

# Maine Yankee

RELIABLE ELECTRICITY SINCE 1972

Charles D. Frizzle  
President and Chief Executive Officer

December 19, 1996  
MN-96-187

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CDF-96-208  
Proposed Change No. 202

UNITED STATES NUCLEAR REGULATORY COMMISSION  
Attention: Document Control Desk  
Washington, DC 20555

Reference: License No. DPR-36 (Docket No. 50-309)

Subject: Proposed Technical Specification Change No. 202 - Boronometer  
Operability Requirement and Reactor Coolant Boron Sampling

Gentlemen:

Maine Yankee hereby submits, pursuant to 10 CFR Parts 2.101 and 50.90, this application to amend a requirement of the Maine Yankee Technical Specifications. The proposed change would modify Table 4.2-1, Minimum Frequencies for Sampling Tests, of Technical Specification 4.2, Equipment and Sampling Tests, by eliminating the continuous Reactor Coolant Boron sampling requirement using the Boronometer. This change would eliminate the costs associated with maintaining an instrument which has proven to be less reliable than originally expected. As a consequence of eliminating the Boronometer the basis of Technical Specification 3.15 Reactivity Anomalies would be modified to indicate a periodic rather than a continuous comparison of actual boron concentration vs. predicted boron concentration. The proposed change would also revise the Reactor Coolant Boron sampling frequency as specified in Technical Specification 3.13 Refueling and Fuel Consolidation Operations (3.13.C) and Technical Specification Table 4.2-1.

The current operability requirement for the Boronometer is controlled by Technical Specification 4.2. The basis for the operability requirement is twofold:

- 1) The Boronometer is currently part of a Post-TMI Commitment to maintain instrumentation to assess plant and environmental conditions during and following an accident. The commitment is described and implemented by two Maine Yankee controlled documents, i.e., Reg. Guide 1.97 Source Document and Plant Procedure No. 1-26-6.
- 2) FSAR Section 14.3, Boron Dilution Incident, lists the Boronometer as one of several alarms and indications available for operator identification of

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a Boron Dilution Incident. Operator identification is an implicit assumption in the analysis of the Boron Dilution Event in order to credit operator action to terminate the dilution prior to a total loss of all shutdown margin.

The proposed deletion of the Boronometer operability requirements from Technical Specification 4.2 is justified as follows.

The Boronometer was originally designed for use as an advisory system. It is not designed as a safeguards system or component of a safeguards system. It is not part of a control element or control system, nor is it designed for this use. Although it is located within the Chemical and Volume Control System (CVCS), the Boronometer is not required for operability of the CVCS. No credit is taken for this system in any accident analysis. As a general operating aid, it provides information as to which additional check analyses are warranted rather than a basis for fundamental operating decisions.

Under postulated accident conditions, the Reactor Coolant System Letdown Line including the Boronometer is isolated from the Reactor Coolant System and Maine Yankee's Post-Accident Sampling System (PASS) would be used to obtain a sample from the RCS for determination of boron concentration. Thus, the Boronometer need not be maintained operable as a post-accident sampling system. Maine Yankee's PASS would be used to meet the Reg. Guide 1.97 commitment.

This instrument is also not required for operator identification of a Boron Dilution Incident analyzed in FSAR Section 14.3. More direct alternative alarms and indications are available for operator identification of the event.

The proposed changes to the Reactor Coolant Boron sampling frequency requirements of Technical Specification 3.13.C and Table 4.2-1 are consistent with the Standard Technical Specifications and are justified as follows:

The Reactor Coolant Boron sampling requirement is intended to facilitate a periodic verification of various reactivity parameters including Predicted Core Burnup, Moderator Temperature Coefficient and Shutdown Margin. No credit is taken for the sampling frequency in an accident analysis. The proposed sampling frequencies vary depending upon the Operating Condition of the plant. When the rate of change of RCS Boron Concentration is expected to increase (Hot Shutdown, Transthermal, Cold Shutdown, Refueling Shutdown and Refueling Operations) the sampling is more frequent. Conversely, in Power Operation and Hot Standby, the Boron Concentration is expected to be more stable and to change at a much slower rate.

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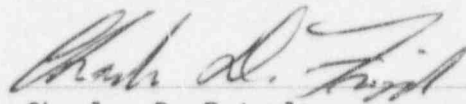
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A description of the proposed change and a summary of the Significant Hazards Evaluation are presented in Attachment A. As discussed in the attachment, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated, create the possibility of a new or different kind of accident from any accident previously evaluated, or involve a significant reduction in the margin of safety. Based on our evaluation, we conclude there is reasonable assurance that operation of the Maine Yankee plant, consistent with the proposed Technical Specifications, will not impact the health and safety of the public.

Revised Technical Specification Pages 3.13-1, 3.15-1 and 4.2-2 are included as Attachment B. This proposed change has been reviewed and approved by the Plant Operation Review Committee. The Nuclear Safety Audit and Review Committee has also reviewed this submittal. A representative of the State of Maine is being informed of this request by a copy of this letter.

We request this proposed change be made effective immediately upon issuance.

Very truly yours,

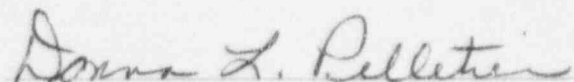


Charles D. Frizzle  
President and Chief Executive Officer

c: Mr. Hubert Miller  
Mr. D. H. Dorman  
Mr. J. T. Yerokun  
Mr. Clough Toppan  
Mr. Patrick J. Dostie

## STATE OF MAINE

Then personally appeared before me, Charles D. Frizzle, who being duly sworn did state that he is President and Chief Executive Officer of Maine Yankee Atomic Power Company, that he is duly authorized to execute and file the foregoing request in the name and on the behalf of Maine Yankee Atomic Power Company, and that the statements therein are true to the best of his knowledge and belief.



Notary Public

Donna L. Pelletier, Notary Public  
State of Maine  
My Commission Expires 12/12/99

ATTACHMENT A  
DESCRIPTION AND SIGNIFICANT HAZARDS EVALUATION OF  
PROPOSED CHANGE NO. 202

DESCRIPTION OF PROPOSED CHANGE

Background

Table 4.2-1, Item 2 of Technical Specification 4.2, Equipment and Sampling Tests, currently requires continuous sampling of reactor coolant boron using the Boronometer except in the cold shutdown condition. Reactor coolant boron must be sampled 3 times per week in the cold shutdown condition. When the Boronometer is inoperable, daily sampling is required.

This current Boronometer operability requirement arises from two bases:

- 1) The Boronometer is part of a Post-TMI commitment to maintain instrumentation to assess plant and environmental conditions during and following an accident in accordance with Reg. Guide 1.97; and,
- 2) FSAR Section 14.3 lists the Boronometer as one of several alarms and indications available for operator identification of a Boron Dilution Incident. Operator identification is an implicit assumption in the analysis of the Boron Dilution Incident in order to credit operator action to terminate the dilution prior to a loss of all shutdown margin.

The proposed deletion of the Boronometer operability requirements from Technical Specification 4.2 and the revision of the basis of Technical Specification 3.15 Reactivity Anomalies is justified as follows.

The Boronometer was originally designed for use as an advisory system. It is not designed as a safeguards system or component of a safeguards system. It is not part of a control element or control system, nor is it designed for this use. Although it is located within the Chemical and Volume Control System (CVCS), the Boronometer is not required for operability of the CVCS. No credit is taken for this system in any accident analysis. As a general operating aid, it provides information as to which additional check analyses are warranted rather than a basis for fundamental operating decisions.

The Boronometer is located in the Reactor Coolant System letdown line. Under postulated accident conditions, the Reactor Coolant System Letdown Line including the Boronometer is isolated from the Reactor Coolant System and Maine Yankee's Post-Accident Sampling System (PASS) would be used to obtain a sample from the RCS for determination of boron concentration. Thus, the Boronometer need not be

maintained operable as a post-accident sampling instrument. Maine Yankee's PASS is an alternative to the Boronometer to meet the Reg. Guide 1.97 commitment.

The source of limiting boron dilution rates is the Chemical and Volume Control System (CVCS). The following indications and alarm functions are available which will directly inform the reactor operator when a change in RCS boron concentration may be occurring:

- a) Volume control tank level indication and high and low level alarms;
- b)  $T_{ave} - T_{ref}$  alarm and indication;
- c) Nuclear/ $\Delta T$  alarm and indication; and,
- d) Letdown flow temperature indication at outlet of regenerative heat exchanger.

In addition, during power operations, procedures require hourly logging of Reactor Power and Electrical Gross Generation.

For dilution events initiated during refueling, an audible count rate signal is also available from the nuclear instrumentation. For dilutions occurring while at power, protection from exceeding the Specified Acceptable Fuel Design Limit on DNBR would be provided by a) the variable overpower pre-trip and trip, b) the symmetric offset pre-trip and trip, or c) the thermal margin low pressure pre-trip and trip.

Potential dilution scenarios from systems external to the CVCS were also evaluated. Separate alarms and indications from those systems are available. The dilution rates available from these systems remain bounded by the dilution capability from the CVCS.

The conditions for availability of the Boronometer as a backup indication of a potential dilution event are: (1) the normal letdown system must be in use, (2) the Boronometer must be operable and not isolated, and (3) the fluid transport delay from core to Boronometer must not be significant relative to the maximum dilution rate.

For all analyzed Boron Dilution Incidents, sufficient time is available to terminate the dilution prior to total loss of all shutdown margin. No explicit credit is assumed regarding use of the Boronometer for operator identification of a Boron Dilution Incident. More direct alternative indications are available for operator identification of the event.



Technical Specification 3.13 Refueling and Fuel Consolidation Operations currently requires the reactor coolant system to be maintained at the refueling boron concentration and that it shall be checked by sampling on each shift whenever the reactor vessel head is removed and there is fuel in the reactor. This periodic verification is made to insure that the boron concentration is sufficient to maintain the core 5% delta k/k subcritical. Table 4.2-1, Item 2 of Technical Specification 4.2, Equipment and Sampling Tests, currently requires reactor coolant boron sampling 3 times per week. If the Boronometer is inoperable and the plant is not in the cold shutdown condition, the reactor coolant boron is to be sampled on a daily basis. Therefore, without the Boronometer the reactor coolant boron sampling frequency would be daily unless the plant is in the cold shutdown condition when sampling would be required 3 times per week.

The proposed change would require RCS boron sampling on a monthly (M) basis in the Power Operation and Hot Standby conditions; a daily (D) basis in the Hot Shutdown, Transthermal, Cold Shutdown and Refueling Shutdown conditions; and every 72 hours in the Refueling Operations condition. The proposed changes to RCS boron sampling frequency requirements of Technical Specification 3.13 and 4.2 are justified as follows:

The Reactor Coolant Boron sampling requirement is intended to facilitate a periodic verification of various reactivity parameters including Predicted Core Burnup, Moderator Temperature Coefficient (MTC) and Shutdown Margin. No credit is taken for the sampling frequency in any accident analysis. The proposed sampling frequencies vary depending upon the Operating Condition of the plant.

In the Power Operation and Hot Standby Conditions, the boron sampling requirement facilitates the verification of Predicted Core Burnup (Technical Specification 3.15), the determination of the Required Shutdown Margin (Technical Specification 3.10.B) and the verification of MTC limits (Technical Specification 3.10.D.) The proposed sampling frequency of monthly (M) is acceptable, based upon the slow rate of core changes due to fuel depletion and the presence of other indicators for prompt indication of an anomaly.

In the Hot Shutdown, Transthermal, Cold Shutdown, Refueling Shutdown and Refueling Operation conditions, the boron sampling requirement facilitates the verification of shutdown margin (Technical Specification Definitions Section) and forms a portion of the criteria for establishing Containment Integrity (Technical Specification 3.11). The proposed sampling frequency of daily (D) is consistent with the current technical specifications and the Standard Technical Specifications.

### Proposed Change

The proposed change removes the requirement for continuous sampling of Reactor Coolant Boron using the Boronometer from item 2, Table 4.2-1, Minimum Frequencies for Sampling Tests, of Technical Specification 4.2, Equipment and Sampling Tests and to replace the word "continuously" with the word "Periodically" in the basis of Technical Specification 3.15 Reactivity Anomalies.

The Proposed change also modifies the RCS boron sampling frequency requirement contained in Technical Specification 3.13 Refueling and Fuel Consolidation Operations and Table 4.2-1, Minimum Frequencies for Sampling Tests, of Technical Specification 4.2, Equipment and Sampling Tests

A marked-up copy of pages 3.13-1, 3.15-1 and 4.2-2 of the Maine Yankee Technical Specifications is shown in Attachment B.

### SIGNIFICANT HAZARDS EVALUATION

The Commission has provided standards in 10CFR50.92(c) for determining whether a significant hazards consideration exists. A proposed change to an operating license, for a facility licensed under 50.21(b) or 50.22, involves no significant hazards consideration if operation of the facility in accordance with the proposed change would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, (2) create the possibility of a new or different kind of accident from any accident previously evaluated, or (3) involve a significant reduction in the margin to safety. Maine Yankee Atomic Power Company has reviewed this proposed license change and determined that its adoption would not involve a significant hazards consideration. The bases for this determination are as follows:

#### Basis

This change does not involve a significant hazards consideration for the following reasons:

- 1 The proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated

Heretofore, the Boronometer operability requirements imposed by Technical Specification 4.2 provided assurance that:

- a) in accordance with the Post-TMI commitment (Reg. Guide 1.97), an instrument would be available to assess plant and environmental conditions during and following an accident; and,
- b) operator identification of a Boron Dilution Incident permits timely operator action to terminate the dilution prior to a loss of all shutdown margin.

In support of this proposed change, Maine Yankee has determined the following. Under accident conditions, the letdown line including the Boronometer is isolated from the Reactor Coolant System, and Maine Yankee's Post-Accident Sampling System (PASS) would be used to obtain a sample from the RCS for determination of boron concentration. Neither the Boronometer nor periodic RCS boron sampling are required for operator identification of a Boron Dilution Incident analyzed in FSAR Section 14.3. More direct alternative indications are available for operator identification of the event.

Since alternative means of post-accident sampling are available, more direct alternative indications are available for operator identification of Boron Dilution Incidents, and no credit is taken in the accident analysis for the presence of the Boronometer or the frequency of RCS boron sampling, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

- 2. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated

The deletion of the Boronometer operability requirements from Technical Specification 4.2 does not introduce any new structures, systems, or components into the plant design. Existing equipment design is not altered by the proposed change. The Boronometer function was heretofore to provide indication of RCS boron concentration to the plant operator. Alternative means of RCS sampling are available and more direct alternative indications of a potential boron dilution event are available. The change in RCS boron sampling frequency is consistent with industry standards and provides adequate periodic verification to assure that the RCS boron concentration is maintained within technical specifications limits. The proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.



3. The proposed change does not involve a significant reduction in the margin of safety

The Boronometer operability requirement imposed by Technical Specification 4.2 was assumed to provide assurance that information on RCS boron concentration would be available to plant operators for post-accident assessment of subcriticality. Since Maine Yankee's PASS would be used for post-accident determination of boron concentration, the capability for post-accident assessment of subcriticality is not affected by the proposed change.

Acceptance criteria for the Boron Dilution Incident include ensuring that an uncontrolled total loss of shutdown margin (inadvertent return to critical) will not occur within 15 minutes for operations with reactor head on and 30 minutes with reactor head off. Credit is assumed for operator action to terminate the dilution event within the required time intervals. This, in turn, assumes operator identification of the incident. For all analyzed Boron Dilution Incidents, sufficient time is available to terminate the dilution prior to total loss of all shutdown margin. No explicit credit is assumed regarding the use of the Boronometer or the periodic RCS boron sample for operator identification of a Boron Dilution Incident. More direct alternative indications are available for operator identification of the event. The proposed change does not involve a reduction in the margin of safety for the Boron Dilution Incidents analyzed in FSAR Section 14.3.

For the above reasons, Maine Yankee has concluded that the proposed change to Technical Specification 4.2, Equipment and Sampling Tests, to eliminate the requirement for continuous Reactor Coolant Boron sampling using the Boronometer does not involve a significant hazards consideration.