

September 14, 1995

Mr. Ted C. Feigenbaum
Senior Vice President
and Chief Nuclear Officer
North Atlantic Energy Service Corporation
P.O. Box 300
Seabrook, NH 03874

SUBJECT: AMENDMENT NO. 42 TO FACILITY OPERATING LICENSE NPF-86: BORON
CONCENTRATION REQUIREMENTS FOR BORATED WATER SOURCES - LICENSE
AMENDMENT REQUEST 95-01 (TAC M92007)

Dear Mr. Feigenbaum:

The Commission has issued the enclosed Amendment No. 42 to Facility Operating License No. NPF-86 for the Seabrook Station, Unit No. 1, in response to your application dated June 16, 1995.

The amendment revises the Appendix A Technical Specifications (TS) relating to core reactivity control available from borated water sources. The amendment changes the minimum boron concentration specified for the refueling water storage tank (RWST) in Limiting Condition for Operation (LCO) in TS 3.1.2.5 and replaces the minimum specified concentration for boron with an acceptable range of boron concentration for the RWST and the accumulators in the LCOs for TS 3.1.2.6, 3.5.1.1, and 3.5.4.

A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

Original signed by:
Albert W. De Agazio, Sr. Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-443
Serial No. SEA-95-019

Enclosures: 1. Amendment No. 42 to NPF-86
2. Safety Evaluation

cc w/encls: See next page

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NAME	SNorris	ADeAgazio:cn	PMcKee	EBOLLEX	
DATE	08/3/95	08/6/95	08/10/95	08/11/95	08/ /95



UNITED STATES
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

September 14, 1995

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A copy of the related Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly Federal Register notice.

Sincerely,

A handwritten signature in cursive script, reading "Albert W. De Agazio, Sr.", written in dark ink.

Albert W. De Agazio, Sr. Project Manager
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Docket No. 50-443
Serial No. SEA-95-019

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cc w/encls: See next page

T. Feigenbaum
North Atlantic Energy Service Corporation

Seabrook Station, Unit No. 1

cc:

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

NORTH ATLANTIC ENERGY SERVICE CORPORATION, ET AL*

DOCKET NO. 50-443

SEABROOK STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 42
License No. NPF-86

1. The Nuclear Regulatory Commission (the Commission) has found that:
 - A. The application for amendment by North Atlantic Energy Service Corporation, et al. (the licensee), dated June 16, 1995, 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.

*North Atlantic Energy Service Company (NAESCO) is authorized to act as agent for the: North Atlantic Energy Corporation, Canal Electric Company, The Connecticut Light and Power Company, Great Bay Power Corporation, Hudson Light and Power Department, Massachusetts Municipal Wholesale Electric Company, Montaup Electric Company, New England Power Company, New Hampshire Electric Cooperative, Inc., Taunton Municipal Light Plant, and The United Illuminating Company, and has exclusive responsibility and control over the physical construction, operation, and maintenance of the facility.

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. NPF-86 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 42, and the Environmental Protection Plan contained in Appendix B are incorporated into Facility License No. NPF-86. NAESCO shall operate the facility in accordance with the Technical Specifications and the Environmental Protection Plan.

3. This license amendment is effective as of the date of its issuance, to be implemented prior to entering MODE 4 following the fourth refueling outage.

FOR THE NUCLEAR REGULATORY COMMISSION



Phillip F. McKee, Director
Project Directorate I-3
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: September 14, 1995

ATTACHMENT TO LICENSE AMENDMENT NO. 42

FACILITY OPERATING LICENSE NO. NPF-86

DOCKET NO. 50-443

Replace the following pages of Appendix A, Technical Specifications, with the attached pages as indicated. The revised pages are identified by amendment number and contain vertical lines indicating the areas of change. Overleaf pages have been provided.

Remove

3/4 1-11

3/4 1-12

3/4 5-1

3/4 5-2*

3/4 5-11

B 3/4 1-3

B 3/4 1-4*

Insert

3/4 1-11

3/4 1-12

3/4 5-1

3/4 5-2*

3/4 5-11

B 3/4 1-3

B 3/3 1-4*

REACTIVITY CONTROL SYSTEMS

BORATION SYSTEMS

BORATED WATER SOURCES - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.5 As a minimum, one of the following borated water sources shall be OPERABLE:

- a. A Boric Acid Storage System with:
 - 1) A minimum contained borated water volume of 6,500 gallons,
 - 2) A minimum boron concentration of 7000 ppm, and
 - 3) A minimum solution temperature of 65°F.
- b. The refueling water storage tank (RWST) with:
 - 1) A minimum contained borated water volume of 24,500 gallons,
 - 2) A minimum boron concentration of 2700 ppm, and
 - 3) A minimum solution temperature of 50°F.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no borated water source OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes.

SURVEILLANCE REQUIREMENTS

4.1.2.5 The above required borated water source shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
 - 1) Verifying the boron concentration of the water,
 - 2) Verifying the contained borated water volume, and
 - 3) Verifying the boric acid storage tank solution temperature when it is the source of borated water.
- b. At least once per 24 hours by verifying the RWST temperature.

REACTIVITY CONTROL SYSTEMS

BORATION SYSTEMS

BORATED WATER SOURCES - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.6 As a minimum, the following borated water sources shall be OPERABLE as required by Specification 3.1.2.2:

- a. A Boric Acid Storage System with:
 - 1) A minimum contained borated water volume of 22,000 gallons,
 - 2) A minimum boron concentration of 7000 ppm, and
 - 3) A minimum solution temperature of 65°F.
- b. The refueling water storage tank (RWST) with:
 - 1) A minimum contained borated water volume of 477,000 gallons,
 - 2) A boron concentration between 2700 and 2900 ppm,
 - 3) A minimum solution temperature of 50°F, and
 - 4) A maximum solution temperature of 98°F.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

- a. With the Boric Acid Storage System inoperable and being used as one of the above required borated water sources, restore the system to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and borated to a SHUTDOWN MARGIN equivalent to at least the limit specified in the CORE OPERATING LIMITS REPORT (COLR) for the above MODES at 200°F; restore the Boric Acid Storage System to OPERABLE status within the next 7 days or be in COLD SHUTDOWN within the next 30 hours.
- b. With the RWST inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

3/4.5 EMERGENCY CORE COOLING SYSTEMS

3/4.5.1 ACCUMULATORS

HOT STANDBY, STARTUP, AND POWER OPERATION

LIMITING CONDITION FOR OPERATION

3.5.1.1 Each Reactor Coolant System (RCS) accumulator shall be OPERABLE with:

- a. The isolation valve open and power removed,
- b. A contained borated water volume of between 6121 and 6596 gallons,
- c. A boron concentration of between 2600 and 2900 ppm, and
- d. A nitrogen cover-pressure of between 585 and 664 psig.

APPLICABILITY: MODES 1, 2, and 3*.

ACTION:

- a. With one accumulator inoperable, except as a result of a closed isolation valve, restore the inoperable accumulator to OPERABLE status within 8 hours or be in at least HOT STANDBY within the next 6 hours and reduce pressurizer pressure to less than 1000 psig within the following 6 hours.
- b. With one accumulator inoperable due to the isolation valve being closed, either immediately open the isolation valve or be in at least HOT STANDBY within 6 hours and reduce pressurizer pressure to less than 1000 psig within the following 6 hours.
- c. With one pressure or water level channel inoperable per accumulator, return the inoperable channel to OPERABLE status within 30 days or be in at least HOT STANDBY within the next 6 hours and in HOT SHUTDOWN within the following 6 hours.
- d. With two pressure channels or two water level channels inoperable per accumulator, immediately declare the affected accumulator(s) inoperable.

SURVEILLANCE REQUIREMENTS

4.5.1.1 Each accumulator shall be demonstrated OPERABLE:

- a. At least once per 24 hours by:
 - 1) Verifying the contained borated water volume and nitrogen cover-pressure in the tanks, and

*Pressurizer pressure above 1000 psig.

EMERGENCY CORE COOLING SYSTEMS

ACCUMULATORS

HOT STANDBY, STARTUP, AND POWER OPERATION

SURVEILLANCE REQUIREMENTS

4.5.1.1 (Continued)

- 2) Verifying that each accumulator isolation valve is open.
- b. By verifying the boron concentration of the accumulator solution under the following conditions:
- 1) At least once per 31 days,
 - 2) Within 6 hours after each solution volume increase of greater than or equal to 1% of tank volume. This surveillance is not required when the volume increase makeup source is the RWST and the RWST has not been diluted since verifying that the RWST boron concentration is equal to or greater than the accumulator boron concentration limit.
- c. At least once per 31 days when the RCS pressure is above 1000 psig by verifying that power to the isolation valve operator is disconnected.
- d. At least once per 18 months by verifying that each accumulator isolation valve opens automatically under each of the following conditions:
- 1) When an actual or a simulated RCS pressure signal exceeds the P-11 (Pressurizer Pressure Block of Safety Injection) Setpoint, and
 - 2) Upon receipt of a Safety Injection test signal.

BORON INJECTION SYSTEM

3/4.5.4 REFUELING WATER STORAGE TANK

LIMITING CONDITION FOR OPERATION

3.5.4 The refueling water storage tank (RWST) shall be OPERABLE with:

- a. A minimum contained borated water volume of 477,000 gallons,
- b. A boron concentration between 2700 and 2900 ppm of boron,
- c. A minimum solution temperature of 50°F, and
- d. A maximum solution temperature of 98°F.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTION:

With the RWST inoperable, restore the tank to OPERABLE status within 1 hour or be in at least HOT STANDBY within 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.4 The RWST shall be demonstrated OPERABLE:

- a. At least once per 7 days by:
 - 1) Verifying the contained borated water volume in the tank, and
 - 2) Verifying the boron concentration of the water.
- b. At least once per 24 hours by verifying the RWST temperature.

REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.2 BORATION SYSTEMS (Continued)

boron capability requirement occurs at EOL from full power equilibrium xenon conditions and requires 22,000 gallons of 7000 ppm borated water from the boric acid storage tanks or a minimum contained volume of 477,000 gallons of 2700 - 2900 ppm borated water from the refueling water storage tank (RWST).

The limitation for a maximum of one centrifugal charging pump to be OPERABLE and the Surveillance Requirement to verify all charging pumps except the required OPERABLE pump to be inoperable in MODES 4, 5, and 6 provides assurance that a mass addition pressure transient can be relieved by operation of a single PORV or an RHR suction relief valve.

As a result of this, only one boron injection system is available. This is acceptable on the basis of the stable reactivity condition of the reactor, the emergency power supply requirement for the OPERABLE charging pump and the additional restrictions prohibiting CORE ALTERATIONS and positive reactivity changes in the event the single injection system becomes inoperable.

The boron capability required below 200°F is sufficient to provide a SHUTDOWN MARGIN as specified in the CORE OPERATING LIMITS REPORT after xenon decay and cooldown from 200° F to 140° F. This condition requires a minimum contained volume of 6500 gallons of 7000 ppm borated water from the boric acid storage tanks or a minimum contained volume of 24,500 gallons of 2700 ppm borated water from the RWST.

The contained water volume limits include allowance for water not available because of discharge line location and other physical characteristics.

The limits on contained water volume and boron concentration of the RWST also ensure a pH value of between 8.5 and 11.0 for the solution recirculated within containment after a LOCA. This pH band minimizes the evolution of iodine and minimizes the effect of chloride and caustic stress corrosion on mechanical systems and components.

The OPERABILITY of one Boron Injection System during REFUELING ensures that this system is available for reactivity control while in MODE 6.

The limitations on OPERABILITY of isolation provisions for the Boron Thermal Regeneration System and the Reactor Water Makeup System in Modes 4, 5, and 6 ensure that the boron dilution flow rates cannot exceed the value assumed in the transient analysis.

3/4.1.3 MOVABLE CONTROL ASSEMBLIES

The specifications of this section ensure that: (1) acceptable power distribution limits are maintained, (2) the minimum SHUTDOWN MARGIN is maintained, and (3) the potential effects of rod misalignment on associated accident analyses are limited. OPERABILITY of the control rod position indicators is required to determine control rod positions and thereby ensure compliance with the control rod alignment and insertion limits. Verification that the Digital Rod Position Indicator agrees with the demanded position

REACTIVITY CONTROL SYSTEMS

BASES

3/4.1.3 MOVABLE CONTROL ASSEMBLIES (Continued)

within ± 12 steps at 24, 48, 120, and 228 steps withdrawn for the Control Banks and 18, 210, and 228 steps withdrawn for the Shutdown Banks provides assurances that the Digital Rod Position Indicator is operating correctly over the full range of indication. Since the Digital Rod Position Indication System does not indicate the actual shutdown rod position between 18 steps and 210 steps, only points in the indicated ranges are picked for verification of agreement with demanded position.

The ACTION statements which permit limited variations from the basic requirements are accompanied by additional restrictions which ensure that the original design criteria are met. Misalignment of a rod requires measurement of peaking factors and a restriction in THERMAL POWER. These restrictions provide assurance of fuel rod integrity during continued operation. In addition, those safety analyses affected by a misaligned rod are reevaluated to confirm that the results remain valid during future operation.

The maximum rod drop time restriction is consistent with the assumed rod drop time used in the safety analyses. Measurement with rods at their individual mechanical fully withdrawn position, T_{avg} greater than or equal to 551°F and all reactor coolant pumps operating ensures that the measured drop times will be representative of insertion times experienced during a Reactor trip at operating conditions.

The fully withdrawn position of shutdown and control banks can be varied between 225 and the mechanical fully withdrawn position (up to 232 steps), inclusive. An engineering evaluation was performed to allow operation to the 232 step maximum. The 225 to 232 step interval allows axial repositioning to minimize RCCA wear.

Control rod positions and OPERABILITY of the rod position indicators are required to be verified on a nominal basis of once per 12 hours with more frequent verifications required if an automatic monitoring channel is inoperable. These verification frequencies are adequate for assuring that the applicable LCOs are satisfied.

For Specification 3.1.3.1 ACTIONS b. and c., it is incumbent upon the plant to verify the trippability of the inoperable control rod(s). Trippability is defined in Attachment C to a letter dated December 21, 1984, from E. P. Rahe (Westinghouse) to C. O. Thomas (NRC). This may be by verification of a control system failure, usually electrical in nature, or that the failure is associated with the control rod stepping mechanism. In the event the plant is unable to verify the rod(s) trippability, it must be assumed to be untrippable and thus falls under the requirements of ACTION a. Assuming a controlled shutdown from 100% RATED THERMAL POWER, this allows approximately 4 hours for this verification.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 42 TO FACILITY OPERATING LICENSE NO. NPF-86
NORTH ATLANTIC ENERGY SERVICE CORPORATION
SEABROOK STATION, UNIT NO. 1
DOCKET NO. 50-443

1.0 INTRODUCTION

By application dated June 16, 1995, North Atlantic Energy Service Corporation (North Atlantic) proposed an amendment to the Appendix A Technical Specifications (TS) for the Seabrook Station, Unit 1 (Seabrook). The proposed amendment would change the minimum boron concentration specified for the refueling water storage tank (RWST) in Limiting Condition for Operation (LCO) in TS 3.1.2.5 and would replace the minimum specified concentration for boron with an acceptable range of boron concentration for the RWST and the accumulators in the LCOs for TS 3.1.2.6, 3.5.1.1, and 3.5.4.

The changes in boron concentration are required to assure that sufficient negative reactivity remains available to offset the design increase in positive core reactivity beginning with Cycle 5. The increase in positive core reactivity is due to the increased cycle length core design.

2.0 EVALUATION

Starting with Cycle 5, the duration of the Seabrook operating cycle will be increased causing a design increase in the positive core reactivity. To assure that sufficient negative reactivity remains available, North Atlantic determined that the boron concentration in borated water sources must be increased. The borated water systems affected are the refueling water storage tank (RWST) for all Modes of operation and the emergency core cooling system (ECCS) accumulators when required to be operable.

With an increase in the boron concentration, there is the concern that boron precipitation will occur in the core. Therefore, North Atlantic proposes to change the post-loss-of-coolant-accident (post-LOCA) recirculation initiation time from the current 18 hours to 9 hours. This appears in Section 6.3 of the Seabrook Final Safety Analysis Report and in Emergency Response Procedures E-1. North Atlantic determined that for recirculation initiation at 9 hours there is sufficient hot leg recirculation flow to remove decay heat.

North Atlantic also has evaluated the sodium hydroxide (NaOH) inventory in the Spray Additive Tank (SAT) based on the proposed increase in boron concentration. The inventory assures an acceptable pH range for the solution

recirculated in the containment after a LOCA. North Atlantic's evaluation determined that a change in the NaOH inventory was not required.

The proposed TS changes are:

TS 3.1.2.5 Borated Water Sources - Shutdown

North Atlantic has proposed to change the RWST boron concentration to 2700 ppm. This value exceeds the predicted shutdown margin requirements for Cycle 5 and other future cycles. The proposed change is consistent with the following proposed TS changes.

TS 3.1.2.6 Borated Water Sources - Operating

North Atlantic has proposed to change the boron concentration in the RWST to the range of 2700 to 2900 ppm. This range exceeds the predicted shutdown margin requirements for Cycle 5 and other future cycles.

TS 3.5.1.1 - Accumulators

North Atlantic has proposed to change the boron concentration to a range of 2600 to 2900 ppm. The proposed upper limit on the boron concentration in the Accumulators ensures that the boron solubility limit will not be approached in these volumes.

TS 3.5.4 RWST - Boron Injection System

North Atlantic has proposed to introduce an upper and lower limit for the boron concentration in the RWST during Modes 1 through 4. The proposed range of 2700 to 2900 ppm is applicable to Cycle 5 and future cycles. North Atlantic asserts that the upper limit ensures that the boron solubility limit will not be approached in this volume.

North Atlantic proposed these changes to the concentrations in the borated water sources based on approved analysis methodology. North Atlantic asserts that these changes (1) exceed the predicted shutdown margin requirements for Cycle 5 and future cycles, (2) ensure that the pH range remains acceptable during post-LOCA recirculation, (3) ensure that the boron solubility limit will not be approached in the RWST, and (4) ensure that following a LOCA the switch from cold-leg to hot-leg recirculation at 9 hours is acceptable. The staff has reviewed North Atlantic's submittal, and based on North Atlantic's findings, the staff finds the aforementioned TS changes acceptable.

3.0 STATE CONSULTATION

In accordance with the Commission's regulations, the New Hampshire and Massachusetts State officials were notified of the proposed issuance of the amendment. The State officials had no comments.

4.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 and changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (60 FR 39442). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

5.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Brewer

Date: September 14, 1995