

**North
Atlantic**

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The Northeast Utilities System

Ted C. Feigenbaum
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NYN- 95051

June 16, 1995

United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Reference: Facility Operating License No. NPF-86, Docket No. 50-443

Subject: License Amendment Request 95-01: Borated Water Sources (TAC No. 92007)

Gentlemen:

North Atlantic Energy Service Corporation (North Atlantic) has enclosed herein License Amendment Request 95-01. This License Amendment Request (LAR) is submitted pursuant to the requirements of 10CFR50.90 and 10CFR50.4.

The purpose of LAR 95-01 is to propose changes to the Seabrook Station Technical Specifications to increase the requirements for core reactivity control available from borated water sources. The increased requirements for boron concentration in borated water sources assure that sufficient negative reactivity remains available to offset the design increase in positive core reactivity beginning with Cycle 5.

LAR 95-01 has been reviewed and approved by the Station Operation Review Committee and the Nuclear Safety Audit Review Committee. A similar change was issued to Millstone Unit 3 as Amendment Number 60 to operating license number NPF-49, in response to their cycle 4 reload application.

As discussed in the enclosed LAR Section IV, the proposed changes do not involve a significant hazard consideration pursuant to 10CFR50.92. A copy of this letter and the enclosed LAR have been forwarded to the New Hampshire State Liaison Officer pursuant to 10CFR50.91(b). In addition, North Atlantic has determined that LAR 95-01 meets the criteria of 10CFR51.22(c) for a categorical exclusion from the requirements for an Environmental Impact Statement (see Section VI enclosed).

North Atlantic requests NRC review of LAR 95-01 and issuance of a license amendment by November 1, 1995 (see Section V enclosed).

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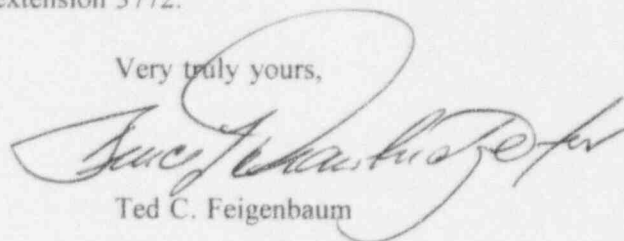
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Should you have any questions regarding this letter, please contact Mr. James M. Peschel, Regulatory Compliance Manager, at (603) 474-9521, extension 3772.

Very truly yours,



Ted C. Feigenbaum

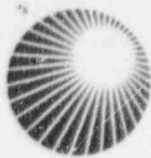
Enclosure

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SEABROOK STATION UNIT 1

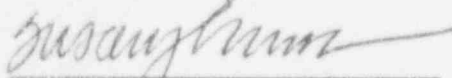
Facility Operating License NPF-86
Docket No. 50-443

License Amendment Request No. 95-01
Borated Water Sources

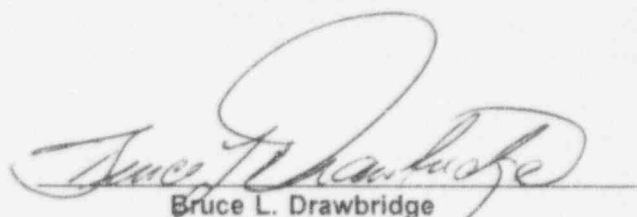
This License Amendment Request is submitted by North Atlantic Energy Service Corporation pursuant to 10CFR50.90. The following information is enclosed in support of this License Amendment Request:

- Section I - Introduction and Safety Evaluation for Proposed Changes
- Section II - Markup of Proposed Changes
- Section III - Retype of Proposed Changes
- Section IV - Determination of Significant Hazards for Proposed Changes
- Section V - Proposed Schedule for License Amendment Issuance and Effectiveness
- Section VI - Environmental Impact Assessment

Sworn and Subscribed
to before me this
16th day of June, 1995



Notary Public



Bruce L. Drawbridge
Executive Director - Nuclear Production

I. Introduction and Safety Evaluation for Proposed Changes

A. Introduction

The purpose of License Amendment Request (LAR) 95-01 is to propose changes to the Seabrook Station Technical Specifications to increase the requirements for core reactivity control available from borated water sources. The increased requirements for boron concentration in borated water sources assure that sufficient negative reactivity remains available to offset the design increase in positive core reactivity beginning with Cycle 5. The design increase in positive core reactivity arises from the increased cycle length.

The affected borated water sources include:

- 1) The Refueling Water Storage Tank (RWST) for all Modes of operation; and
- 2) The Emergency Core Cooling System (ECCS) Accumulators when required to be operable.

For Cycle 5, the existing 10CFR50.46 requirement for post-LOCA subcriticality and long term cooling establishes the need for increased reactivity control from the RWST and the Accumulators. Current concentration requirements in all other borated water sources were reviewed and found to meet the reactivity control requirements of the Cycle 5 design.

The proposed increase in the required boron concentrations in the RWST and Accumulators required a review of the NaOH inventory in the Spray Additive Tank (SAT). This inventory assures an acceptable range of pH of between 8.5 and 11.0 for the solution recirculated within containment after a Loss of Coolant Accident (LOCA). This review determined that changes to the NaOH inventory are not required.

The increase in the required boron concentrations necessitates a change in the post-LOCA hot leg recirculation initiation time to prevent boron precipitation. This switchover time is presently 18 hours and appears in Section 6.3 of the Seabrook Station Updated Final Safety Analysis Report (UFSAR) and in Emergency Response Procedures (ERPs) E-1, Loss of Reactor or Secondary Coolant, and ES-1.4, Transfer to Hot Leg Recirculation. The increase in the required boron concentrations requires a switchover time of 9 hours to prevent the core region from reaching the boron precipitation limit. The available hot leg recirculation flow is sufficient to remove decay heat at 9 hours. Therefore, a hot leg recirculation time of 9 hours post-LOCA is acceptable.

The combination of proposed changes to Technical Specifications and Bases will assure that sufficient core reactivity control remains available during the operation of Cycle 5 and subsequent cycles. The proposed upper limit on boron concentration in the RWST and Accumulators also ensures that the boron solubility limit will not be approached in these volumes. Boron concentrations in borated water sources and containment sump pH after a LOCA are calculated using existing analysis methodology. The post-LOCA time for switchover to hot leg recirculation is changed to assure the core region will not reach the boron precipitation limit.

B. Safety Evaluation of Proposed Changes

This section describes the safety evaluation of the proposed changes to the Facility Operating License to assure that sufficient core reactivity control remains available during the operation of Cycle 5 and subsequent cycles. In summary, the proposed changes affect:

- a) *Technical Specification 3.1.2.5, Borated Water Sources - Shutdown;*
- b) *Technical Specification 3.1.2.6, Borated Water Sources - Operating;*
- c) *Technical Specification 3.5.1.1, Accumulators; and*
- d) *Technical Specification 3.5.4, RWST - Boron Injection System.*

A safety evaluation of each proposed change is provided below. The proposed changes are also summarized in Table 1. For completeness, the safety evaluation includes a discussion of potentially affected Technical Specifications for which no changes are proposed. Markups of the proposed changes to *Technical Specifications* and *Bases*, are provided later in Section II of this LAR.

1. Technical Specification 3.1.1.2, Mode 5 Shutdown Margin

Technical Specification 3.1.1.2 currently requires that the Reactor Coolant System boron concentration shall be greater than or equal to 2000 ppm boron when the reactor coolant loops are in a drained condition. The basis for this requirement is to permit sufficient time for the operator to terminate an inadvertent boron dilution event with T_{avg} less than 200°F. The current boron concentration requirement exceeds the requirements for acceptable boron dilution accident analysis results for Cycle 5. So, a change to the required boron concentration is not proposed.

2. Technical Specification 3.1.2.5, Borated Water Sources - Shutdown

Technical Specification 3.1.2.5 requires that either the Boric Acid Storage Tank (BAST) or the Refueling Water Storage Tank (RWST) be operable in Modes 5 and 6. The basis for the minimum contained water volumes and minimum boron concentrations is to provide the shutdown margin specified in the Core Operating Limits Report (COLR) after xenon decay and cooldown from 200°F to 140°F. The contained volumes include allowance for unusable volumes because of discharge line location and other physical characteristics. The current boron concentration requirement for the BAST exceeds the predicted shutdown margin requirements for Cycle 5 and other future cycles. So, a change to the BAST boron concentration requirement is not proposed. The current RWST boron concentration requirement of 2000 ppm is increased to 2700 ppm where the value appears in the *Limiting Condition for Operation and Bases*. The proposed value of 2700 ppm exceeds the predicted shutdown margin requirements for Cycle 5 and other future cycles. The proposed value is consistent with the proposed changes to *Technical Specifications 3.1.2.6* and *3.5.4* discussed below.

Affects: *Technical Specifications* pages 3/4 1-11 and B 3/4 1-3

3. Technical Specification 3.1.2.6, Borated Water Sources - Operating

Technical Specification 3.1.2.6 requires that either the Boric Acid Storage Tank (BAST) or the Refueling Water Storage Tank (RWST) be operable in Modes 1 to 4. The basis for the minimum contained water volumes and minimum boron concentrations is to provide the shutdown margin specified in the COLR from expected operating conditions after xenon decay and cooldown to 200°F. The contained volumes include allowance for unusable volumes because of discharge line location and other physical characteristics. The limits on contained water volume and boron concentration of the RWST also ensure an acceptable range of pH of between 8.5 and 11.0 for the solution recirculated within containment after a LOCA. The current boron concentration requirement for the BAST exceeds the predicted shutdown margin requirements for Cycle 5 and other future cycles. So, a change to the BAST boron concentration requirement is not proposed. The current minimum RWST boron concentration requirement of 2000 ppm is changed to a required range of 2700 to 2900 ppm where the value appears in the *Limiting Condition for Operation and Bases*. The proposed range of RWST boron concentration:

- a) exceeds the predicted shutdown margin requirements for Cycle 5 and other future cycles;
- b) ensures an acceptable range of pH for the solution recirculated within containment after a LOCA;
- c) ensures that the boron solubility limit will not be approached in the RWST.

The proposed change is also consistent with the proposed changes to *Technical Specifications 3.1.2.5 and 3.5.4*.

Affects: Technical Specifications pages 3/4 1-12 and B 3/4 1-2

4. Technical Specification 3.5.1.1, Accumulators

Technical Specification 3.5.1.1 requires that the accumulators be operable with a boron concentration range of 1900 to 2100 ppm during Modes 1 to 3. The basis for the limits on boron concentration is to ensure that the assumptions used for accumulator injection in the safety analysis are met. The current required range of boron concentration in the accumulators is changed for Cycle 5 and other future cycles to a required range of 2600 to 2900 ppm as it appears in the *Limiting Condition for Operation*. The proposed upper limit on boron concentration in the Accumulators ensures that the boron solubility limit will not be approached in these volumes. This change together with the proposed change to *Technical Specification 3.5.4, RWST - Boron Injection System*, ensures that following a LOCA:

- 1) the core remains subcritical in the cold condition and amenable to long term cooling;
- 2) the range of pH for the solution recirculated within containment remains acceptable; and,
- 3) the switchover from cold leg to hot leg recirculation at 9 hours is acceptable.

Affects: Technical Specifications page 3/4 5-1

5. Technical Specification 3.5.4, RWST - Boron Injection System

Technical Specification 3.5.4 currently requires that the RWST be operable in Modes 1 to 4 with a minimum boron concentration of 2000 ppm of boron. The basis for the limit on boron concentration is to ensure that following a LOCA, 1) the core remains subcritical in the cold condition and amenable to long term cooling, and 2) the range of pH of between 8.5 and 11.0 for the solution recirculated within containment remains acceptable. The current required minimum boron concentration in the RWST is changed for Cycle 5 and other future cycles to a required range of 2700 to 2900 ppm as it appears in the *Limiting Condition for Operation*. The proposed upper limit on boron concentration in the RWST ensures that the boron solubility limit will not be approached in this volume. This change together with the proposed change to *Technical Specification 3.5.1.1, Accumulators*, ensures that following a LOCA:

- 1) the core remains subcritical in the cold condition and amenable to long term cooling;
- 2) the range of pH for the solution recirculated within containment remains acceptable;
- 3) the switchover from cold leg to hot leg recirculation at 9 hours is acceptable.

Affects: *Technical Specifications* page 3/4 5-11

6. Technical Specification 3.6.2.2, Spray Additive Tank

Technical Specification 3.6.2.2 currently requires that the Spray Additive Tank (SAT) be operable with a contained volume between 9420 and 9650 gallons of between 19 and 21% by weight NaOH solution in Modes 1 to 4. The limits on NaOH volume and concentration ensure a pH value of between 8.5 and 11.0 for the solution recirculated within containment after a LOCA. The limits on contained solution volume include an allowance for solution not usable because of tank discharge line location and other physical characteristics. The effect of the proposed changes to boron concentrations in the Accumulators (*Technical Specification 3.5.1.1*) and RWST (*Technical Specification 3.5.4*) on the post-LOCA sump pH was re-evaluated consistent with the methodology described in UFSAR Section 6.2.2.2. In conclusion, the current limits on NaOH inventory in the SAT ensure an acceptable range of pH for the solution recirculated within containment after a LOCA. No change to the SAT is proposed.

7. Technical Specification 3.9.1, Refueling Boron Concentration

Technical Specification 3.9.1 currently requires during Mode 6 (refueling) that 1) $k_{eff} \leq 0.95$ or 2) the boron concentration in all filled portions of the RCS and the refueling canal be ≥ 2000 ppm, whichever is more restrictive. The basis for these limitations is to assure consistency with initial conditions assumed for the boron dilution incident in the safety analyses. The current boron concentration requirement exceeds the requirements for acceptable boron dilution accident analysis results for Cycle 5. No change to the required boron concentration is proposed.

For convenience, the proposed changes described above are also summarized in Table 1.

TABLE 1**LAR 95-01: BORATED WATER SOURCES**

TECH. SPEC. NUMBER	AFFECTED PARAMETER	CURRENT VALUE	TECHNICAL SPECIFICATION BASIS	PROPOSED CHANGE
3.1.2.5 Borated Water Sources Modes 5,6 (Shutdown)	Minimum RWST C_B	2000 ppm	The RWST is an alternate borated water source sufficient to provide the shutdown margin specified in the COLR after xenon decay and cooldown from 200°F to 140°F.	Change value to: 2700 ppm
3.1.2.6 Borated Water Sources Modes 1 to 4 (Operating)	Minimum RWST C_B	2000 ppm	The RWST is an alternate borated water source sufficient to provide the shutdown margin specified in the COLR from expected operating conditions after xenon decay and cooldown to 200°F. The limits on contained water volume and C_B of the RWST ensure a sump pH between 8.5 and 11.0 after a LOCA.	Change value to: 2700 to 2900 ppm.
3.5.1.1 Accumulators	C_B limits	1900 to 2100 ppm	The limits on contained water volume, C_B , and pressure ensure that the assumptions for accumulator injection in the safety analysis are met.	Change range to: 2600 to 2900 ppm
3.5.4 RWST - Boron Injection System Modes 1 to 4	Minimum C_B	2000 ppm	The limits on contained water volume and C_B ensure 1) adequate recirculation cooling flow to the core, 2) a subcritical core in the cold condition and amenable to long term cooling, and 3) a sump pH between 8.5 and 11.0 after a LOCA.	Change value to: 2700 to 2900 ppm.

II. Markup of Proposed Changes

The enclosed markup pages reflect the currently issued version of Technical Specifications and Bases and include the changes approved in License Amendment No. 33, Wide-Band Operation and Core Enhancements^(1,2). Revision bars are provided in the right margin to designate a change in the text.

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- (1) Letter from A.W. De Agazio (USNRC) to T.C. Feigenbaum (NAESCo), Amendment No. 33 to Facility Operating License NPF-86: Wide-Band Operation and Core Enhancements - License Amendment Request 93-18 (TAC M87849), November 23, 1994.
- (2) Letter from A.W. De Agazio (USNRC) to T.C. Feigenbaum (NAESCo), Correction to Amendment 33 to Facility Operating License NPF-86 (TAC M87849), December 6, 1994.