket No. 50-331

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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:

SUBJECT: AMENDMENT NO. 159 TO FACILITY OPERATING LICENSE NO. DPR-49
(TAC NO. 65338)

The Commission has issued the enclosed Amendment No. 159 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center (DAEC). This amendment consists of changes to the Technical Specifications in response to your application dated April 24, 1987.

The amendment revises the DAEC Radiological Effluent Technical Specifications (RETS) to adopt the format of the NRC staff's model RETS for Boiling Water Reactors (NUREG-0473, Revision 2, February 1980). These changes are administrative in nature and do not affect the technical content of the existing RETS, which were incorporated into the DAEC operating license in Amendment No. 109, issued January 14, 1985.

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,

/s/

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. 159 to License No. DPR-49
2. Safety Evaluation

DFO1

cc w/enclosures:
See next page

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Surname:	PKreutzer	RHall/mr	JHannon	
Date:	4/4/89	4/16/89	4/19/89	4/10/89

4/25/89

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Mr. Lee Liu
Iowa Electric Light and Power Company

Duane Arnold Energy Center

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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. 159
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 April 24, 1987 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:

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(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No.159 , 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

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

Attachment:
Changes to the Technical Specifications

Date of Issuance: April 28, 1989

ATTACHMENT TO LICENSE AMENDMENT NO. 159

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

iiia
3.14-1
3.14-2
3.14-3
3.14-4
3.14-6
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LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.14 RADIOACTIVE LIQUID EFFLUENT	4.14 RADIOACTIVE LIQUID EFFLUENT
3.14.A Radioactive Liquid Effluent Instrumentation	4.14.A Radioactive Liquid Effluent Instrumentation
3.14.A.1 The radioactive liquid effluent monitoring instrumentation channels shown in Table 3.14-1 shall be OPERABLE with their alarm and trip setpoints set to ensure that the limits of Specification 3.14.B are not exceeded. APPLICABILITY: As shown in Table 3.14-1. ACTION: a. When a radioactive liquid effluent monitoring instrumentation channel alarm and trip setpoint is less conservative than a value which will ensure that the limits of 3.14.B are met, adjust without delay to meet Specification 3.14.B, or suspend the release of radioactive liquid effluents monitored by the affected channel, or declare the channel inoperable. b. When less than the minimum required liquid effluent monitoring instrument channel is OPERABLE, take the ACTION stated in Table 3.14-1 and make every reasonable effort to restore the instrument to operable status. In the event the minimum required instrumentation is not returned to OPERABLE status within 30 days, explain in the next Semiannual Radioactive Material Release Report, in lieu of any other report, why the instrument was not made OPERABLE in a timely manner.	4.14.A.1 Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST operations during the modes and at the frequencies shown in Table 4.14-1. 4.14.A.2 The setpoints shall be determined in accordance with the method described in the ODAM.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.14.B Liquid Effluent Concentration	4.14.B Liquid Effluent Concentration
3.14.B.1 The concentration of radioactive material in liquid effluent released from the site to the unrestricted area (see UFSAR Figure 1.2-1) shall not exceed the concentrations specified in 10CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall not exceed 2×10^{-4} μCi/ml total activity.	4.14.B.1 Each radioactive liquid waste batch shall be sampled and analyzed in accordance with Table 4.14-2 before release. Alternatively, pre-release analysis of batch(es) of radioactive liquid waste may be by gross β or γ counting provided the maximum permissible concentration, 1×10^{-7} μCi/ml, is applied at the unrestricted area boundary.
APPLICABILITY: At all times.	4.14.B.2 The results of pre-release analyses shall be used with the calculational methods in the ODAM to establish trip setpoints for batch releases to assure that the concentration at the restricted area boundary does not exceed the limit in Specification 3.14.B.
ACTION: a. With the concentration of radioactive material released from the site to unrestricted areas exceeding the limit, without delay restore the concentration within the limit.	4.14.B.3 In any week during which Service Water is released to the unrestricted area, a grab sample of water shall be collected from that Service Water System and analyzed as specified in Table 4.14-2, Item B.1 or B.2, and Item B.4. In the event the radioactivity concentration in the service water exceeds the LLD stated in Table 4.14-2 for the analytical method used, the activity concentration shall be determined by sampling and post-release analyses specified in Table 4.14-2, Items B.2 through B.5.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.14.C Dose Due to Radioactive Effluents	4.14.C Dose Due to Radioactive Effluents
3.14.C.1 The dose or dose commitment to a member of the Public from radioactive materials in liquid effluents released to the unrestricted area (see UFSAR Figure 1.2-1) shall not exceed: 1.5 mrem to the total body during any calendar quarter, 5.0 mrem to any organ during any calendar quarter, 3.0 mrem to the total body during any calendar year, or 10.0 mrem to any organ during any calendar year.	4.14.C.1 Dose Calculations. In any quarter in which radioactive liquid effluent is discharged, an assessment shall be performed in accordance with the ODAM at least once per 30 days in order to verify that the cumulative dose commitment does not exceed the limits in Specification 3.14.C.
APPLICABILITY: At all times.	
ACTION: a. With the calculated dose from the release of radioactive materials in liquid effluents exceeding the above limit, prepare and submit to the Commission within 30 days from the end of the quarter during which the release occurred, pursuant to Specification 6.11.3, and in lieu of any other report, a Special Report which identifies the cause(s) for exceeding the limit and defines the corrective actions to be taken.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.14.D Liquid Waste Treatment	4.14.D Liquid Waste Treatment
3.14.D.1 Appropriate liquid radwaste equipment shall be used to treat any untreated batch of liquid waste prior to discharge when a pre-release analysis indicates a radioactivity concentration (exclusive of tritium and dissolved noble gases) of 0.01 μCi/ml or higher.	4.14.D.1 Each radioactive liquid waste batch shall be sampled and analyzed in accordance with Table 4.14-2 before release.
APPLICABILITY: At all times.	Alternatively, pre-release analysis of batch(es) of radioactive liquid waste may be by gross β or γ counting provided the maximum permissible concentration, 1×10^{-7} μCi/ml, is applied at the unrestricted area boundary.
ACTION:	
a. With radioactive liquid waste being discharged without treatment and in excess of the above limit, prepare and submit to the Commission within 30 days, pursuant to Specification 6.11.3, a Special Report, in lieu of any other report, which includes the following information:	
1. Identification of equipment or subsystems not OPERABLE and the reason for inoperability.	
2. Action(s) taken to restore the inoperable equipment to OPERABLE status.	
3. Summary description of action(s) taken to prevent a recurrence.	

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 gross radioactivity at least once per eight hours during actual release. The analysis shall be capable of detecting 10^{-7} μCi/ml.

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.

3.14.A and 4.14.A BASES

1. Radioactive Liquid Effluent Instrumentation

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the release of radioactive material in liquid effluents. The OPERABILITY and use of these instruments implements the requirements of 10 CFR Part 50, Appendix A, General Design Criteria 60, 63, and 64. The alarm and/or trip setpoints for these instruments are calculated in the manner described in the ODAM to assure that the alarm and/or trip will occur before the limit specified in 10 CFR Part 20.106 is exceeded.

Instrumentation is expected to be OPERABLE and in service when required by Specification. An instrument may be removed from service voluntarily for the purpose of tests, checks, calibration, or preventative maintenance without declaring the channel inoperable.

3.14.B and 4.14.B BASES

1. Liquid Effluent Concentration

Specification 3/4.14.B is provided to satisfy the regulation governing the maximum concentration of radioactive material in liquid effluent that may be released to an unrestricted area as stated in 10 CFR Part 20.106 and the regulation requiring surveys needed to determine compliance stated in Part 20.201.

Conformance to Specification 3.14.B, when applied to the activity concentration in the river at the site boundary due to liquid effluent, would assure that the average activity concentration in liquid effluent released to the unrestricted area is a small fraction of the limit specified in Part 20.106.

The sample points noted in Table 4.14-2 are adequate to ensure sampling of potential liquid radioactive effluents from the service water systems. The sample points include the General Service Water System and the RHR Service Water Systems A and B. The sample point for the RHR Service Water Systems is at a location downstream of the point where Emergency Service Water discharge joins with the RHR Service Water System, and upstream of the point where the RHR Rupture Disc Line branches off of the RHR Service Water System. This sample point will therefore provide for sampling effluents from the RHR Service Water System, Emergency Service Water System and/or RHR Rupture Disc Line.

3.14.C and 4.14.C BASES

1. Dose Due to Radioactive Effluents

Specifications 3.14.C, 3.15.C, and 3.15.D implement the requirements of 10 CFR Part 50.36a and of 10 CFR Part 50, Appendix I, Section IV. These specifications state Limiting Conditions of Operation (LCO) to keep levels of radioactive materials in LWR effluents as low as is reasonably achievable. Compliance with these specifications will also keep average releases of radioactive material in effluents at small percentages of the limits specified in 10 CFR Part 20.106. Surveillance requirements provide for the measurement of releases and calculation of doses to verify compliance with the Specifications. Action statements in these Specifications implement the requirements of 10 CFR Part 50.36(c)(2) and 10 CFR Part 50, Appendix I, Section IV.A in the event a LCO is not met.

2. Liquid Effluents

With the implementation of Specification 3.14.C, there is reasonable assurance that Station operation will not cause a radionuclide concentration in public drinking water taken from the River that exceeds the standard for anthropogenic radioactivity in community drinking water. The equations in the ODAM for calculating doses due to measured releases of radioactive material in liquid effluent will be consistent with the methodology in Regulatory Guide 1.109 and 1.113. The assessment of personal doses will examine potential exposure pathways including, as appropriate, consumption of fish and water taken from the River downstream of the discharge canal.

3.14.D and 4.14.D BASES

1. Liquid Waste Treatment

This specification implements the requirements of 10CFR Part 50.36a (a) (1) that operating procedures be established and followed and that equipment be maintained and used to keep releases to the environment as low as is reasonably achievable. The specification intends that appropriate portions of the system which were used to establish compliance with the design objectives in 10CFR Part 50, Appendix I, Section II be used when specified to provide reasonable assurance that releases of radioactive material in liquid effluent will be kept as low as is reasonably achievable. The components in the liquid radwaste system which are appropriate to process liquid waste in order to satisfy Specification 4.14.D are the floor drain demineralizer and the radwaste demineralizer.

The activity concentration, 0.01μCi/ml, below which liquid radwaste treatment would not be cost-beneficial, and therefore not required, is demonstrated below.

The quantity of radioactive material in liquid effluent released annually from the DAEC has been calculated to be[1]

total iodines	0.11 curie
total others (less H^3)	0.25
Total	0.36 curie

The population dose commitment resulting from the radioactive material in liquid effluent released annually has been calculated to be[1]

thyroid	0.164 man rem
total body	0.114
Total	0.278 man rem

[1]"Evaluation of the Duane Arnold Energy Center to demonstrate Conformance to the Design Objectives of 10 CFR 50, Appendix I, "Iowa Electric Light & Power Company, May 1976.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.15 RADIOACTIVE GASEOUS EFFLUENTS	4.15 RADIOACTIVE GASEOUS EFFLUENTS
3.15.A Radioactive Gaseous Effluent Instrumentation	4.15.A Radioactive Gaseous Effluent Instrumentation
3.15.A.1 The radioactive gaseous effluent monitoring instrumentation channels shown in Table 3.15-1 shall be OPERABLE. Their radioactive noble gas monitor alarm setpoint shall be set to cause automatic alarm when the limits of Specification 3.15.B.1 are exceeded.	4.15.A.1 Each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, AND CHANNEL FUNCTIONAL TEST operations during the MODES and at the frequencies shown in Table 4.15-1.
APPLICABILITY: As shown in Table 3.15-1.	4.15.A.2 The setpoints shall be determined according to the method described in the ODAM.
ACTION:	
a. With radioactive gaseous effluent monitoring instrumentation channel alarm setpoint less conservative than a value which will ensure that the limits of 3.15.B are met, adjust without delay to meet Specification 3.15.A, declare the channel inoperable, or immediately suspend any release via the instrumented pathway.	
b. With less than the minimum required gaseous effluent monitoring instrument channels OPERABLE, take the action stated in Table 3.15-1 and make every reasonable effort to restore the instrument to operable status. In the event the minimum required instrumentation is not returned to OPERABLE status within 30 days, explain in the next Semiannual Radioactive Material Release Report, in lieu of any other report, why the instrument was not made OPERABLE in a timely manner.	

Amendment No. 109, 128, 159

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.15.B Gaseous Effluent Concentration	4.15.B Gaseous Effluent Concentration
3.15.B.1 The dose rate in the unrestricted area (see UFSAR Figure 1.2-1) due to radioactive noble gas released in effluents shall not exceed 500 mrem/year to the total body or 3000 mrem/year to skin.	4.15.B.1 Compliance with 3.15.B shall be assessed on the basis of results of measurements specified in Table 4.15-2 and according to methodology stated in the ODAM.
3.15.B.2 The dose rate in the unrestricted area due to I-131, I-133, H-3, and to radioactive particulates having half-lives of 8 days or more that are released in effluents shall not exceed 1500 mrem/year to any organ.	
APPLICABILITY: Whenever monitoring or sampling is required.	
ACTION: When the dose rate exceeds a limit in 3.15.B, decrease the release rate without delay to comply with the limit.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.15.C Doses Due to Noble Gases	4.15.C Doses Due to Noble Gases
3.15.C.1 The air dose in the unrestricted area (see UFSAR Figure 1.2-1) due to noble gases released in gaseous effluents shall not exceed: 5.0 mrad from gamma radiation during any calendar quarter, 10.0 mrad from beta radiation during any calendar quarter, 10.0 mrad from gamma radiation during any calendar year, or, 20.0 mrad from beta radiation during any calendar year.	4.15.C.1 Dose Assessment An assessment shall be performed in accord with the ODAM at least once every 30 days to verify that the cumulative air dose during the quarter and year due to noble gases does not exceed the limits in Specification 3.15.C.
APPLICABILITY: At all times when monitors are required.	
ACTION: a. If the calculated air dose from radioactive noble gases in gaseous effluents exceeds either of the above limits prepare and submit a Special Report to the Commission within 30 days following the end of the calendar quarter during which the release occurred. The Special Report shall be pursuant to Specification 6.11.3, shall be in lieu of any other report, and shall identify the cause(s) for exceeding the limit and define the corrective actions taken.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.15.D Doses Due to Iodine and Particulates in Air	4.15.D Doses Due to Iodine and Particulates in Air
3.15.D.1 The dose to a member of the public from iodine-131, I-133, H-3, and from radionuclides in particulate form having half-lives greater than eight days in gaseous effluents released from the site to the unrestricted area (see UFSAR Figure 1.2-1) shall not exceed: 7.5 mrem to any organ during any calendar quarter, or, 15.0 mrem to any organ during any calendar year.	4.15.D.1 An assessment shall be performed in accordance with the ODAM at least once every 31 days to verify that the cumulative dose commitment due to I-131, I-133, H-3, and radioactive particulates having half-lives greater than eight days in gaseous effluents does not exceed the limits in Specification 3.15.D.
APPLICABILITY: At all times when monitors are required.	
ACTION: a. With the calculated dose from the release of I-131, I-133, H-3, and radionuclides in particulate form having half-lives greater than eight days in gaseous effluents exceeding the above limit, prepare and submit a Special Report to the Commission within 30 days following the end of the calendar quarter during which the release occurred. The Special Report shall be made pursuant to Specification 6.11.3, shall be in lieu of any other report, and shall identify the cause(s) for exceeding the limit and define the corrective actions taken.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.15.E Gaseous Radwaste Treatment	4.15.E Gaseous Radwaste Treatment
3.15.E.1 Every reasonable effort shall be made to maintain at least one train of the Offgas System OPERABLE. Within four hours after commencing operation of the main condenser air ejector, at least one train of charcoal beds in the Offgas System shall be placed in operation to treat radioactive gases from the main condenser air ejector. During continuing reactor operation, at least one train of charcoal beds in the Offgas System shall be used to treat the gases before discharge. APPLICABILITY: When the main condenser air ejector is operating. ACTION: a. If gaseous wastes are discharged for more than 7 days without treatment, prepare and submit a Special Report to the Commission within 30 days pursuant to Specification 6.11.3, in lieu of any other report, including the following information: 1. Identification of the inoperable equipment or subsystem and reason for inoperability. 2. Action(s) taken to restore the inoperable equipment to OPERABLE status. 3. Summary description of action(s) taken to prevent a recurrence.	4.15.E.1 The gaseous effluent monitoring systems of Specification 3.2.D shall be used to verify the operation of the offgas system.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.15.F Explosive Gas Mixture	4.15.F Explosive Gas Mixture
3.15.F.1 The concentration of hydrogen in the offgas system downstream of the recombiners shall be limited to $\leq$ 4% by volume. APPLICABILITY: During Offgas System operation. ACTION: a. With the concentration of hydrogen in the main condensor offgas treatment system downstream of the recombiners exceeding the limit, restore the concentration to within the limit within 48 hours. b. In the event the hydrogen concentration is not reduced to $\leq$ 4% within 48 hours, be in at least HOT SHUTDOWN or within the limit within the following 24 hours.	4.15.F.1 The concentration of hydrogen in the Offgas System shall be determined by monitoring the offgases in the Offgas System downstream of the recombiners with the hydrogen monitors.

TABLE 4.15-2
(Continued)

TABLE NOTATION

a. Table 4.14-2, Note a is a definition of the lower limit of detection (LLD).

b. Analyses shall be performed following an increase of more than 50% in the steady state releases as indicated by the post-treat noble gas activity monitor, after factoring out the effect due to a change in reactor power.

c. Sample media shall be changed at least once per seven days and the analysis completed within 48 hours after changing (or after removal from the sampler). Analyses shall also be performed within 48 hours following an increase of more than 50% in the steady state release as indicated by the post-treat noble gas activity monitor, after factoring out the effect due to a change in reactor power. When samples collected for 24 hours or less are analyzed, the corresponding LLD may be increased by a factor of 10.

d. The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Specifications 3.15.B, 3.15.C and 3.15.D.

e. The principal gamma emitters for which the LLD specification will apply are exclusively the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 for gaseous emissions and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be detected and reported. Other peaks which are measurable and identifiable, together with the above nuclides, shall also be identified and reported. Nuclides which are below the LLD may be reported as "less than" their respective LLD and should not be reported as being present at the LLD of the nuclide. Each measured radionuclide concentration is used in a required concentration or dose calculation only if it is detected at or above the LLD. When unusual circumstances persist more than 30 days and cause LLD higher than required, the reasons shall be documented in the Semiannual Radioactive Material Release Report.

f. A quarterly composite sample shall include an equal fraction of each weekly particulate sample collected during the quarter.

g. An H-3 grab sample will also be taken from the Offgas Stack or Reactor Building Vent when the reactor head is removed.

3.15.A and 4.15.A BASES

1. Radioactive Gaseous Effluent Instrumentation

The radioactive gaseous effluent instrumentation is provided to monitor the release of radioactive materials in gaseous effluents and, as appropriate, to control potential releases. Instrumentation for monitoring the concentration of potentially explosive gas mixtures in the main condenser offgas treatment system is also provided. The presence of instruments for monitoring both radioactive and explosive gaseous effluents is depicted in ODAM Figure 3-1. The OPERABILITY and use of these instruments implements the requirements of 10CFR Part 50, Appendix A, General Design Criteria 60, 63, and 64.

Reactor building exhaust ventilation shaft radiation monitors initiate isolation of the reactor building normal ventilation and start standby gas treatment when a high trip point is reached.

DAEC is equipped with a radioactive gaseous effluent monitoring system which includes detectors at the offgas stack (R3), the reactor building vent (R4), the turbine building vent (R5), and the LLRPSF vent. A remote indication and control unit located near each detector displays the detector reading and, whenever the setpoint is exceeded, an indicator light. The data are also routed to a control computer and a control room display and, except for the LLRPSF vent detector, do not cause a trip to isolate the ventilated area. The LLRPSF vent detector does isolate the LLRPSF ventilation system. However, the isolation function is not required by regulation but is provided as an engineering design conservatism. In the event the control computer and/or control room display fail to function or are voluntarily taken out of service, each remote indication and control unit is designed to acquire data for up to 30 hours. It is intended that each affected remote indication and control unit display be observed at least once per 24 hours (in which case the affected channel remains OPERABLE).

If an alarm trip setpoint is exceeded at the same time the control computer and/or control room display are neither functioning nor in service, alarm annunciation will still occur in the control room. In the event the detector reading and the indication of exceeding the monitor setpoint are not provided at either the control room or the remote indication and control unit, then the affected channel is not OPERABLE and DAEC will either perform the appropriate ACTION or will provide an alternate monitoring system. This permits DAEC to retain the GE gaseous monitoring system as an alternate system for normal effluent monitoring when the Kaman system is temporarily inoperable. When used as an alternate monitoring system, the GE system is subject to the requirements stated in Specifications 3.15.A and 4.15.A and to LLD requirements stated in Table 4.15-2, Item C.

2. Not used

3. Gaseous Effluents

Assessments of dose required by Specifications 4.15.C and 4.15.D to verify compliance with Appendix I, Section IV are based on measured radioactivity in gaseous effluent and on calculational methods stated in the ODAM. Pathways of exposure and location of individuals are selected such that the dose to a nearby resident is unlikely to be underestimated. Dose assessment methodology described in the ODAM for gaseous effluent will be consistent with the methodology in Regulatory Guides 1.109 and 1.111. Cumulative and projected assessments of dose made during a quarter are based on historical average meteorological conditions measured at DAEC. Assessment made for the annual radiological environmental report will be based on annual averages of atmospheric conditions during the period of release.

3.15.B and 4.15.B BASES

Gaseous Effluent Concentration

This specification is intended to ensure that the concentration of radioactive material in the unrestricted area beyond the site boundary due to gaseous effluents from DAEC will maintain doses within the annual dose limits to unrestricted area provided in 10 CFR Part 20. Compliance with these limits also reasonably assures that radioactive material in gaseous effluents will not result in exposure of a member of the public in an unrestricted area to annual averaged concentrations exceeding the limit in 10 CFR Part 20.106. The occupancy time of members of the public who may occasionally be on the site is expected to be low enough to compensate for any less atmospheric dispersion on site than to the environs offsite.

Assessment of compliance is based upon an effluents measurement program defined in Table 4.15-2 and methodology stated in the ODAM. The resolving time of the measurements, ie., the sample integration time, bounds the minimum averaging time of the effluent measurements waste streams. The Standby Gas Treatment System is considered an Engineered Safety Feature and not an exhaust ventilation treatment system. Thus the exhaust ventilation system discharges via the reactor building vent.

3.15.C and 4.15.C BASES

Doses due to Noble Gases

These specifications implement the requirements of 10 CFR Part 50, Appendix I.

3.15.D and 4.15.D BASES

Doses due to Iodine and Particulates in Air

These specifications implement 10 CFR Part 50, Appendix I. The dose calculation methods in the ODAM depend on existing pathways of exposure to a member of the public or more conservative conditions assumed (yielding a higher calculated dose). Calculations and methods are such that an estimate of the dose to a member of the public is not likely to be underestimated substantially.

3.15.E and 4.15.E BASES

1. Gaseous Radwaste Treatment

This specification implements the requirement of 10 CFR Part 50.36a (a)(1) that operating procedures be established and followed and that equipment be maintained and used to keep releases to the environment as low as is reasonably achievable. In order to satisfy Technical Specification 3.15.E, every reasonable effort shall be made to maintain and operate at least one train of the Offgas System charcoal adsorbers with pre-and aft-particulate filters to process radioactive gaseous effluent prior to release. The specification that the Offgas System which was used to establish compliance with the design objectives in 10CFR Part 50, Appendix I, Section II be used when specified provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept as low as is reasonably achievable.

ODAM Figure 3-1 is a flow diagram depicting gaseous radioactive waste streams. The Standby Gas Treatment System is considered an Engineered Safety Feature and not an exhaust ventilation treatment system.

3.15.F and 4.15.F BASES

1. Explosive Gas Mixture

Specification 3/4.15.F is provided to ensure that the concentration of potentially explosive gas in the offgas treatment sytem downsteam of the recombiners is maintained below the flammability limit of a hydrogen and oxygen mixture in the system. Keeping the mixture below its flammability limit will provide assurance that offgas treatment system integrity and operability is maintained and that the radioactive material concentration in the offgas will be controlled in conformance with 10CFRPart 50, Appendix A, Criterion 60. Calibration gas concentrations will be within the range of interest for hydrogen concentration and will not include 0% or 100% hydrogen concentrations.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.16 OFFSITE DOSE ASSESSMENT	4.16 OFFSITE DOSE ASSESSMENT
3.16.A Dose	4.16.A Dose
3.16.A.1 The annual dose or dose commitment to any member of the public due to radiation and radioactive material in effluents from DAEC shall not exceed 75 mrem to his thyroid or 25 mrem to his total body or any other organ.	4.16.A.1 Cumulative dose contributions from liquid and gaseous effluents to a member of the public offsite shall be evaluated at least once every year as described in the ODAM.
APPLICABILITY: At all times.	
ACTION:	
a. If the calculated dose from radioactive material released in liquid or gaseous effluents exceeds twice the limits of Specifications 3.14.C, 3.15.C, or 3.15.D, perform an assessment of compliance with 40 CFR 190 and limit subsequent releases such that the dose or dose commitment to a member of the public is $\leq$ 75 mrem to his thyroid and $\leq$ 25 mrem to his total body or any other organ over 12 consecutive months including the period of elevated release.	
b. If the estimated dose exceeds either limit in Specification 3.16.A, prepare and submit a Special Report to the NRC within 30 days in lieu of any other report; it shall include the cause of the release of exposure, an estimate of the dose to the likely most exposed member(s) of the public, corrective actions taken or planned to prevent a recurrence, and a schedule for achieving compliance. If the condition causing the limit(s) to be exceeded has not been corrected, the Special Report may also state a request for a variance in accordance with the provisions of 40 CFR Part 190. In that event, the request is timely and a variance is granted until NRC action on the request is complete.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.16.B Radiological Environmental Monitoring Program	4.16.B Radiological Environmental Monitoring Program
3.16.B.1 A radiological environmental monitoring program shall be conducted as specified in Table 3.16-1. APPLICABILITY: At all times. ACTION: a. In the event the radiological environmental monitoring program is not conducted as specified in the Table 3.16-1, prepare and submit to the Commission in the Annual Radiological Environmental Report the reasons for not conducting the program in accord with the Table 3.16-1 and the plans for preventing a recurrence. b. In the event radioactivity in a sampled environmental medium, averaged over a calendar quarter, is attributable to DAEC and exceeds an appropriate value listed in Table 3.16-3 or, if not listed, causes a potential annual dose exceeding two times the quarterly dose limit in Specification 3.14.C or 3.15.D, prepare and submit to the Commission within 30 days after discovery a Special Report which includes an evaluation of any release conditions, environmental factors or other conditions which caused the value(s) of Table 3.16-3 or two times the quarterly dose limit to be exceeded and which defines the corrective actions to be taken. If the radioactivity in environmental sample(s) is not attributable to releases from the Station, the Special Report is not	4.16.B.1 Sampling and analyses required in Table 3.16-1 shall be performed such that the detection capabilities specified in Table 3.16-2 are achieved under routine conditions. If a sample analysis does not meet the LLD specified, report the reason attributed in the next Annual Radiological Environmental Report. 4.16.B.2 Land Use Census DAEC shall conduct annually a land use census within three miles of the Station to identify radiologically important changes in land use.

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.16.C Interlaboratory Comparison Program	
3.16.C.1 Analyses shall be performed on radioactive materials supplied in an Interlaboratory Comparison Program which has been approved by the NRC.	
APPLICABILITY: Applicable to the Radiological Environmental Monitoring Program at all times.	
ACTION: In the event analyses were not performed as required in Specification 3.16.C, report the corrective actions taken to prevent a recurrence in the Annual Radiological Environmental Monitoring Report.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENT
3.16.D Radioactive Waste Solids	4.16.D Radioactive Waste Solids
3.16.D.1 Appropriate equipment shall be operated in accordance with a Process Control Program to process wet radioactive waste solids destined for disposal to a form that meets appropriate requirements of 10 CFR Part 61.56 before the waste is shipped from the DAEC site.	4.16.D.1 The Process Control Program shall state the essential operating parameters of the process(es), the essential characteristics of the waste form to be shipped, and the essential product verification requirements.
APPLICABILITY: During Processing of radioactive waste solids for disposal.	
ACTION:	
1. Suspend delivery to a transport carrier of any container of radioactive waste not complying with 10 CFR Part 61.56.	

3.16.A and 4.16.A BASES

1. Dose

Specification 3.16.A is provided to comply with the dose limitation requirement of 40CFR190. This specification requires the assessment of dose to demonstrate that a person (a nearby resident) has not received a radiation dose exceeding that specified in 40CFR190 including doses from direct radiation. There is no other licensed nuclear fuel cycle facility within 50 miles of DAEC, thus it is assumed that the dose from other uranium fuel cycle facilities is negligible. In the event a report is required to satisfy Specification 3.16.A, Action b, it shall be deemed adequate to satisfy the reporting requirement in Specification 6.11.1.g.(5).

3.16.B and 4.16.B BASES

1. Radiological Environmental Monitoring

The radiological environmental monitoring program, including the land use census, is conducted to satisfy the requirements of 10CFR Part 50, Appendix I, Section IV.B.2 and .3. The minimum radiological monitoring program required by this specification provides measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides which lead to the highest potential radiation exposures of individuals resulting from the station operation. This monitoring program thereby supplements the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways.

The land use census is conducted annually to identify changes in use of the unrestricted area in order to recommend modifications in monitoring programs for evaluating individual doses from principal exposure pathways. It may be conducted by door-to-door survey, by aerial survey, or by consulting with local agricultural or governmental authorities.

In order that radiological environmental monitoring stations may be relocated to reflect current conditions, the locations of stations required by Table 3.16-1 are described in a section of the Offsite Dose Assessment Manual. Revisions thereto are administered in accordance with Specification 6.15. IELP may conduct additional environmental monitoring exclusive of the requirements of Specifications 3.16.B and 6.11.1.g.

3.16.C BASES

1. Interlaboratory Comparison Program

The requirement for participation in an Interlaboratory Comparison Program is provided to ensure that independent checks on the precision and accuracy of the measurements of radioactive material in

environmental sample matrices are performed as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are reasonably valid.

3.16.D and 4.16.D BASES

1. Radioactive Waste Solids

This specification implements the requirements of 10 CFR Part 50.36a(a), the General Design Criterion 60 of 10 CFR Part 50 Appendix A, and of 10 CFR Part 61.56 on characteristics of low-level radioactive wastes destined for disposal by burial. Applicable requirements on packaging and delivery of packages of radioactive material to a carrier for transport stated in 10 CFR Part 71 and on transportation of hazardous materials in 49 CFR 171-179 are not restated in the technical specifications.

Processing waste to meet characteristics permitted under 10 CFR Part 61.56 may include solidification, preparation for deposit in a high integrity container, or any form acceptable under Part 61 for shipment to and receipt by a licensed disposal facility or licensed radioactive waste processor.

It is intended that a Contractor may perform the waste processing provided he operates according to a Process Control Program approved in accordance with Technical Specification 6.15.

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO.159 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

On January 14, 1985, the staff issued Amendment No. 109 to Facility Operating License (DPR-49) for the Duane Arnold Energy Center (DAEC). This amendment incorporated the Radiological Effluent Technical Specifications (RETS) into the DAEC operating license.

2.0 EVALUATION

By letter April 24, 1987, the Iowa Electric Light and Power Company (the licensee) proposed a license amendment modifying portions of the DAEC Radiological Effluent Technical Specifications (RETS). These proposed changes occur on pages iiia, 3.14-1, 3.14-2, 3.14-3, 3.14-4, 3.14-6, 3.14-12, 3.14-13, 3.15-1, 3.15-2, 3.15-3, 3.15-4, 3.15-5, 3.15-6, 3.15-12, 3.15-13, 3.15-14, 3.15-15, 3.16-1, 3.16-2, 3.16-4, 3.16-5, 3.16-11, and 3.16-12 of the current DAEC Technical Specifications (TS).

The staff has reviewed these proposed changes and has determined that they are consistent with the staff's model RETS for Boiling Water Reactors, NUREG-0473, Revision 2, February 1980.

These changes are administrative in nature and incorporate clarifications as well as typographical corrections to improve format consistency with the rest of the DAEC TS. These changes do not affect the technical content or intent of the existing RETS. Therefore, the staff finds the proposed Technical Specification changes to be acceptable.

3.0 ENVIRONMENTAL CONSIDERATIONS

This amendment relates to changes in recordkeeping, reporting, or administrative procedures or requirements. Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(10). 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.

4.0 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: W. Meinke

Dated: April 28, 1989