



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

NORTHEAST NUCLEAR ENERGY COMPANY

DOCKET NO. 50-245

MILLSTONE NUCLEAR POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 72
License No. DPR-21

- I. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by Northeast Nuclear Energy Company (the licensee), dated January 14, 1994, 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-21 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 72, 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 issuance, to be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION


John F. Stolz, Director
Project Directorate I-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: March 24, 1994

ATTACHMENT TO LICENSE AMENDMENT NO. 72

FACILITY OPERATING LICENSE NO. DPR-21

DOCKET NO. 50-245

Replace the following pages of the Appendix A Technical Specifications with the enclosed pages. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change.

Remove

3/4 4-4

B 3/4 4-1

B 3/4 4-1a

Insert

3/4 4-4

B 3/4 4-1

B 3/4 4-1a

LIMITING CONDITION FOR OPERATION

3.4 STANDBY LIQUID CONTROL SYSTEM

C. Boron Requirements

The liquid poison tank shall contain a boron-bearing solution that satisfies the following requirements at all times when the liquid poison system is required to be OPERABLE:

- o Boron enrichment (atom % B-10) \geq 50%, and
- o Solution concentration \geq 11 wt%, and
- o Solution volume \geq 1,850 gallons, and
- o The temperature of the solution, including that in the piping, shall not be less than the temperature presented in Figure 3.4.1.

D. Shutdown Requirement

If Specifications 3.4.A, 3.4.B, and 3.4.C are not met, an orderly shutdown shall be initiated.

SURVEILLANCE REQUIREMENT

4.4 STANDBY LIQUID CONTROL SYSTEM

C. 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 is added or if the solution temperature drops below the limits specified by Figure 3.4.1.

2. At least once per day

Solution volume shall be checked.

3. At least once per day

The solution temperature, including that in the piping, shall be checked.

4. At least once per refueling cycle

Boron-10 enrichment shall be determined. In addition, the boron-10 enrichment shall be determined within 60 days of adding sodium pentaborate to the tank.

3.4 STANDBY LIQUID CONTROL SYSTEM

BASES

A. Normal Operation

The design objective of the liquid control system is two fold. One objective 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 sufficient quantity of Boron-10 (the boron isotope with the higher neutron absorption cross-section) in less than 125 minutes to bring the reactor from full power to a minimum of 2.6% delta K subcritical condition considering the hot to cold reactivity swing, xenon poisoning, analytical biases and uncertainties, etc. This quantity is equivalent to the quantity of naturally occurring boron which produces a concentration of 660 ppm.

An additional 25% of boron solution is provided for possible imperfect mixing of the chemical solution in the reactor coolant. A minimum quantity of 1,610 net gallons of 50% B-10 enriched sodium pentaborate ($\text{Na}_2\text{B}_{10}\text{O}_{18} \cdot 10\text{H}_2\text{O}$) in a solution having a concentration of no less than 10 wt% is required to meet this shutdown requirement. The higher minimum solution concentration of 11 wt% in the LCO accounts for the measurement uncertainty. Actual minimum system volume for this quantity is 1,850 gallons. (240 gallons are contained below the pump suction and, therefore, cannot be inserted.)

The time requirement (125 minutes) for insertion of the boron solution was selected to override the rate of reactivity insertion due to cooldown of the reactor following the xenon poison peak.

The second objective of the liquid control system is to meet the requirement of the ATWS rule (10CFR50.62) which states that, in part:

"Each boiling water reactor must have a standby liquid control system (SLCS) with the capability of injecting into the reactor pressure vessel a borated water solution at such a flow rate, level of boron concentration and boron-10 isotope enrichment, and accounting for reactor pressure vessel volume, that the resulting reactivity control is at least equivalent to that resulting from injection of 86 gallons per minute of 13 weight percent sodium pentaborate decahydrate solution at the natural boron-10 isotope abundance into a 251-inch inside diameter reactor pressure vessel for a given core design."

3.4 STANDBY LIQUID CONTROL SYSTEM (con't.)

BASES

The equivalency requirement is met by satisfying the following equations:

$$\frac{Q}{86} * \frac{M251}{M} * \frac{C}{13} * \frac{E}{19.8} \geq 1$$

Where:

- Q = Flowrate from one SLCS pump, 38 gpm. (The higher value specified in the LCO accounts for the measurement uncertainty).
- $\frac{M251}{M}$ = The ratio of mass of water in the reactor vessel and recirculation system at hot rated conditions for a plant with a vessel diameter of 251 inches to that of Millstone Unit 1. (This ratio is greater than 1.25).
- C = Sodium pentaborate solution concentration, 10 wt% (the higher value specified in the LCO accounts for the measurement uncertainty).
- E = B-10 isotope enrichment, 50 atom percent.

Boron concentration, solution temperature (within the tank and connecting piping including check of tank heater and pipe heat tracing system), 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. Testing of B-10 enrichment once per refueling cycle or whenever sodium pentaborate is added to the tank provides sufficient assurance that the minimum B-10 enrichment will be maintained.

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 operating cycle unnecessary. A test of one installed explosive charge is made at least once during each operating cycle to assure that the charges are satisfactory. The replacement charge will be selected from the same batch as the tested charge. A continual check of the firing circuit continuity is provided by pilot lights in the control room.

The relief valves in the standby liquid control system protect the system piping and positive displacement pumps, which are nominally designed for 1500 psi, from overpressure. The pressure relief valves discharge back to the standby liquid control solution tank.