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

COMMONWEALTH EDISON COMPANY

AND

IOWA-ILLINOIS GAS AND ELECTRIC COMPANY

DOCKET NO. 50-254

QUAD CITIES NUCLEAR POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 106
License No. DPR-29

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Commonwealth Edison Company (the licensee) dated November 17, 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 3.B. of Facility Operating License No. DPR-29 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 106, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Daniel R. Muller

Daniel R. Muller, Director
Project Directorate III-2
Division of Reactor Projects - III
IV, V and Special Projects

Attachment: Changes to the Technical Specifications

Date of Issuance: March 28, 1988

ATTACHMENT TO LICENSE AMENDMENT NO.106

FACILITY OPERATING LICENSE NO. DPR-29

DOCKET NO. 50-254

Revise the Appendix A Technical Specifications by removing the pages identified below and inserting the attached pages. The revised pages are identified by the captioned amendment number and contain marginal lines indicating the area of change.

REMOVE	INSERT
3.4/4.4-1	3.4/4.4-1
3.4/4.4-2	3.4/4.4-2
3.4/4.4-3	3.4/4.4-3
Figure 3.4-1	3.4/4.4-3a

3.4/4.4 STANDBY LIQUID CONTROL SYSTEM

LIMITING CONDITIONS FOR OPERATION

Applicability:

Applies to the operating status of the standby liquid control system.

Objective:

To assure the availability of an independent reactivity control mechanism.

SURVEILLANCE REQUIREMENTS

Applicability:

Applies to the periodic testing requirements for the standby liquid control system.

Objective:

To verify the operability of the standby liquid control system.

SPECIFICATIONS

A. Normal Operation

During periods when fuel is in the reactor and prior to startup from a cold condition, the standby liquid control system shall be operable except as specified in Specification 3.4.B. This system need not be operable when the reactor is in the cold shutdown condition, all control rods are fully inserted, and Specification 3.3.A is met.

A. Normal Operation

The operability of the standby liquid control system shall be verified by performance of the following tests:

1. At least once per month

   Demineralized water shall be recycled to the test tank. Pump minimum flow rate of 40 gpm shall be verified against a system head of 1275 psig.

2. At least once during each operating cycle

   Manually initiate the system, except the explosion valves and pump solution in the recirculation path, to demonstrate that the pump suction line from the storage tank is not plugged.

   Explode two of six charges or two of four charges manufactured in the same batch using the permanent system wiring to verify proper function. Then install the untested charges in the explosion valves.

   Demineralized water shall be injected via a test connection into the reactor vessel to test that valves (except explosion valves) not checked by the recirculation test are not clogged.

Test that the setting of the system pressure relief valves is between 1455 and 1545 psig.

3. Disassemble and inspect one explosion valve so that it can be established that the valve is not clogged. Both valves shall be inspected in the course of two operating cycles.

B. Operation with Inoperable Components

From and after the date that a redundant component is made or found to be inoperable, Specification 3.4.A shall be considered fulfilled and continued operation permitted provided that the component is returned to an operable condition within 7 days.

B. Operation with Inoperable Components

When a component becomes inoperable, its redundant component shall be demonstrated to be operable immediately and daily thereafter.

C. Liquid Poison Tank-Boron Concentration

The liquid poison tank shall contain a boron-bearing solution of at least 3733 gallons of at least 14 WT percent sodium pentaborate Decahydrate ($Na_2 B_{10} O_{16} \cdot 10H_2O$) at all times when the standby liquid control system is required to be operable and the solution temperature shall not be less than the temperature presented in Figure 3.4-2.

C. Liquid Poison Tank-Boron Concentration

The availability of the proper boron-bearing solution shall be verified by performance of the following tests:

1. At least once per month

   Boron concentration shall be determined. In addition, the boron concentration shall be determined any time water or boron are added or if the solution temperature drops below the limits specified by Figure 3.4-2.

2. At least one per day

   Solution volume shall be checked.

3. At least once per day

   The solution temperature shall be checked.

D. If Specifications 3.4.A through C are not met, an orderly shutdown shall be initiated and the reactor shall be in the cold shutdown condition within 24 hours.

3.4 LIMITING CONDITIONS FOR OPERATION BASES

A. The design objective of the standby liquid control system is to provide the capability of bringing the reactor from full power to a cold, xenon-free shutdown assuming that none of the withdrawn control rods can be inserted. To meet this objective, the liquid control system is designed to inject a quantity of boron which produces a concentration of no less than 600 ppm of boron in the reactor core in approximately 83 minutes with imperfect mixing. A boron concentration of 600 ppm in the reactor core is required to bring the reactor from full power to 3% Δk or more subcritical condition considering the hot to cold reactivity swing, xenon poisoning and an additional margin in the reactor core for imperfect mixing of the chemical solution in the reactor water. A normal quantity of 3,321 gallons of solution having a 14% sodium pentaborate concentration is required to meet this shutdown requirement.

For a required pumping rate of 40 gpm, 3321 gallons of at least 14 WT percent solution will be inserted in approximately 83 minutes. This insertion rate of boron solution will override the rate of reactivity insertion due to cool down of the reactor following the zenon peak. Two pump operation will enable faster reactor shutdown for ATWS events. The monthly pump minimum flowrate test shall require a minimum flowrate of 40 gpm. This requirement, combined with the solution concentration requirements of at least 14 WT percent, will demonstrate that the Standby Liquid Control System meets the requirements of 10CFR50.62.

Boron concentration, solution temperature, and volume are checked on a frequency to assure a high reliability of operation of the system should it ever be required. Experience with pump operability indicates that monthly testing is adequate to detect if failures have occurred.

The only practical time to test the standby liquid control system is during a refueling outage and by initiation from local stations. Components of the system are checked periodically as described above and make a functional test of the entire system on a frequency of less than once each refueling outage unnecessary. A test of explosive charges from one manufacturing batch is made to assure that the charges are satisfactory. A continual check of the firing circuit continuity is provided by pilot lights in the control room.

B. Only one of two standby liquid control pumping circuits is needed for proper operation of the system. If one pumping circuit is found to be inoperable, there is no immediate threat to shutdown capability, and reactor operation may continue while repairs are being made. Assurance that the remaining system will perform its intended function and that the reliability of the system is good is obtained by demonstrating operation of the pump in the operable circuit at least once daily. A reliability analysis indicates that the plant can be operated safely in this manner for 7 days.

The Standby Liquid Control System is operated by a five position control switch (SYS 1&2, SYS 1, OFF, SYS 2, and SYS 2&1). The single pump operation positions are for operating cycle surveillance testing. This testing demonstrates the capability of firing the explosive trigger assemblies. Also during this testing, sodium pentaborate is circulated from the storage tank, through one suction line, through a pump, and back into the storage tank. This is done separately for each system demonstrating that both suction lines are not plugged. The two pump operation positions will be used for the injection of the sodium pentaborate into the vessel during an ATWS event. By using the two pump operation position, the Standby Liquid Control System will be meeting the requirements of 10CFR50.62 (Requirements for reduction of risk from ATWS events for light-water-cooled nuclear power plants).

C. The solution saturation temperature of 13% sodium pentaborate, by weight, is 59°F. The solution shall be kept at least 10°F above the saturation temperature to guard against boron precipitation. The 10°F margin is included in Figure 3.4-2. Temperature and liquid level alarms for the system are annunciated in the control room.

Pump operability is checked on a frequency to assure a high reliability of operation of the system should it ever be required.

Once the solution has been made up, boron concentration will not vary unless more boron or more water is added. Level indication and alarm indicate whether the solution volume has changed, which might indicate a possible solution concentration change. Considering these factors, the test interval has been established.

D. Periodic tests to demonstrate two-pump flow capability are not feasible in the present system configuration and are unnecessary because the flow path integrity can be determined from the test of a single pump. Comparison of single-pump test pressures with previous results and correlation of these data with initial two-pump tests are used to verify the capability of the piping.