Docket File
50-254

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

December 21, 1994

Mr. D. L. Farrar, Manager
Nuclear Regulatory Services
Commonwealth Edison Company
Executive Towers West III, Suite 500
1400 OPUS Place
Downers Grove, IL 60515

SUBJECT: CORRECTION TO AMENDMENT NO. 151 TO FACILITY OPERATING LICENSE NO. DPR-29 FOR QUAD CITIES NUCLEAR POWER STATION, UNIT 1

Dear Mr. Farrar:

By letter dated November 16, 1994, the Commission issued Amendment No. 151 to Facility Operating License No. DPR-29 for the Quad Cities Nuclear Power Station Unit 1. The technical specification (TS) pages contained some typographical errors which are administrative in nature that need to be corrected.

In TS section 3.4.C on page 3.4/4.4-2, Figures 3.4.1 and 3.4.2 should be Figures 3.4-1 and 3.4-2.

In Bases section 3.4.A, first paragraph on page 3.4/4.4-4, the word addition should be additional. The sentence should be changed to read as follows:

> "A boron concentration of 600 ppm in the reactor core is required to bring the reactor from full power to a 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."

In Bases section 3.4.C, the second sentence on page 3.4/4.4-5 is missing a period. The sentence should read as follows:

> "The solution shall be kept at least 10°F above the saturant temperature to guard against boron precipitation."

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The corrected TS pages are included as enclosures to this letter. Please accept our apologies for any inconvenience these errors may have caused.

Sincerely,

Original signed by:

Robert M. Pulsifer, Project Manager
Project Directorate III-2
Division of Reactor Projects - III/IV
Office of Nuclear Reactor Regulation

Docket No. 50-254

Encls: as stated

cc w/encls: see next page

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D. L. Farrar
Commonwealth Edison Company

Quad Cities Nuclear Power Station
Unit Nos. 1 and 2

cc:

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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.

C. Liquid Poison Tank-Boron Concentration

The liquid poison tank shall contain a boron bearing solution of at least 14 weight percent, but not more than 16.5 weight percent sodium pentaborate decahydrate at all times when the standby liquid control system is required to be operable. The available volume and temperature of the sodium pentaborate solution shall be greater than or equal to the limits specified by Figures 3.4-1 and 3.4-2.

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

3.4 LIMITING CONDITION 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 less than 100 minutes with imperfect mixing. A boron concentration of 600 ppm in the reactor core is required to bring the reactor from full power to a 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 3254 gallons of solution having a 14% sodium pentaborate concentration is required to meet this shutdown requirement. An additional volume of solution is contained below the pump suction and is not available for injection. Other equivalent combinations of increased concentration and reduced volume are also acceptable provided they have considered required temperatures and net positive suction head.

For a required pumping rate of 40 gpm, a minimum of 3254 gallons of at least 14 WT percent solution at ≤ 110°F will be inserted in less than 100 minutes. This insertion rate of boron solution will override the rate of reactivity insertion due to cooldown of the reactor following the xenon peak. Two pump operation will enable faster reactor shutdown for ATWS events. The minimum gross volume required in the storage tank is dependent on solution temperature (to assure adequate net positive suction head). The monthly pump minimum flowrate test shall require a minimum flowrate of 40 gpm. This requirement, combined with the solution concentration requirement of at least 14 WT percent, will demonstrate that the Standby Liquid Control System meets the requirements of 10 CFR 50.62.

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 during 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 the 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 safety 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 10 CFR 50.62 (Requirements for reduction of risk from ATWS events for light-water-cooled nuclear power plants).

C. For the maximum solution concentration of 16.5% sodium pentaborate, by weight, the saturation temperature is 73°F. The solution shall be kept at least 10°F above the saturant 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. Figure 3.4-1 provides additional requirements for minimum tank volume based on solution temperature and concentration to ensure adequate net positive suction head exists for one or two pump operation.

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. Initial two-pump test data correlation with single-pump test data verified the capability of the piping to support two-pump flow. Periodic single-pump test data is compared to the required flow rate and to the previous test data to identify any significant degradation.