May 12, 1994

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. 197 TO FACILITY OPERATING LICENSE NO. DPR-49
(TAC NO. M84943)

The Commission has issued the enclosed Amendment No. 197 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center. This amendment consists of changes to the Technical Specifications in response to your application dated March 24, 1993.

The amendment revises the Technical Specifications by modifying the requirements of TS Section 3.8/4.8 to improve organization and clarity. The testing requirements for the Emergency Service Water pump and loop were changed when the other pump or loop are inoperable. This amendment also changes TS Section 4.5.G.1 to eliminate the requirement to synchronize to the grid while determining operability of the remaining emergency diesel generator (EDG) when the other EDG is inoperable. This change provides for a manual start of the EDG for a brief period to allow increasing the speed to synchronous and verifying voltage and frequency. Editorial changes have also been incorporated.

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

Sincerely,
Original signed by Robert M. Pulsifer

Robert M. Pulsifer, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 197 to
License No. DPR-49
2. Safety Evaluation

cc w/enclosures:
See next page

*See Previous Concurrence

OFFICE	LA:PDIII-3	PM:PDIII-3	*D:EELB	D:PDIII-3	OGC
NAME	MRushbrook	RPulsifer:dy	CBerlinger	JHannon	
DATE	4/14/94	4/18/94	4/17/94	4/19/94	4/25/94

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Docket No. 50-331

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The amendment revises the Technical Specifications by modifying the requirements of the TS Section 3.8/4.8 to improve organization and clarity. The testing requirements for the Emergency Service Water pump and loop were changed when the other pump or loop are inoperable. It changes TS Section 4.5.G.1 for not needing to synchronize with the grid while determining operability of the remaining emergency diesel generator (EDG) when the other EDG is inoperable. Editorial changes have also been incorporated.

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

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NAME	MRushbrook	RPulsifer:dy	CBerlinger	JHannon	
DATE	3/31/94	4/1/94	4/13/94	/ /94	/ /94

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

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. 197
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 March 24, 1993, 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. 197 , 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 120 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert M. Pulsifer, 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: May 12, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 197

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.

Remove	Insert
iii	iii
vii	vii
3.5-10	3.5-10
3.8-1	3.8-1
3.8-2	3.8-2
3.8-3	3.8-3
3.8-4	3.8-4
3.8-5	3.8-5
3.8-6	3.8-6
3.8-6a	---
3.8-7	3.8-7
3.8-8	3.8-8
3.8-9	3.8-9
3.8-10	3.8-10
3.8-11	3.8-11
3.8-12	---
3.8-13	---
3.8-14	---

LIST OF FIGURES

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
G. Minimum Low Pressure Cooling and Diesel Generator Availability	G. Minimum Low Pressure Cooling and Diesel Generator Availability
1. During any period when one diesel generator is inoperable, continued reactor operation is permissible only during the succeeding seven days unless such diesel generator is sooner made OPERABLE, provided that the remaining diesel generator and all low pressure core and containment cooling subsystems supported by the OPERABLE diesel generator are OPERABLE. If this requirement cannot be met, an orderly SHUTDOWN shall be initiated and the reactor shall be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.	1. When it is determined that one diesel generator is inoperable, the remaining diesel generator shall be demonstrated to be OPERABLE in accordance with Specification 4.8.A.2.a.1.a within the first 24 hours and every subsequent 72 hours thereafter. In addition, all low pressure core cooling and containment cooling subsystems supported by the OPERABLE diesel shall be verified to be OPERABLE.
2. Any combination of inoperable components in the core and containment cooling systems shall not defeat the capability of the remaining OPERABLE components to fulfill the cooling functions.	
3. When irradiated fuel is in the reactor vessel and the reactor is in the COLD SHUTDOWN Condition or REFUEL Mode:	
a. If no work is being performed which has the potential for draining the reactor vessel, both core spray and RHR systems may be inoperable; or	
b. If work is being performed which has the potential for draining the reactor vessel, at least two of any combination of core spray and/or RHR (LPCI or shutdown cooling mode) pumps shall be OPERABLE (including the capability to inject water into the reactor vessel with suction from the suppression pool) except as	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.8 AUXILIARY ELECTRICAL SYSTEMS	4.8 AUXILIARY ELECTRICAL SYSTEMS
Applicability:	Applicability:
Applies to the auxiliary electrical power systems.	Applies to the periodic testing requirements of the auxiliary electrical power systems.
Objective:	Objective:
To assure an adequate supply of electrical power for operation of those systems required for safety.	Verify the OPERABILITY of the auxiliary electrical systems.
Specification:	Specification:
A. AC Power Systems	A. AC Power Systems
At all times when the reactor is in the RUN Mode or STARTUP Mode and not in a COLD CONDITION, the following AC electrical power sources shall be OPERABLE:	
1. Both offsite sources and the startup and standby transformers are available and capable of supplying power to the 4kV emergency buses.	
2. Operation with Inoperable Components.	1. Surveillance Requirements with Inoperable Components.
a. With one of the offsite sources or startup or standby transformers inoperable, maintain the other offsite source OPERABLE and both emergency diesel generators OPERABLE.	
b. With one of the offsite sources or the startup or standby transformers and one emergency diesel generator inoperable, the requirements of Specification 3.5.G.1 shall be satisfied.	a. With one of the offsite sources or the startup or standby transformers and one emergency diesel generator inoperable, the requirements of Specification 4.5.G.1 shall be satisfied.
c. With both the startup and standby transformers inoperable, maintain both emergency diesel generators, associated buses and all Low Pressure Cooling Systems OPERABLE and either:	b. With both the startup and standby transformers inoperable, verify that both emergency diesel generators are either OPERABLE or operating and the requirements of Specification 4.5.G.1 shall be satisfied.
1) Restore one or both of the transformers to OPERABLE status, or	
2) Be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.	

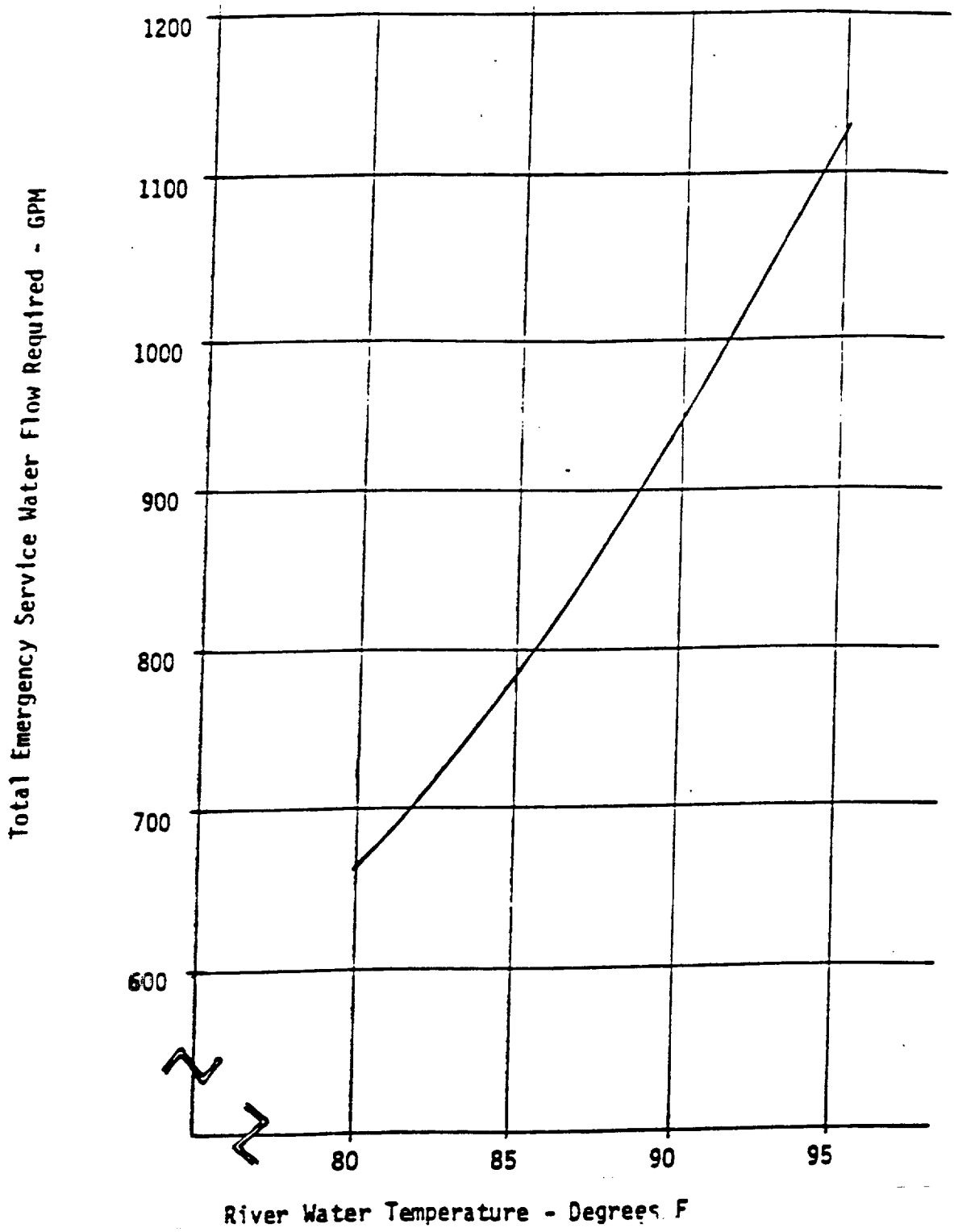
LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3. Emergency Diesel Generators The two emergency diesel generators shall be OPERABLE with a minimum of 36,317 gallons of diesel fuel in the diesel fuel oil tank.	2. Emergency Diesel Generators a. Diesel Start Test 1) Once each month both emergency diesel generators shall be: a) Manually started, the speed increased from idle to synchronous, and verified to deliver rated voltage and frequency. b) Manually loaded to rated load. The test shall continue for at least a one-hour period at rated load. c) During the monthly start test the emergency diesel generator starting air compressors shall be checked for operation and their ability to recharge air receivers. The operation of the diesel fuel oil transfer pumps shall also be demonstrated during this test. 2) Once each six months both emergency diesel generators shall be manually started and loaded to demonstrate that they will reach rated frequency and voltage within specified time limits. This test may be run in lieu of the regular monthly test. During the semiannual test the same checks to the Air Start System and fuel oil pumps performed during monthly testing shall be performed. In addition, the emergency diesel generator starting time to reach rated frequency and voltage shall be recorded. b. Once per OPERATING CYCLE the condition under which the emergency diesel generator is required will be simulated and a test conducted to demonstrate that it will start and accept the emergency load within the specified time sequence. The emergency diesel generator shall be operated loaded for a minimum of 5 minutes. The results shall be recorded. c. Once per OPERATING CYCLE, during shutdown, each emergency diesel generator shall be given an inspection in accordance with

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
	procedures based on the manufacturer's recommendations.
	d. A sample shall be drawn from each diesel fuel delivery and tested for API gravity, viscosity, and water and sediment prior to addition to the storage tank. Once it is determined that the fuel meets the criteria for these characteristics specified in ASTM-D975-77, the fuel may be added to the tank.
	e. The quantity of diesel fuel available shall be recorded monthly and after each use of the diesels.
	f. Once per month a sample of diesel fuel shall be checked for viscosity, water and sediment. The values for viscosity, water and sediment shall be within the acceptable limits specified in Table 1 of ASTM D975-77 and recorded.
	g. Once each 3 months a sample of diesel fuel shall be checked for particulate accumulation and the amount recorded. The amount of particulates shall not exceed 10 mg/liter when filtered through a 0.8 micron filter.
4. Operation with Inoperable Components.	3. Surveillance Requirements with Inoperable Components.
a. With one of the emergency diesel generators inoperable, the requirements of Specification 3.5.G.1 shall be met.	a. When it is determined that one of the emergency diesel generators is inoperable, the requirements of Specification 4.5.G.1 shall be met.
b. With both of the emergency diesel generators inoperable either:	
1) Restore one or both emergency diesel generators to OPERABLE status, or	
2) Be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.	
B. <u>DC Power Systems</u>	B. <u>DC Power Systems</u>
1. At all times when the reactor is in the RUN Mode or STARTUP Mode and not in a COLD CONDITION, the essential station 24, 125 and 250 Volt DC Power Systems shall be OPERABLE. The associated battery	1. The DC Power System surveillance shall be as follows:
	a. Each week the specific gravity, the voltage and temperature of the pilot cell and overall battery

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
chargers for the 24 Volt Systems, two of the three battery chargers for the 125 Volt Systems, and one of the two battery chargers for the 250 Volt System shall be OPERABLE.	voltage shall be measured and recorded. b. Each three months the essential batteries' voltage of each cell to the nearest 0.01 Volt, specific gravity of each cell, and temperature of every fifth cell shall be measured and recorded. c. Once each OPERATING CYCLE, the essential batteries shall be subjected to a Service Discharge Test (load profile). The specific gravity and voltage of each cell shall be determined after the discharge and recorded. d. Once every five years, the essential batteries shall be subjected to a Performance Discharge Test (capacity). This test will be performed in lieu of the Service Test requirement of 4.8.B.1.c above.
2. Operation with Inoperable Components.	2. Surveillance Requirements with Inoperable Components.
a. With normal battery room ventilation unavailable, portable ventilation equipment shall be provided.	a. With the battery room ventilation unavailable, samples of the battery room atmosphere shall be taken daily for hydrogen concentration determination.
b. With one of the two 125 Volt DC Systems inoperable, verify that Specification 3.5.G is met, and within 3 days either: 1) Restore the inoperable 125 Volt DC System to OPERABLE status, or 2) Be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.	
c. With the 250 Volt DC System inoperable, the HPCI System and other affected primary containment isolation valves shall be considered inoperable and the requirements of Specifications 3.5.D and 3.7.D respectively shall be met.	
d. With one of the 24 Volt DC Systems inoperable, the requirements associated with the affected instruments of Specifications 3.1 and 3.2 shall be met.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
C. Onsite Power Distribution Systems	C. Onsite Power Distribution Systems
1. At all times when the reactor is in the RUN Mode or STARTUP Mode and not in a COLD CONDITION the essential AC 4160 volt buses 1A3 and 1A4, and 480 volt buses 1B3, 1B4, 1B9 and 1B20 shall be energized and OPERABLE.	1. Once each 4 OPERATING CYCLES each circuit breaker shall be subjected to inspection and preventive maintenance in accordance with procedures based on the manufacturer's recommendations.
2. Operation with Inoperable Components.	
a. With one of the essential AC 480 volt buses, 1B9 or 1B20, inoperable, restore the bus to OPERABLE status within 7 days, or be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.	
b. With one of the essential AC 4160 volt buses, 1A3 or 1A4, or 480 volt buses 1B3 or 1B4 inoperable, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.	
D. Auxiliary Electrical Equipment - CORE ALTERATIONS	
Refer to Specification 3.9.D.	

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
E. Emergency Service Water System	E. Emergency Service Water System
1. Except as required in Specification 3.8.E.2 below, both Emergency Service Water System loops shall be OPERABLE whenever irradiated fuel is in the reactor vessel and reactor coolant temperature is greater than 212°F.	1. Emergency Service Water System surveillance shall be as follows:
	a. Simulated automatic actuation test. — Once/OPERATING CYCLE
	b. Pump and motor operated valve OPERABILITY — Once/3 months
	c. Flow Rate Test: Each Emergency Service Water pump shall deliver at least that flow determined from Figure 4.8.E-1 for the existing river water temperature. — After major pump maintenance and once per 3 months, except weekly during periods of time the river water temperature exceeds 80°F.
2. With one of the Emergency Service Water System pumps or loops inoperable, REACTOR POWER OPERATION must be limited to seven days unless OPERABILITY of that system is restored within this period. During such seven days all active components of the other Emergency Service Water System shall be OPERABLE, provided the requirements of Specification 3.5.G are met.	2. With one Emergency Service Water System pump or loop inoperable, the OPERABLE pump and loop shall be verified to be OPERABLE. In addition, the requirements of Specification 4.5.G.1 shall be met.
3. If the requirements of Specification 3.8.E cannot be met, be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours.	



Duane Arnold Energy Center Iowa Electric Light and Power Company Technical Specifications
DAEC Emergency Service Water Flow Requirement Figure 4.8.E-1

3.8 BASES:

The objective of this specification is to assure that adequate power will be available to operate essential equipment. Adequate AC power can be provided by any one of the following sources: The startup transformer, the standby transformer or either of the two emergency diesel generators. The startup transformer provides all auxiliary power during plant startup and until the main generator is synchronized with the system. After synchronization, the plant auxiliary buses 1A1 and 1A2 are manually transferred to the auxiliary transformer. The startup transformer continues to provide the normal source of power to essential AC buses 1A3 and 1A4. The standby transformer is connected to either of the two essential AC buses by automatic switching upon loss of power from the startup transformer.

This Specification assures that at least two offsite and two onsite AC power sources will be available before the reactor is taken beyond "just critical" testing. The two offsite sources are 161 KV and 345 KV power which are supplied to the startup and standby transformers respectively, through the DAEC site switchyard. These power sources are provided through the several transmission lines tied to the regional power grid. In addition to assuring power source availability, all of the associated essential AC switchgear must be operable as specified to assure that the emergency core cooling equipment can be operated, if required, from the power sources.

The minimum diesel fuel supply of 36,317 gallons will supply one emergency diesel generator for a minimum of seven days of operation satisfying the load requirements for the operation of the essential equipment. Additional fuel can be obtained and delivered to the site from nearby sources within the seven day period.

A battery charger is supplied with each of the two 125 volt DC station batteries. In addition, a spare charger is available and can supply power to either 125 Volt DC System. Since this alternative source is available, one battery charger can be allowed out of service for maintenance and repairs. Similarly, one of the two battery chargers provided for the 250 volt DC station battery can be allowed out of service for maintenance and repairs.

Adequate power is available to operate all essential equipment from either the startup transformer or the standby transformer. In addition, each of the emergency diesel generator units is capable of supplying the essential AC-powered loads required under postulated design basis accident conditions. Each unit is physically and electrically independent of the other and of any offsite power source. Therefore, one emergency diesel generator can be allowed out of service for a period of seven days to allow reasonable repairs. In such cases, emergency diesel generator OPERABILITY demonstrations will be limited to an unloaded start test.

In the event that the startup or standby transformer and one emergency diesel generator is inoperable, adequate power is available to operate the essential equipment from either the OPERABLE transformer or the OPERABLE emergency diesel generator. If both the startup and standby transformers are inoperable, either emergency diesel generator is sufficient to operate the essential AC-powered loads.

Each of the two 125 volt DC and the 250 volt DC station batteries has enough capacity to energize its vital buses and supply DC power to the other essential DC-powered equipment for four hours without being recharged. Due to the high reliability of battery systems, one of the two batteries may be out of service for up to three days. This minimizes the probability of unwarranted shutdown by providing adequate time for reasonable repairs. A station battery is considered inoperable if more than one cell is out of service. A cell will be considered out of service if its float voltage is below 2.13 volts and the specific gravity is below 1.190 at 77°F.

The 250 Volt DC System provides power for the HPCI system and other primary containment isolation valves. If the battery is taken out of service, the HPCI system would be inoperable and the requirements of Specification 3.5.D for this condition must be satisfied. Certain primary containment isolation valves would also be inoperable, thus the requirements of Specification 3.7.D must be satisfied.

The 24 Volt DC System provides power for reactor neutron monitoring and process radiation monitoring. The neutron monitoring function is fail-safe in that loss of 24 volt DC power would cause the associated trip to occur (UFSAR Section 8.3.2).

The battery room is ventilated to prevent accumulation of hydrogen gas exceeding 4 percent concentration. On loss of battery room ventilation, the use of portable ventilation equipment and daily sampling provides assurance that potentially hazardous quantities of hydrogen gas will not accumulate.

4.8 BASES:

Offsite power availability and onsite power distribution is continuously monitored by INSTRUMENTATION which alerts operators to any problems so that appropriate action can be taken. In addition to the annunciators, automatic switching occurs to maintain power to the emergency buses at all times. The breakers and distribution panels are subjected to preventive maintenance based on manufacturer's recommendations. The schedule is based on performance of maintenance on one of the buses (1A1, 1A2, 1A3 and 1A4) each Refuel Outage.

The monthly tests of the emergency diesel generators (EDGs) are conducted to demonstrate satisfactory system performance and OPERABILITY. To prevent excessive wear and stress on the diesel engines, the diesels are manually started and the speed incrementally increased to synchronous speed. With one EDG inoperable, the remaining EDG can be demonstrated to be OPERABLE by starting and verifying proper output voltage and frequency. Once every six months, a fast-start test is performed to demonstrate the capabilities of the diesel engines to accelerate to rated speed as required for the design basis for the plant. The test of the automatic starting circuits will prove that each EDG will receive all automatic start signals. The loading of each EDG is conducted to demonstrate proper operation at maximum expected emergency loading and at equilibrium operating conditions. Generator experience at other generating stations, and NRC published guidance (Generic Letter 84-15), indicates that the testing frequency is adequate to assure a high reliability of operation should the system be required.

Each EDG has two independent starting air supply systems. One consists of a motor driven air compressor which automatically recharges two air receivers and the other consists of a diesel driven air compressor which is manually operated to recharge a third air receiver. During the monthly check of the EDG, both air start systems will be checked for proper operation.

Following the tests (at least monthly) or other operation of the EDGs, the fuel volume remaining in the diesel oil storage tank will be checked.

At the end of the monthly load test of the EDG, the fuel oil transfer pump will be operated to refill the day tank and to check the operation of this pump. The day tank level indicator and alarm switches and fuel oil transfer pump control switches will be checked at this time.

The test of the EDGs once each OPERATING CYCLE will be more comprehensive in that it will functionally test the system; i.e., it will check starting of the diesel and closure of electrical breakers and sequencing of essential loads. The test will be initiated by simulation of a loss-of-coolant accident. In addition, a loss of normal AC power condition will be imposed to simulate a loss of offsite power. The essential load sequence timing will be checked to assure proper loading in the time required. Periodic tests check the capability of the units to start in the required time and to deliver the expected emergency load requirements. Periodic testing of the various components plus a FUNCTIONAL TEST each OPERATING CYCLE are sufficient to maintain adequate reliability.

Recording the diesel fuel supply after each operation (at least monthly) assures that the minimum fuel supply requirements will be maintained. New fuel is tested against the specification, ASTM D975-77 (API gravity, viscosity and water and sediment prior to addition, and the other characteristics within 30 days of addition to the storage tank). A monthly test for quality of the diesel fuel oil will be performed to verify that viscosity and water and sediment are within the limits specified in ASTM D975-77. The quality of the diesel fuel oil will be acceptable if the results of the tests are within the limiting requirements for diesel fuel oils shown on Table 1 of ASTM D975-77. Additionally, a quarterly test for particulate accumulation in the

stored fuel oil will provide further assurance that the fuel oil is not deteriorating to the point that EDG operation would be affected. This characteristic is trended so that actions can be taken to restore fuel quality prior to reaching unacceptable levels. Should a test result show unacceptable particulate accumulation which does not fit an established trend, a second sample is allowed to be tested prior to taking actions to restore the fuel.

Although the station batteries will deteriorate with time, utility experience indicates there is almost no possibility of precipitous failure. The type of surveillance described in this specification is that which has been demonstrated over the years to provide an indication of a cell becoming irregular or unserviceable long before it becomes a failure.

The Service Discharge Test provides adequate indication of the batteries' ability to satisfy the design requirements (battery duty cycle) of the associated DC system. This test will be performed using simulated loads at the rates and for the durations specified in the design load profile.

The Performance Discharge Test provides adequate indication and assurance that the batteries have the specified ampere hour capacity. The rate of discharge during this test shall be in accordance with the manufacturer's discharge characteristic curves. The results of these tests will be recorded and compared with the manufacturer's recommendations of acceptability.

The Emergency Service Water System has two loops with one pump each. If one Emergency Service Water System loop becomes inoperable, the other loop provides sufficient cooling to components to assure performance of the safety function after an accident. Continued plant operation with one loop inoperable is restricted to a seven-day period during which time the OPERABLE Emergency Service Water loop is verified to be OPERABLE.

The surveillance test intervals for the Emergency Service Water pumps and associated valves are based on Section XI of the ASME Code.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 197 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

Duane Arnold Energy Center (DAEC) proposed in its letter of March 24, 1993, to correct some erroneous references in its earlier letter of October 30, 1992, and to make some editorial changes to the technical specifications (TS) submittal. The March 24, 1993, letter superseded the October 30, 1992, letter in its entirety. The changes to the TS are the result of a DAEC evaluation made in 1991 as part of a TS improvement program. The evaluation included comparisons of the DAEC TS with the TS from equivalent plants, Standard Technical Specifications (STS), and the Improved Technical Specifications (ITS). TS Section 3.8/4.8 was reorganized to delineate operability, limiting conditions for operation, and surveillance requirements for ac power systems, dc power systems, onsite power distribution systems, auxiliary electrical equipment, core alterations, and the emergency service water system.

In addition to reviewing these changes, the staff raised a concern about operability testing of the emergency diesel generators (EDGs). The current specification requires that upon the loss of one EDG, or one EDG and one of the two offsite power sources, the other EDG must be demonstrated operable by starting it, synchronizing it to the grid, and running it fully loaded for 1 hour. During this hour, abnormal conditions on the grid could trip or damage the EDG. The new TS proposes to start the operable EDG, but not load it, because the vulnerability of the EDG to damage will be reduced if it is not connected to the grid.

The licensee made a similar proposal in regard to the emergency service water (ESW) system. The existing requirement to demonstrate operability of an ESW pump and loop when the other is inoperable is proposed to be changed to verify operability of the alternative ESW pump and loop by inspection.

The staff finds both of these proposed changes acceptable because testing exposes the EDG or the ESW to an increased number of test errors and to increased wear without a compensating increased assurance of operability.

2.0 EVALUATION

The proposed TS amendment revises Sections 4.5.G.1 and 3.8/4.8 to improve clarity and consistency of limiting conditions of operation (LCOs) and surveillance requirements for auxiliary electrical systems. Significant changes are evaluated below. DAEC proposes to divide TS Section 3.8/4.8, previously divided into two categories (A- Auxiliary Electrical Equipment and B- Operation With Inoperable Components), into categories consistent with STS (NUREG-1202) Section 3.8/4.8. The proposed categories are: A- AC Power Systems, B- DC Power Systems, C- Onsite Power Distribution Systems, D- Auxiliary Electrical Equipment-Core Alterations, and E- Emergency Service Water System. The above changes are consistent with the STS for BWR/4 plants.

The DAEC proposed changes of an editorial nature are acceptable if they are consistent with either NUREG-1202, the STS, or NUREG-1433, the improved STS for BWR/4 plants.

2.1 TS Section 3.8/4.8, "Auxiliary Electrical Systems"

The contents of this section have been divided into the five sections as stated above. Each new section describes conditions under which the described systems must be operable. The operability requirements are followed by limiting conditions of operation for each inoperable component or system. Surveillance requirements were reviewed against the requirements in NUREG-1202. These editorial changes are acceptable to the staff.

2.2 New TS Section 4.8.E.2, (old TS Section 4.8.C.2)

TS testing requirement in Section 4.8.C.2 stated: "When one emergency service water [ESW] pump or loop becomes inoperable, the other pump or loop shall be demonstrated to be operable immediately and daily thereafter." In the proposed revision, DAEC changed the statement to say: "...the other (ESW) system pump or loop shall be verified to be operable." Verification of operability is defined in the licensee's TS on page 1.0-2 as an "administrative check, by examination of appropriate plant records (logs, surveillance test records) to determine that a system, subsystem, train, component or device is not inoperable." A demonstration of operability requires that the equipment be powered and shown to be capable of performing its safety function.

The licensee further proposes in the new section to refrain from running the pump daily thereafter, while one ESW system continues inoperable. The basis offered by the licensee for the proposed change is the unnecessary wear on the pump and other components. The licensee says, further, that 10 CFR 50.55a permits an inservice inspection, in accordance with ASME Boiler and Pressure Vessel Code, 1980 Edition through the winter 1981 Addenda, Section XI, subsection IWP, in lieu of a running test.

DAEC has such an inservice testing program in accordance with NRC Generic Letter 89-04. The two ESW pumps, 1P-099A and 1P-099B, are subject to the IWP inservice testing. Inservice quantities measured are: inlet pressure

before pump start, differential pressure across pump, flow rate, and vibration amplitude at two positions on each pump.

The staff finds that to base system operability on periodic, scheduled tests without requiring additional tests when a redundant safety train is inoperable, is consistent with the intent of the ASME Code Section XI, subsection IWP, as the staff found on August 12, 1991, when it concluded in its safety evaluation of DAEC TS proposed Amendment No. 174, that verification of operability rather than demonstration was acceptable. TS Amendment No. 174 allows the licensee to verify the operability of the remaining train of safety equipment when the first train is inoperable. The ESW pumps were not specifically covered by Amendment No. 174; hence, the present licensee proposal.

The staff accepts the ESW system surveillance change from demonstration, via operation of the pump and other hardware, to inservice inspection because periodic inservice inspection with maintenance is sufficient to assure that the ESW pumps will operate on demand.

2.3 New TS Section 3.8.A.2.c (old TS Section 3.8.B.3.b)

DAEC proposes to reduce the Limiting Condition of Operation (LCO) from 7 days to 24 hours for inoperable startup and standby transformers because the risk of continuing to operate while the transformers are repaired is greater than the risks associated with a controlled shutdown. In any case, for many transformer failures, the loss of power to the essential buses would cause the reactor protection system to initiate an automatic scram. Further, the proposed LCO change is consistent with the STS and with the TSs of other BWR/4 reactors.

The staff position is that it is generally safe to reduce the time limit of an LCO. Accordingly, the licensee's proposal to reduce the startup and the standby transformer LCO time limit is acceptable to the staff.

2.4 TS Section 4.5.G.1 (Both Old and New)

The existing specification in Section 3.8/4.8.A requires that if one EDG or one EDG and one of the two offsite power sources were lost, the other EDG must be demonstrated operable. The present method of demonstrating operability is to start the EDG, synchronize it to the grid, and run it fully loaded for 1 hour. DAEC states that running the EDG connected to the grid exposes the EDG to conditions that might trip or damage it. The staff agrees that it is undesirable to load the EDG with the grid when one EDG is inoperable because, as stated in Branch Technical Position (BTP) ICSB-8, "General Design Criterion 17 requires that provisions be included to minimize the probability of losing electric power from any of the remaining supplies as a result of or coincident with...loss of power from the grid..."

BTP ICSB-8 says further, "...the staff concludes that the potential for common failure modes should preclude interconnection of onsite and offsite power sources except for short periods for the purpose of load testing." Then, with

one EDG already inoperable, it is even less desirable, than with both EDGs operable, that the remaining EDG should be exposed to common-mode failures.

In the new TS Section 4.5.G.1, the licensee proposes to incorporate a reference to TS Section 4.8.A.2.a.1.a, which says that the EDG shall be: "(a) Manually started, the speed increased from idle to synchronous, and verified to deliver rated voltage and frequency."

The staff has determined that the added benefit of running this test under these circumstances is small. Therefore, the licensee's proposal to conduct a start-only test, whereby EDG operability is verified, rather than demonstrated by a start and load test, is acceptable to the staff.

2.5 New TS Section 4.8.A.1.b (old TS Section 4.8.B.3.b)

DAEC proposes to add a section allowing verification of EDG operability during a loss of offsite power (LOP) by observing the running EDG, since other surveillance is not possible without stopping it.

The staff accepts the licensee's proposed change, because interference with a running EDG during a LOP, in order to comply with a surveillance requirement is unacceptable.

2.6 New TS Section 3.8.A.3 (old TS Section 3.8.A.2)

DAEC proposes to increase the minimum quantity of EDG diesel fuel oil required to be onsite to 36,317 gallons, because a new engineering calculation has determined that this amount is needed to fuel one EDG for the required 7 days. Since an increase in onsite fuel oil must increase the ability of Duane Arnold to cope with occurrences of LOP, the staff has determined that the proposed 3.8% increase in fuel oil stored onsite is appropriate.

2.7 New TS Sections 4.8.A.2.d, e, f, and g (old TS Section 4.8.A.2.c and d)

DAEC proposes to add TS Sections 4.8.A.2.e and f which will carry details of the existing DAEC fuel quality assurance program, and to add Sections 4.8.A.2.d and g. Section 4.8.A.2.d lists tests that must be carried out before new fuel oil is added to existing stock, and 4.8.A.2.g describes a new test for particulate contamination of the stored fuel; namely, every 3 months the onsite diesel generator fuel oil will be checked for particulate accumulation. The staff accepts the proposed new sections for the increased assurance of adequate fuel quality which, in turn, can only tend to increase the diesel generator reliability.

2.8 New TS Section 3.8.B.2.c

A reference to TS Section 3.7.D which carries surveillance requirements for 250-V dc power-operated isolation valves is proposed to be added to new TS Section 3.8.B.2.c to assist operators whenever the 250-V dc system becomes inoperable. The staff agrees that the added reference will assist the operators.

2.9 New TS Section 3.8.B.2.d

The licensee proposes to add an LCO for the +/- 24 V dc system; currently, LCOs for the system loads are provided elsewhere in the TS. This revision adds a reference to those sections containing requirements for the components powered by the +/- 24-V dc system. The staff accepts the proposed addition as likely to reduce operator delays if the +/- 24-V dc system fails.

2.10 New TS Section 3.8.C.2.a and b

DAEC proposes to add two new sections to the TS: Section 3.8.C.2.a is an LCO for the essential buses providing power to the river water supply system and Section 3.8.C.2.b is an LCO for the other essential buses. These LCOs are consistent with the most limiting LCOs for the equipment powered by these buses. The staff accepts the licensee's assurance that this additional information will enable the operators to more expeditiously find the LCOs when needed, than to continue with the present separation of the load LCOs from the power supply LCOs, which requires the operator to look through other specifications for the most limiting LCO when a power supply is lost.

2.11 New TS Section 4.8.C.1

DAEC proposes to add this new section to the TS for surveillance requirements for the onsite power distribution system consisting of inspections and preventive maintenance (IPM) based on equipment manufacturers' recommendations. The schedule is based on the existing DAEC practice of IPM on one of the four 4160-V ac buses per refueling outage. The scope includes all breakers and load centers supplied by these buses down to the motor control centers and lighting panels. Further, the justification for the IPM and schedule, that is, the "bases," has been revised to provide additional clarification and consistency with TS Section 3.8/4.8. The staff accepts the licensee's proposal because additional specificity and clarification of IPM requirements should improve the reliability of the systems subject to them.

2.12 General TS changes

2.12.1 Extension of Time to Cold Shutdown

Throughout the revised TS, the wording of the shutdown requirements associated with LCOs has been changed. The existing TS says, whenever shutdowns are required: "If the requirements of section XXX cannot be met, an orderly SHUTDOWN shall be initiated and the reactor shall be in a COLD SHUTDOWN condition within 24 hours." The proposed TS would say: "If this requirement cannot be met, an orderly SHUTDOWN shall be initiated and the reactor shall be in at least HOT SHUTDOWN within the next 12 hours and in COLD SHUTDOWN within the following 24 hours." The staff accepts the proposed shutdown extension because a more orderly and leisurely shutdown will reduce the probability of unexpected operational transients and their attendant risks to the plant safety, and because the proposed changes are consistent with the STS.

2.12.2 AC and DC Power Systems: The changes discussed above are all clarifications or administrative changes that do not affect equipment, nor the way in which it is operated. As such, they may help operators to find LCOs and other restrictions for disabled systems, but they cannot increase either the probabilities or the consequences of accidents, previously evaluated or new. The staff agrees with DAEC that the revisions to the "bases" are administrative and that they only reflect changes to the individual sections and that all the changes are consistent with applicable standards and DAEC FSAR specifications. The staff agrees that none of the proposed changes alter the design of the plant or equipment or the dynamics of the plant's responses to initiating events, and that the changes to the LCOs in DAEC TS Section 3.8 are consistent with the STS and ITS. Furthermore, these changes give greater assurance than the old DAEC TS, that equipment assumed to be operable in the DAEC accident analysis will be operable on demand. Additional LCOs will ensure that accident analysis assumptions will remain valid.

2.13 CONCLUSION

Without exception, the changes to the DAEC TS proposed in the attachments to the licensee's letter of March 24, 1993, to the NRC, have been accepted by the staff in the safety evaluation above, for the reasons given there.

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 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 (58 FR 39051). 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 Contributors: Charles Morris
Robert Pulsifer

Date: May 12, 1994

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 12, 1994

Docket No. 50-331

Mr. Lee Liu
Chairman of the Board and
Chief Executive Officer
IES Utilities Inc
Post Office Box 351
Cedar Rapids, Iowa 52406

Dear Mr. Liu:

SUBJECT: AMENDMENT NO. 197 TO FACILITY OPERATING LICENSE NO. DPR-49
(TAC NO. M84943)

The Commission has issued the enclosed Amendment No. 197 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center. This amendment consists of changes to the Technical Specifications in response to your application dated March 24, 1993.

The amendment revises the Technical Specifications by modifying the requirements of TS Section 3.8/4.8 to improve organization and clarity. The testing requirements for the Emergency Service Water pump and loop were changed when the other pump or loop are inoperable. This amendment also changes TS Section 4.5.G.1 to eliminate the requirement to synchronize to the grid while determining operability of the remaining emergency diesel generator (EDG) when the other EDG is inoperable. This change provides for a manual start of the EDG for a brief period to allow increasing the speed to synchronous and verifying voltage and frequency. Editorial changes have also been incorporated.

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

Sincerely,

Robert M. Pulsifer, Project Manager
Project Directorate III-3
Division of Reactor Projects III/IV/V
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No. 197 to
License No. DPR-49
2. Safety Evaluation

cc w/enclosures:
See next page