

June 29, 2004

Mr. David A. Christian  
Senior Vice President and  
Chief Nuclear Officer  
Dominion Nuclear Connecticut, Inc.  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

SUBJECT: MILLSTONE POWER STATION, UNIT 1 - ISSUANCE OF AMENDMENT RE:  
SPENT FUEL POOL STORAGE (TAC NO. MC0853)

Dear Mr. Christian:

The Commission) has issued the enclosed Amendment No. 113 to Facility Operating License No. DPR-21 for the Millstone Power Station, Unit 1. The amendment consists of changes to the Technical Specifications in response to your application dated September 18, 2003.

The amendment revises Technical Specification 4.2, "Fuel Storage," to eliminate all credit for Boraflex as a neutron absorber, reduce the number of fuel assemblies allowed to be stored in the spent fuel pool (SFP), change the required SFP  $k_{eff}$ , and eliminate design features requirements on new fuel storage.

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

Sincerely,

**/RA/**

Alan B. Wang, Project Manager, Section 2  
Project Directorate IV  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-245

Enclosures: 1. Amendment No. 113 to DPR-21  
2. Safety Evaluation

cc w/encls: See next page

June 29, 2004

Mr. David A. Christian  
Senior Vice President and  
Chief Nuclear Officer  
Dominion Nuclear Connecticut, Inc.  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

SUBJECT: MILLSTONE POWER STATION, UNIT 1 - ISSUANCE OF AMENDMENT RE:  
SPENT FUEL POOL STORAGE (TAC NO. MC0853)

Dear Mr. Christian:

The Commission) has issued the enclosed Amendment No. 113 to Facility Operating License No. DPR-21 for the Millstone Power Station, Unit 1. The amendment consists of changes to the Technical Specifications in response to your application dated September 18, 2003.

The amendment revises Technical Specification 4.2, "Fuel Storage," to eliminate all credit for Boraflex as a neutron absorber, reduce the number of fuel assemblies allowed to be stored in the spent fuel pool (SFP), change the required SFP  $k_{eff}$ , and eliminate design features requirements on new fuel storage.

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

Sincerely,

**/RA/**

Alan B. Wang, Project Manager, Section 2  
Project Directorate IV  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket No. 50-245

Enclosures: 1. Amendment No. 113 to DPR-21  
2. Safety Evaluation

cc w/encls: See next page

\*SE Input

DISTRIBUTION

PUBLIC

PDIV-2 Reading

RidsNrrDlpm (HBerkow)

RidsNrrPMAWang

RidsNrrLAEPeyton

RidsOgcRp

GHill (2)

TBoyce

RidsAcrrAcnwMailCenter

RidsRgn1MailCenter (DScrenci/JDurr/TJackson)

**TS Pages: ML041880212 Nrr-100**

**ACCESSION NO.: ML041840482 Nrr-058**

**Pkg No.: ML041890397**

OFFICE	PDIV-2/PM	PDIV-2/LA	SRXB*	OGC	PDIV-2/SC
NAME	AWang	EPeyton	FAkstulewicz	CMarco	SDembek
DATE	6/18/04	6/18/04	6/15/04	6-25-04	6/28/04

DOCUMENT NAME: C:\ORPCheckout\FileNET\ML041840482.wpd

OFFICIAL RECORD COPY

DOMINION NUCLEAR CONNECTICUT, INC.

DOCKET NO. 50-245

MILLSTONE POWER STATION, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 113  
License No. DPR-21

1. The Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Dominion Nuclear Connecticut, Inc. (the licensee) dated September 18, 2003, 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 be decommissioned in conformity with 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. 113, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. The license amendment is effective as of its date of issuance and shall be implemented within 60 days of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

**/RA/**

Stephen Dembek, Chief, Section 2  
Project Directorate IV  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Attachment: Changes to the  
Technical Specifications

Date of Issuance: June 29, 2004

ATTACHMENT TO LICENSE AMENDMENT NO. 113

FACILITY OPERATING LICENSE NO. DPR-21

DOCKET NO. 50-245

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

REMOVE

4.0-1

---

INSERT

4.0-1

4.0-2

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 113 TO FACILITY OPERATING LICENSE NO. DPR-21  
DOMINION NUCLEAR CONNECTICUT, INC.  
MILLSTONE POWER STATION, UNIT 1  
DOCKET NO. 50-245

## 1.0 INTRODUCTION

By letter dated September 18, 2003, Dominion Nuclear Connecticut, Inc. (the licensee) requested changes to the Technical Specifications (TSs) for the Millstone Power Station, Unit 1 (MP1). The amendment proposes to revise Technical Specification 4.2, "Fuel Storage." Specifically, the proposed changes would eliminate all credit for Boraflex as a neutron absorber, reduce the number of fuel assemblies allowed to be stored in the spent fuel pool (SFP), change the required SFP  $k_{\text{eff}}$ , and eliminate design features requirements on new fuel storage.

## 2.0 REGULATORY EVALUATION

The staff finds that the licensee in Section 5.2 of its submittal identified the applicable regulatory requirements. The regulatory requirements for which the staff based its acceptance are:

- Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Appendix A, "General Design Criteria (GDC) for Nuclear Power Plants," provides a list of the minimum design requirements for nuclear power plants. According to GDC 62, "Prevention of criticality in fuel storage and handling," the licensee must prevent criticality in the fuel handling and storage system by physical systems or processes.
- 10 CFR Section 50.68, "Criticality accident requirements," provides the NRC regulatory requirements for maintaining subcritical conditions in SFPs: "If no credit for soluble boron is taken, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95 percent probability, 95 percent confidence level, if flooded with unborated water. If credit is taken for soluble boron, the k-effective of the spent fuel storage racks loaded with fuel of the maximum fuel assembly reactivity must not exceed 0.95, at a 95 percent probability, 95 percent confidence level, if flooded with borated water, and the k-effective must remain below 1.0 (subcritical), at a 95 percent probability, 95 percent confidence level, if flooded with unborated water." The licensee's amendment proposed to increase the SFP required  $k_{\text{eff}}$  from 0.90 to 0.95, as discussed in Section 2.2 of this safety evaluation (SE).

The NRC has also defined acceptable methodologies for performing SFP criticality analyses in the following documents:

- NUREG-0800, Standard Review Plan (SRP), Section 9.1.2, "Spent Fuel Storage," Draft Revision 4
- Proposed Revision 2 to Regulatory Guide (RG) 1.13, "Spent Fuel Storage Facility Design Basis"
- Memorandum from L. Kopp (NRC) to T. Collins (NRC), "Guidance on the Regulatory Requirements for Criticality Analysis of Fuel Storage at Light-Water Reactor Power Plants"

The staff used the guidance contained in these documents as part of its review.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Background

The following describes the proposed changes:

1. The licensee will delete TS 4.2.1 pertaining to new fuel storage.
2. In TS 4.2.2, the licensee will increase the required  $k_{\text{eff}}$  limit from 0.90 to 0.95, add the phrase "and with no fuel allowed in the storage locations shown in Figure 4.1," and add Figure 4.1.
3. In TS 4.2.3, the licensee will change the maximum number of fuel assemblies allowed to be stored in the SFP from 3229 to 2959.

The staff has reviewed the licensee's regulatory and technical analyses in support of its proposed license amendment which are described in Sections 4.0 and 5.0 of the licensee's submittal against the regulatory criteria described in Section 2.0 of this SE. The basis for the staff's acceptance and a description of the review it performed is located in Section 3.2 of this SE. The detailed evaluation below will support the conclusion 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.

#### 3.2 Technical Evaluation

The MP1 SFP controls reactivity with two types of storage rack materials: boron carbide  $B_4C$  plates and Boraflex. The licensee must demonstrate that subcriticality is maintained within the SFP at all times. The licensee submitted a criticality analysis with their proposed license amendment in order to fulfill this requirement (Attachments 3 and 4 to their September 18, 2003, submittal). The analysis demonstrates that for the spent fuel storage cells that currently use Boraflex for reactivity control, if fuel is limited to a 3-out-of-4 fuel storage configuration,  $k_{\text{eff}}$  of the racks will be maintained at  $\leq 0.95$ , on a 95/95 basis, without credit for any Boraflex. The 3-out-of-4 fuel storage configuration would require the reduction of 270 specific fuel storage locations. The licensee's analysis conservatively assumes that all fuel in the SFP is at the most reactive condition possible, using the most reactive fuel design and at the most reactive normal

operating temperature. The analysis also considers abnormal and accident conditions. The licensee states that the revised criticality analysis for the Boraflex storage racks does not affect the other storage racks in the SFP.

In order to withdraw Boraflex credit, the licensee has requested increasing the allowable SFP  $k_{eff}$  limit from 0.90 to 0.95. The use of 0.95 as the SFP  $k_{eff}$  limit is an NRC accepted standard, as documented in the SRP (Section 9.1.2) and RG 1.13.

The NRC staff has reviewed the criticality analysis that accompanies the licensee's request. The licensee used KENO Va from the SCALE-4.4 code package to perform the necessary calculations on the 3-out-of-4 fuel loading pattern. This included benchmarking input files, and analyzing the results to determine trends in independent variable bias. The licensee then determined an upper subcritical limit for the SFP from those resulting trends.

The licensee also modeled potential biases and accident scenarios to determine the maximum  $k_{eff}$  possible for the SFP. After establishing a baseline  $k_{eff}$  for the 3-out-of-4 fuel storage configuration, the licensee developed independent bias models concerning channel swelling, pitch tolerance, stainless steel thickening tolerance, and eccentric assembly positioning. The licensee additionally modeled three single-accident SFP scenarios: heating of the SFP to boiling; a dropped fuel assembly on top of or next to the SFP rack; and a worst-case single assembly misload. Of these three cases, the misload yielded the highest  $k_{eff}$ . Combining the accidental misload  $k_{eff}$  with the net bias delta-K (calculated by way of root mean square from the considered biases) and a 3 sigma value created the licensee's maximum determined  $k_{eff}$ . The licensee compared the max  $k_{eff}$  to the calculated upper subcritical limit, determined the max  $k_{eff}$  to be the lower number, and therefore stated that the new SFP configuration will maintain subcriticality without credit for Boraflex. The NRC staff has reviewed all the steps that the licensee has taken to perform this criticality analysis, and finds them acceptable. Additionally, the staff determined the licensee properly applied double contingency considerations in their analysis.

TS Figure 4.1 has been added to the TSs to prohibit fuel storage in 270 specific locations to maintain SFP subcriticality without credit for Boraflex. This loading pattern was assumed in the revised SFP criticality analysis as discussed above and is therefore acceptable. TS 4.2.3 will be revised to change the maximum number of fuel assemblies allowed to be stored in the SFP from 3229 to 2959. This reduction of 270 fuel storage locations, the new 3-out-of-4 fuel storage configuration, is needed to maintain the SFP  $k_{eff}$  limit at  $\leq 0.95$ . In addition, lowering the number of allowed fuel storage locations will not impact any other storage rack or heat load analyses. The NRC staff has reviewed this request and finds that decreasing the maximum number of fuel assemblies, as described in TS Figure 4.1, stored in the SFP will maintain the SFP  $k_{eff}$  limit at  $\leq 0.95$  in the SFP assuming no credit for Boraflex.

The licensee requested a deletion of TS 4.2.1, which pertains to the  $k_{eff}$  of new fuel storage facilities. The NRC staff recognizes that MP1 has ceased power operation and will no longer receive new fuel; therefore deleting TS 4.2.1 does not increase the potential for criticality in the SFP.



### 3.3 Conclusion

The NRC staff reviewed the proposed TS changes addressing fuel storage requirements. These changes included elimination of all credit for Boraflex as a neutron absorber, reduction of the maximum number of fuel assemblies allowed in the SFP, increasing the required SFP  $k_{\text{eff}}$  limit to  $\leq 0.95$ , and elimination of new fuel storage requirements. The staff finds that these TS changes meet the requirements of GDC 62 and 10 CFR 50.68, and are therefore acceptable.

### 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Connecticut State official was notified of the proposed issuance of the amendment. The State official 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 here has been no public comment on such finding (68 FR 68659). 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: M. Langschwager

Date: June 29, 2004

Millstone Power Station Unit 1

cc:

Lillian M. Cuoco, Esquire  
Senior Counsel  
Dominion Resources Services, Inc.  
Rope Ferry Road  
Waterford, CT 06385

Edward L. Wilds, Jr., Ph.D.  
Director, Division of Radiation  
Department of Environmental Protection  
79 Elm Street  
Hartford, CT 06106-5127

Mr. Allan Johanson, Assistant Director  
Office of Policy and Management  
Policy Development & Planning Division  
450 Capitol Avenue - MS# 52ERN  
P.O. Box 341441  
Hartford, CT 06134-1441

Regional Administrator, Region I  
U.S. Nuclear Regulatory Commission  
475 Allendale Road  
King of Prussia, PA 19406

First Selectmen  
Town of Waterford  
15 Rope Ferry Road  
Waterford, CT 06385

Attorney Nicholas J. Scobbo, Jr.  
Ferriter, Scobbo, & Rodophele, PC  
125 High Street  
Boston, MA 02110

Ernest C. Hadley, Esquire  
1040 B Main Street  
P.O. Box 549  
West Wareham, MA 02576

Mr. Evan W. Woollacott, Co-Chair  
Nuclear Energy Advisory Council  
128 Terry's Plain Road  
Simsbury, CT 06070

Citizens Regulatory Commission  
ATTN: Ms. Susan Perry Luxton  
180 Great Neck Road  
Waterford, CT 06385

Deborah Katz, President  
Citizens Awareness Network  
P.O. Box 83  
Shelburne Falls, MA 03170

Mr. John Buckingham  
Department of Public Utility Control  
Electric Unit  
10 Liberty Square  
New Britain, CT 06051

Nancy Burton, Esquire  
147 Cross Highway  
Redding Ridge, CT 06876

Mr. W. R. Matthews  
Senior Vice President - Nuclear Operations  
Dominion Nuclear Connecticut, Inc.  
Rope Ferry Road  
Waterford, CT 06385

Mr. P. J. Parulis  
Manager - Nuclear Oversight  
Dominion Nuclear Connecticut, Inc.  
Rope Ferry Road  
Waterford, CT 06385

Mr. S. E. Scace  
Assistant to the Site Vice President  
Dominion Nuclear Connecticut, Inc.  
Rope Ferry Road  
Waterford, CT 06385

Mr. J. Alan Price  
Site Vice President - Millstone  
Dominion Nuclear Connecticut, Inc.  
Rope Ferry Road  
Waterford, CT 06385

cc:

Mr. G. D. Hicks, Director  
Nuclear Station Safety and Licensing  
Dominion Nuclear Connecticut, Inc.  
Rope Ferry Road  
Waterford, CT 06385

Mr. A. J. Jordan, Jr.  
Director - Nuclear Engineering  
Dominion Nuclear Connecticut, Inc.  
Rope Ferry Road  
Waterford, CT 06385

Mr. S. P. Sarver, Director  
Nuclear Station Operations & Maintenance  
Dominion Nuclear Connecticut, Inc.  
Rope Ferry Road  
Waterford, CT 06385

Mr. Chris L. Funderburk  
Director, Nuclear Licensing and  
Operations Support  
Dominion Resources Services, Inc.  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

Mr. David W. Dodson  
Licensing Supervisor  
Dominion Nuclear Connecticut, Inc.  
Rope Ferry Road  
Waterford, Connecticut 06385