

May 13, 1997

Mr. Ted C. Feigenbaum  
Executive Vice President and  
Chief Nuclear Officer  
North Atlantic Energy Service Corporation  
c/o Mr. Terry L. Harpster  
P.O. Box 300  
Seabrook, NH 03874

SUBJECT: AMENDMENT NO. 51 TO FACILITY OPERATING LICENSE NPF-86: FUEL ASSEMBLY  
RECONSTITUTION - LICENSE AMENDMENT REQUEST 97-01 (TAC M97929)

Dear Mr. Feigenbaum:

The Commission has issued the enclosed Amendment No. 51 to Facility Operating License No. NPF-86 for the Seabrook Station, Unit No. 1, in response to your application dated February 18, 1997, as modified by letter dated February 26, 1997.

The amendment revises the Appendix A Technical Specifications (TSs) relating to the reactor core fuel assembly design features requirements contained in Technical Specification 5.3.1, *Fuel Assemblies*. The changes made by this amendment allow for the limited replacement of failed or damaged fuel rods in fuel assemblies with solid stainless steel or zirconium alloy filler rods. The reconstituted fuel assemblies would be limited to those fuel designs that have been analyzed with applicable NRC-staff-approved codes and methods and that have been shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing would be allowed to be placed in nonlimiting core regions.

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-97-010

Enclosures: 1. Amendment No. 51 to NPF-86  
2. Safety Evaluation

cc w/encls: See next page

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Seabrook Station, Unit No. 1

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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. 51  
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 February 18, 1997, as supplemented by letter dated February 26, 1997, 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.

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\*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.

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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. 51, 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 within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION



Patrick A. Milano, Acting 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: May 13, 1997

ATTACHMENT TO LICENSE AMENDMENT NO. 51

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

5-9

5-10\*

Insert

5-9

5-10\*

## DESIGN FEATURES

### DESIGN PRESSURE AND TEMPERATURE

5.2.2 The containment building is designed and shall be maintained for a maximum internal pressure of 52.0 psig and a temperature of 296°F.

### 5.3 REACTOR CORE

#### FUEL ASSEMBLIES

5.3.1 The reactor shall contain 193 fuel assemblies. Each assembly shall consist of a matrix of cylindrical zircaloy clad fuel rods with an initial composition of natural or slightly enriched uranium dioxide (UO<sub>2</sub>) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with NRC-approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff-approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 5.0 weight percent U-235.

#### CONTROL ROD ASSEMBLIES

5.3.2 The core shall contain 57 full-length control rod assemblies. The full-length control rod assemblies shall contain a nominal 142 inches of absorber material. The nominal values of absorber material shall be 80% silver, 15% indium, and 5% cadmium. All control rods shall be clad with stainless steel tubing.

### 5.4 REACTOR COOLANT SYSTEM

#### DESIGN PRESSURE AND TEMPERATURE

5.4.1 The Reactor Coolant System is designed and shall be maintained:

- a. In accordance with the Code requirements specified in Section 5.2 of the FSAR, with allowance for normal degradation pursuant to the applicable Surveillance Requirements,
- b. For a pressure of 2485 psig, and
- c. For a temperature of 650°F, except for the pressurizer which is 680°F.

#### VOLUME

5.4.2 The total water and steam volume of the Reactor Coolant System is 12,255 cubic feet at a nominal T<sub>avg</sub> of 588.5°F.

### 5.5 (THIS SPECIFICATION NUMBER IS NOT USED)

## DESIGN FEATURES

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### 5.6 FUEL STORAGE

#### CRITICALITY

5.6.1.1 The spent fuel storage racks are designed and shall be maintained with:

- a. A  $k_{\text{eff}}$  equivalent to less than or equal to 0.95 when flooded with unborated water, which includes margin for uncertainty in calculation methods and mechanical tolerances with a 95% probability at a 95% confidence level.
- b. A nominal 10.35 inch center-to-center distance between fuel assemblies placed in the storage racks.

5.6.1.2 The new fuel storage racks are designed and shall be maintained with:

- a. A  $k_{\text{eff}}$  equivalent to less than or equal to 0.95 when flooded with unborated water, which includes margin for uncertainty in calculational methods and mechanical tolerances with a 95% probability at a 95% confidence level.
- b. A  $k_{\text{eff}}$  equivalent to less than or equal to 0.98 when aqueous foam moderation is assumed, which includes margin for uncertainty in calculational methods and mechanical tolerances with a 95% probability at a 95% confidence level.
- c. A nominal 21 inch center-to-center distance between fuel assemblies placed in the storage racks.

#### DRAINAGE

5.6.2 The spent fuel storage pool is designed and shall be maintained to prevent inadvertent draining of the pool below elevation 14 feet 6 inches.

#### CAPACITY

5.6.3 The spent fuel storage pool is designed and shall be maintained with a storage capacity limited to no more than 1236 fuel assemblies.

### 5.7 COMPONENT CYCLIC OR TRANSIENT LIMIT

5.7.1 The components identified in Table 5.7-1 are designed and shall be maintained within the cyclic or transient limits of Table 5.7-1.



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 51 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 February 18, 1997, as supplemented by letter dated February 26, 1997, North Atlantic Energy Service Corporation (North Atlantic/the licensee) proposed an amendment to the Appendix A Technical Specifications (TSs) for the Seabrook Station, Unit 1 (Seabrook) that would change the reactor core fuel assembly design features requirements contained in Technical Specification 5.3.1, *Fuel Assemblies*. The change would allow for limited substitution (fuel assembly reconstitution) of fuel rods in fuel assemblies with solid stainless steel or zirconium alloy filler rods. Fuel assembly reconstitution allows the removal of individual fuel rods that are found to be damaged or that have the potential for cladding breach to be replaced by filler rods. Reconstitution permits these fuel assemblies to be reused without the radiological consequences that could result from operation with defective fuel rods.

Reconstituted fuel assemblies would be limited to those fuel designs that have been analyzed with applicable NRC-staff-approved codes and methods and shown by tests or analyses to comply with all fuel safety design bases. The proposed change also would allow limited number of lead test assemblies that have not completed representative testing to be placed in nonlimiting core regions.

2.0 EVALUATION

On July 31, 1992, the staff issued Supplement 1 to Generic Letter 90-02 (GL 90-02), "Alternative Requirements for Fuel Assemblies in the Design Features Section of Technical Specifications," as a line-item improvement to accommodate limited fuel reconstitution based on NRC-approved generic topical reports. North Atlantic has proposed incorporating the generic letter guidance to provide flexibility to permit timely removal of fuel rods that are found to be leaking during a refueling outage or are determined to be the probable sources of future leakage.

In Supplement 1 to GL 90-02, the staff stated:

"The staff considers an NRC-approved methodology to be any methodology that the NRC staff has explicitly approved in a written safety evaluation, or a plant-specific technical specification basis. That NRC-approved methodology must be used only for the purpose and the scope of application specified in the reviewed document as approved or modified in the NRC approval documentation. In general, the scope of application for generic methods is limited to fuel configurations that are represented by fuel assembly test configurations used to validate an approved methodology."

The definition of an NRC-approved methodology assures that the proposed reconstitution has been adequately reviewed by the staff prior to implementation.

North Atlantic proposes to use filler rods of zirconium alloy or stainless steel to replace damaged or failed fuel rods for reconstituting the fuel assemblies. The North Atlantic specific safety analyses of reconstitution will be performed using NRC-approved methodology as described in the approved topical report WCAP-13060-P-A, "Westinghouse Fuel Assembly Reconstituted Evaluation Methodology," to demonstrate that operation with the reconstituted fuel assembly or assemblies is in compliance with all safety design bases. In addition, North Atlantic should be aware of and conform to the several restrictions specified in the staff safety evaluation for using the reconstitution methodology described in WCAP-13060-P-A.

North Atlantic also proposes the use of a limited number of lead test assemblies in non-limiting core positions for the purpose of completing representative testing of a new fuel design. The staff has reviewed the use of reconstituted and lead test assemblies with regard to neutronic, mechanical, and thermal-hydraulic safety and design requirements. The staff concludes that the use of reconstituted and lead test assemblies are compatible with the existing core, and there are no safety concerns to the operation of the Seabrook core.

### 3.0 TECHNICAL SPECIFICATION CHANGE

#### 3.1 Design Features

##### Section 5.3 Reactor Core, Fuel Assemblies

North Atlantic has proposed to revise Section 5.3.1 of the Technical Specifications by replacing the existing specification in its entirety with the following new paragraph:

5.3.1 The reactor shall contain 193 fuel assemblies. Each assembly shall consist of a matrix of cylindrical zircaloy clad fuel rods with an initial composition of natural or slightly enriched uranium dioxide ( $UO_2$ ) as fuel material. Limited substitutions of zirconium alloy or stainless steel filler rods for fuel rods, in accordance with NRC-approved applications of fuel rod configurations, may be used. Fuel assemblies shall be limited to those fuel designs that have been analyzed with applicable NRC staff-approved codes and methods and shown by tests or

analyses to comply with all fuel safety design bases. A limited number of lead test assemblies that have not completed representative testing may be placed in nonlimiting core regions. Reload fuel shall be similar in physical design to the initial core loading and shall have a maximum enrichment of 5.0 weight percent U-235.

We have reviewed North Atlantic's proposed change to the Technical Specifications, and based on the staff's evaluation, we conclude that the proposed change is consistent with the requirements described in Supplement 1 to GL 90-02, and, therefore, is acceptable.

#### 4.0 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.

#### 5.0 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. 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 (62 FR 11496). 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.

#### 6.0 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. L. Wu

Date: May 13, 1997