NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 665-5000

December 6, 1990

Docket No. 50-423
13684
Re: 10CFR50.90

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Reference: E. J. Mroczka letter to the U. S. Nuclear Regulatory Commission, Proposed Revision to Technical Specifications--Containment Pressure, dated February 26, 1990.

Gentlemen:

Millstone Nuclear Power Station, Unit No. 3
Proposed Revision to Technical Specifications
Containment Pressure (TAC No. 76066)

By letter dated February 26, 1990 (Reference), Northeast Nuclear Energy Company (NNECO) submitted a proposed revision to Technical Specifications for Millstone Unit No. 3. Specifically, Technical Specification 3/4.6 (Containment Systems) and its associated bases are being revised to allow containment pressure to increase to 14.0 psia during Modes 1 through 4. The purpose of the containment pressure increase is to reduce the potential for personnel injury when entering containment due to pressure changes and to permit more expedient entry into the containment for inspection and problem resolution. The proposed increase in the containment pressure is based upon a new containment analysis performed by Stone and Webster at the direction of NNECO. The new containment analysis demonstrates that it is safe to operate Millstone Unit No. 3 at a containment pressure of 14.2 psia with 75°F service water temperature. In addition, a new radiological evaluation was performed for the proposed change. This evaluation includes the effect of fission product removal by the quench spray and containment recirculation system.

Since the current radiological analyses for Millstone Unit No. 3 do not take credit for fission product removal by the quench spray and containment recirculation systems, it is not a design basis for the systems. During initial licensing of Millstone Unit No. 3, a conformance review of these systems against the Standard Review Plan (SRP) 6.5.2 acceptance criteria was not performed. The radiological evaluation for the proposed change (i.e., increase in the containment pressure to 14.0 psia discussed in the referenced letter) does, however, include the effect of fission product removal by the quench spray and containment recirculation systems. The effectiveness of the systems for fission product removal is based on the as-designed systems. The proposed change will therefore result in the addition of fission product removal as a design basis for the quench spray and containment recirculation system. Therefore, consistent with the approach outlined in 10CFR50.34(g),

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NNECO conducted an evaluation of the quench spray and containment recirculation systems against the SRP 6.5.2 criteria. The evaluation included an identification and description of all differences in design features, analytical techniques, and procedural measures provided for the quench spray and containment recirculation systems and the corresponding features, techniques, and measures given in the SRP 6.5.2 acceptance criteria.

Attachment 1 provides the results of the evaluation. Specifically, it identifies and summarizes conformance to and deviations from the SRP acceptance criteria and discusses how the alternatives proposed provide an acceptable method of complying with the regulations that underline SRP acceptance criteria. Based on the evaluation, NNECO concludes that the Millstone Unit No. 3 quench spray system and containment recirculation system as fission product cleanup systems meet the applicable provisions of SRP 6.5.2.

We believe the above information, coupled with information provided in the referenced letter, provides a complete basis for approval of the requested amendment. Of course, should the Staff have any additional questions, we remain available to discuss the Staff's concerns.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

E. J. Mroczka
Senior Vice President

cc: T. T. Martin, Region I Administrator
D. H. Jaffe, NRC Project Manager, Millstone Unit No. 3
W. J. Raymond, Senior Resident Inspector, Millstone Unit Nos. 1, 2, and 3

Mr. Kevin McCarthy, Director
Radiation Control Unit
Department of Environmental Protection
Hartford, CT 06116

STATE OF CONNECTICUT)
) ss. Berlin
COUNTY OF HARTFORD)

Then personally appeared before me, E. J. Mroczka, who being duly sworn, did state that he is Senior Vice President of Northeast Nuclear Energy Company, a Licensee herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Licensee herein, and that the statements contained in said information are true and correct to the best of his knowledge and belief.

Notary Public

My Commission Expires March 31, 1995

Docket No. 50-423
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Attachment

Millstone Nuclear Power Station, Unit No. 3

Standard Review Plan Section 6.5.2
Acceptance Criteria Conformance Review

December 1990

Millstone Nuclear Power Station, Unit No. 3
Standard Review Plan Section 6.5.2
Acceptance Criteria Conformance Review

In accordance with the provisions of 10CFR50.34(g), Northeast Nuclear Energy Company (NNECO) performed an evaluation of the Millstone Unit No. 3 quench spray system and containment recirculation system against the acceptance criteria of Standard Review Plan (SRP) 6.5.2, "Containment Spray as a Fission Product Cleanup System." It is noted that these systems were reviewed and accepted by the NRC during initial licensing of Millstone Unit No. 3 as the containment heat removal systems. The details of these systems related to design bases, system description, safety evaluation, testing and inspection requirements, and instrumentation as required by Regulatory Guide 1.70, Revision 3, are provided in the Millstone Unit No. 3 Final Safety Analysis Report (FSAR) Section 6.2.2. The evaluation presented below identifies and summarizes conformance to and deviations from the SRP acceptance criteria and discusses how the alternatives proposed for the deviations from the SRP acceptance criteria provide an acceptable method of complying with the rules and regulations that underline the SRP acceptance criteria.

Section II--Acceptance Criteria of SRP 6.5.2

1. Design Requirements for Fission Product Removal

The design of the quench spray and containment recirculation systems meets the requirements of the ANSI/ANS 56.5-1979 standard. These systems' designs are unchanged from those originally licensed at Millstone Unit No. 3. For additional details, refer to the Millstone Unit No. 3 FSAR Section 6.2.2.2

a. System Operation

The quench spray system is initiated automatically and draws water from the refueling water storage tank (RWST). Sodium hydroxide solution is added to the quench spray by direct gravity feed from the chemical addition tank. The quench spray system operates until the RWST inventory is exhausted. The containment recirculation system is also initiated automatically approximately 670 seconds after the containment depressurization actuation (CDA) signal. The containment recirculation system is switched to the cold leg recirculation mode of operation approximately 35 to 67 minutes after the receipt of a CDA signal for maximum and minimum engineered safety features (ESF), respectively. For further details, refer to FSAR Section 6.2.2.3, "Design Evaluation."

b. Coverage of Containment Building Volume

The quench spray system and containment recirculation system headers are located in the containment dome to maximize spray droplet fall distance.

The design of the spray headers, including nozzle orientations, provides uniform spray distribution over the entire containment cross section.

The design spray nozzle locations and orientations consider the effect of the postaccident conditions on the spray patterns.

c. Promotion of Containment Building Atmosphere Mixing

Mixing inside containment is promoted by providing vents at the top and bottom of all cubicles.

d. Spray Nozzles

The spray nozzle is the SPRAYCO 1713A, the design used by most commercial pressurized water reactors in the United States. This design produces sufficiently small droplet diameters for effective iodine absorption. The nozzle has no moving parts and has an orifice diameter of 0.375 inches.

e. Spray Solution

Under the design basis requirement, the pH of the solution delivered by the quench spray system is 8.7 (see FSAR page 6.2-43).

f. Containment Sump Solution Mixing

The containment recirculation sump is located near the containment wall at the lowest level in containment. Emergency core cooling system water which spills to the containment sump mixes with the sump solution as it flows to the sump.

g. Containment Sump and Recirculation Spray Solutions

The final pH of the water in the containment sump after a design basis accident, including the contents of the RWST, is between 7 and 7.35.

h. Storage of Additives

The sodium hydroxide solution is stored in the chemical addition tank (CAT). More detailed information is provided in FSAR Section 6.2.2.4.3. This SRP section requires the CAT and associated

components to be heat traced if exposed to less than 40°F by means of heat tracing and insulation. The CAT is maintained above 36°F by means of heat tracing and insulation. Component design data for the CAT is given in the FSAR Table 6.2-61.

i. Single Failure

The quench spray system and containment recirculation system are designed to accomplish their intended safety function even if a single active failure occurs in either system. More detailed information is provided in FSAR Section 6.2.2.3 (Table 6.2-62).

2. Testing

Testing requirements for the quench spray system and containment recirculation system are discussed in FSAR Section 6.2.2.4. As a part of the preoperational testing program, several tests were performed to demonstrate that the quench spray system and containment recirculation system, as installed, meet all design requirements for an effective containment heat removal function. As stated earlier, the original licensing basis analysis did not credit these systems as an effective fission product cleanup system. A review of the preoperational tests completed during initial start-up of Millstone Unit No. 3 was performed to verify that these tests meet the acceptance criteria of this SRP section. The following tests conducted previously meet the acceptance criteria of SRP 6.5.2, Sections II.2.a and II.2.c.

a. Containment Spray Piping and Nozzles From Obstructions

(1) Test No. T3306-P (Hot Air Test, Pump Performance Test)
(2) Test No. T3309-P001 (Hot Air Test, Pump Performance Test)

b. Spray Additives' Capability

Test No. T3309-P002 (CAT Drawdown Test)

Although no integrated test was performed to verify capability of the system to deliver the required spray flow (i.e., actually spraying the containment), the following overlapping tests performed during initial start-up of Millstone Unit No. 3 demonstrate the quench spray system and containment recirculation system meet the acceptance criteria of SRP 6.5.2, Section II.2.b.

Flow capability

a. Test No. T3306-P (Hot Air Test, Pump Performance Test)
b. Test No. T3309-P001 (Hot Air Test, Pump Performance Test)
c. Test No. T3309-P002 (CAT Drawdown Test)

d. Test No. T3306-1F01 (Flushed RSS Piping)
e. Test No. T3309-1F01 (Flushed QSS Piping)

These overlapping tests demonstrate the capability of the quench spray pump, containment recirculation pump to deliver the required flow through spray nozzles.

3. Technical Specifications

The Millstone Unit No. 3 Technical Specification Sections 3.5.2, "ECCS Subsystems (T_{avg} > 350°F)"; 3.5.3, "ECCS Subsystems (T_{avg} < 350°F)"; 3.5.4, "RWST"; 3.7.4, "Service Water System"; 4.0.5, "ISI/IST of ASME Components"; 3.6.2.1, "Containment Quench Spray System"; 3.6.2.2, "Recirculation Spray System"; and 3.6.2.3, "Spray Additive System," specify appropriate limiting conditions for operation, tests, and inspections to provide assurance that the systems are capable of performing their design function for Modes 1 through 4 operating conditions. These Technical Specifications are consistent with the Westinghouse Standard Technical Specifications. Moreover, the operability requirements are verified by performance of the following surveillance tests:

Surveillance Procedure Number	Title	Technical Specification Requirement
SP 3606.1	Containment Recirculation Pump 3RSS*P1A Operational Readiness Test	Specifications 4.5.2.f.4, 4.6.2.2.b, 4.6.2.2.c, and 4.0.5
SP 3606.2	Containment Recirculation Pump 3RSS*P1B Operational Readiness Test	Specifications 4.5.2.f.4, 4.6.2.2.b, 4.6.2.2.c, and 4.0.5
SP 3606.3	Containment Recirculation Pump 3RSS*P1C Operational Readiness Test	Specifications 4.5.2.f.4, 4.6.2.2.b, 4.6.2.2.c, and 4.0.5
SP 3606.4	Containment Recirculation Pump 3RSS*P1D Operational Readiness Test	Specifications 4.5.2.f.4, 4.6.2.2.b, 4.6.2.2.c, and 4.0.5
SP 3606.8	Recirculation Spray Train A Valve Operability	Specification 4.0.5
SP 3606.9	Recirculation Spray Train B Valve Operability	Specification 4.0.5
SP 3609.1	Quench Spray Pump QSS-P3A Operational Readiness Test	Specifications 4.6.2.1.b and 4.0.5

Surveillance Procedure Number	Title	Technical Specification Requirement
SP 3609.2	Quench Spray Pump QSS-P3B Operational Readiness Test	Specifications 4.6.2.1.b and 4.0.5
SP 3609.3	Containment Quench Spray Train A Valve Line-Up Verification	Specification 4.6.2.1.a.1
SP 3609.4	Containment Quench Spray Train B Valve Line-Up Verification	Specification 4.6.2.1.a.1

Surveillance Procedure SP 3860 verifies that the additive (sodium hydroxide solution), quantity, and concentrations are within the limits specified in Technical Specification 3.6.2.3. Surveillance Procedures EN 31105 (QSS Hot Air Test) and EN 31106 (RSS Hot Air Test) verify that essential piping and passive devices are free of obstructions.

4. Computation of Fission Product Removal Rate

SRP 6.5.2 states in part that acceptable methods for computing fission product removal rates by the spray system are given in Subsection III.4.C of SRP 6.5.2, "Fission Product Cleanup Models." For Millstone Unit No. 3, calculation of the elemental iodine removal coefficient is based on the model presented in the ANSI/ANS 56.5-1979, "PWR and BWR Containment Spray System Design Criteria," rather than that presented in Subsection III.4.C of SRP 6.5.2. The model specified in the ANS standard considers the effect of pH on the iodine removal coefficient. The model specified in the SRP does not consider this effect with the exception that an upper limit is placed on the value for boric acid spray. For the spray droplet diameters and pH values applicable to Millstone Unit No. 3, the ANS standard is more conservative than the SRP.

Conclusion

Based upon the above, NNECO hereby concludes that the Millstone Unit No. 3 quench spray system and containment recirculation system as fission product cleanup systems meet the applicable provisions of SRP 6.5.2.