Maine Yankee
RELIABLE ELECTRICITY FOR MAINE SINCE 1972

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January 29, 1990
MN-90-12 JHG-90-03

Region I
UNITED STATES NUCLEAR REGULATORY COMMISSION
475 Allendale Road
King of Prussia, Pennsylvania 19406

Attention: Mr. William T. Russell, Regional Administrator

References:
(a) License No. DPR-36 (Docket No. 50-309)
(b) USNRC Generic Letter 89-13: Service Water System Problems Affecting Safety-Related Equipment, dated July 18, 1989
(c) USNRC letter to Maine Yankee dated March 27, 1989, NRC Safety System Functional Inspection Team Report No. 50-309/89-80
(d) Maine Yankee letter to USNRC dated June 13, 1989 (MN-89-80), Response to NRC Safety System Functional Inspection Team Report
(e) Maine Yankee letter to USNRC dated May 21, 1981 (FMY 81-83), Response to IE Bulletin No. 81-03
(f) Maine Yankee letter to USNRC dated March 30, 1983 (MN-83-50), Response to Request for Additional Information, IE Bulletin No. 81-03
(g) NRC IE Bulletin No. 81-03, "Flow Blockage of Cooling Water to Safety System Components by Corbicula Sp. (Asiatic Clam) and Mytilus Sp. (Mussel)", dated April 10, 1981
(h) "Closeout of IE Bulletin 81-03: Flow Blockage of Cooling Water to Safety System Components by Corbicula Sp. (Asiatic Clam) and Mytilus Sp. (Mussel)", NUREG/CR-3054, published June 1984

Subject: Schedule for Implementation of Generic Letter 89-13 Recommended Actions

Gentlemen:

With Generic Letter 89-13, Reference (b), the USNRC requested licensees supply information about their respective service water systems to assure the NRC of compliance with General Design Criteria and quality assurance requirements, and to confirm that the safety functions of their respective service water systems are being met. The Generic Letter recommends five actions to be taken by addressees and requests that licensees perform those or equally effective actions. The Generic Letter requires that, within 180 days of receipt of the letter, each licensee advise the NRC whether it has established programs to implement its recommendations, or an equally effective alternative course of action; this response is to include schedules for implementation of the various actions.

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The purpose of this letter is to provide Maine Yankee's plans for addressing the recommendations of Generic Letter 89-13. The attachment to this letter provides each of the NRC Recommended Actions, followed by Maine Yankee's plan for addressing each action.

Maine Yankee voluntarily established a program to recover the plant's design basis in 1987. Thus far we have completed reviews for emergency feedwater, instrument air and control room ventilation. We are now in the process of performing a vertical audit for the service water and component cooling systems.

Maine Yankee's first refueling beginning 9 months or more after the date of the Generic Letter occurs in the fall of 1991. Therefore, we plan to complete the required actions during the 1991 refueling outage and within thirty days of our return to full power following that outage.

Should you have any questions on the attached, please contact us.

Very truly yours,

John H Garrity

John H. Garrity, Vice President
Licensing and Engineering

JHG:SJJ

Attachment

c: Document Control Desk (original cover letter)
Mr. Cornelius F. Holden
Mr. Eric J. Leeds

STATE OF MAINE

Then personally appeared before me, John H. Garrity, who being duly sworn did state that he is Vice President of Maine Yankee Atomic Power Company, that he is duly authorized to execute and file the foregoing response in the name and on behalf of Maine Yankee Atomic Power Company, and that the statements therein are true to the best of his knowledge and belief.

S E Nichols

Notary Public

STEVEN E. NICHOLS
NOTARY PUBLIC, MAINE
MY COMMISSION EXPIRES MARCH 8, 1991

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ATTACHMENT A

MAINE YANKEE PLANS TO ADDRESS
RECOMMENDED ACTIONS OF GENERIC LETTER 89-13

NRC Generic Letter 89-13 defines the service water system "as the system or systems that transfer heat from safety-related structures, systems, or components to the UHS (Ultimate Heat Sink). If an intermediate system is used between the safety-related items and the system rejecting heat to the UHS, it performs the function of a service water system and is thus included in the scope of this Generic Letter. A closed-cycle system is defined as a part of the service water system that is not subject to significant sources of contamination, one in which water chemistry is controlled, and one in which heat is not directly rejected to a heat sink. If all these conditions are not satisfied, the system is to be considered an open-cycle system in regard to the specific actions required below."

At Maine Yankee, our service water system and component cooling system together make up the service water system addressed by the Generic Letter.

Maine Yankee's service water system is the open-cycle system addressed by the Generic Letter. The service water system is described in our Final Safety Analysis Report (FSAR) Section 9.6. The service water system provides the heat sink for waste heat from the plant auxiliary systems. It performs this function by pumping sea water (from a tidal river) through primary and secondary component cooling heat exchangers.

Maine Yankee's component cooling system is the closed-cycle system addressed by the Generic Letter. The component cooling system is described in our FSAR Section 9.4. The component cooling system provides cooling water service for plant equipment. The heat transfer function is performed by carrying heat from components serviced to the component cooling heat exchangers where heat is transferred to the service water system.

RECOMMENDED ACTION I:

For open-cycle service water systems, implement and maintain an ongoing program of surveillance and control techniques to significantly reduce the incidence of flow blockage problems as a result of biofouling. A program acceptable to the NRC is described in "Recommended Program to Resolve Generic Issue 51" (Enclosure 1). It should be noted that Enclosure 1 is provided as guidance for an acceptable program. An equally effective program to preclude biofouling would also be acceptable. Initial activities should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter. All activities should be documented and all relevant documentation should be retained in appropriate plant records.

The surveillance and control techniques of Enclosure 1 of the Generic Letter are summarized, by Maine Yankee, as follows:

Surveillance Technique A: Visual inspection of the intake structure, once per refueling cycle, for macroscopic biofouling, sediment, and corrosion, and removal of any fouling accumulations.

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(continued)

Control Technique B: Continuous chlorination (or equally effective treatment with another biocide) whenever the potential for a macroscopic biological fouling species exists.

Control Technique C: Periodically flush and flow test redundant and infrequently used cooling loops; regularly test other components; fill and treat loops before layup; treat systems, that use raw service water, before layup.

Control Technique D: Sampling by freshwater plants that have not previously detected the presence of Asiatic clams in their source water bodies.

MAINE YANKEE RESPONSE I:

I.A. Maine Yankee routinely performs inspections and cleaning of the intake structure during refueling outages. This has included:

- Dewatering of the entire intake structure, by individual bay;
- Removal of marine growth and sediment from the intake structure itself, including suction bells of each service water pump;
- Inspection, cleaning, and repair/repaint as necessary of the travelling water screens;
- Inspections of the outside of the intake structure;
- Sandblast, inspection, repair and repaint of trash racks.

Also, Maine Yankee periodically measures silt accumulation outside of the intake structure. This silt accumulation was removed during the last refueling outage, in November of 1988.

We feel that our past practice addresses the recommended surveillance technique A of the Generic Letter. We will, however, evaluate these practices during our vertical audit of the service water system and recommend any appropriate follow-up actions, in light of the Generic Letter. We will provide a summary of recommended improvements and schedule for implemention, by December 31, 1990.

I.B. Maine Yankee utilizes a thermal backwash mussel control procedure to treat our service water system in lieu of chlorination. The mussel control procedure was described in our responses (References e and f) to USNRC IE Bulletin No. 81-03 (Reference g). A review of Reference (h) indicates that our mussel control procedure was acceptable to the NRC, in 1984.

Nevertheless, in light of the Generic Letter's recommendation for continuous chlorination, during our vertical audit of the service water system Maine Yankee will reevaluate the effectiveness of our thermal backwash mussel control procedure. We will report the results of this evaluation to the USNRC, along with any proposed actions and schedule for implementation, by December 31, 1990. It should be noted that our National Pollutant Discharge Elimination System (NPDES) Permit and State Waste Discharge License do not authorize chlorination.

I.C. Individual elements of this recommended control technique are addressed below:

Flushing and Flow Testing:

Maine Yankee is equipped with four component cooling/service water heat exchangers. Two are normally in service (outboard heat exchangers) and two are in standby (inboard heat exchangers). The standby heat exchangers are placed in service about once per month during thermal backwash mussel control of the outboard heat exchangers. Following mussel control, the outboard heat exchangers are returned to service and the inboard units are opened, inspected and cleaned prior to returning them to standby. The inboard heat exchangers will be included in the flow test program to be developed in response to Recommended Action II.

The service water pumps and appropriate valves are periodically tested under the Inservice Testing Program. The pumps will, of necessity, be addressed by the test program to be developed in response to Recommended Action II.

With the accomplishment of activities described in the foregoing, there is no additional action necessary to satisfy this control technique element.

Layup

The service water cooling loops are in continuous use and are not placed in layup. Therefore, the layup control technique is not applicable to Maine Yankee.

Raw Service Water as a Source:

Maine Yankee does not use raw service water for safety-class applications other than cooling the component cooling heat exchangers. Therefore, this control technique is not applicable to Maine Yankee.

I.D. Not applicable. Maine Yankee is not a freshwater plant.

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RECOMMENDED ACTION II:

Conduct a test program to verify the heat transfer capability of all safety-related heat exchangers cooled by service water. The total test program should consist of an initial test program and a periodic retest program. Both the initial test program and the periodic retest program should include heat exchangers connected to or cooled by one or more open-cycle systems as defined above. Operating experience and studies indicate that closed-cycle service water systems, such as component cooling water systems, have the potential for significant fouling as a consequence of aging-related in-leakage and erosion or corrosion. The need for testing of closed-cycle system heat exchangers has not been considered necessary because of the assumed high quality of existing chemistry control programs. If the adequacy of these chemistry control programs cannot be confirmed over the total operating history of the plant or if during the conduct of the total testing program any unexplained downward trend in heat exchanger performance is identified that cannot be remedied by maintenance of an open-cycle system, it may be necessary to selectively extend the test program and the routine inspection and maintenance program addressed in Action III, below, to the attached closed-cycle systems.

A program acceptable to the NRC for heat exchanger testing is described in "Program for Testing Heat Transfer Capability" (Enclosure 2)... (Recommended action continues with additional discussion/guidance on testing, retesting, and alternative actions)...

MAINE YANKEE RESPONSE II:

A. Open-Cycle Service Water System

Per the Generic Letter, this item applies to Maine Yankee's four component cooling heat exchangers. The component cooling system was the subject of an NRC Safety System Functional Inspection in January and February of 1989, the results of which are documented in Reference (c). One of the issues that arose from that inspection concerned performance testing of the component cooling heat exchangers. In our response to the Inspection Report, provided in Reference (d), we committed to investigating means of verifying the adequacy of these heat exchanger performance levels to meet design basis requirements. Since the inspection, we have completed a thermal analysis of the service water and component cooling systems; this provided required component cooling heat exchanger duty (heat transfer) requirements. We are in the process of performing calculations to support a test program for the four component cooling heat exchangers. We plan to test the heat exchangers upon startup from the 1991 refueling shutdown. Prior to testing, however, Maine Yankee must first evaluate the currently installed instrumentation and controls, and determine where enhancements are needed. We plan to accomplish this through the following steps:

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1. Develop a test program by

   - Identifying appropriate test methods;
   - Calculating acceptable heat exchanger fouling levels to satisfy the heat exchanger duty requirements;
   - Determining instrumentation requirements, including location, range and accuracy;
   - Evaluating heat inputs to the system and comparing to design heat loads, to enable correlation of actual test data to design conditions.

2. Develop a test procedure before the 1991 refueling outage.

3. Prepare engineering design change packages necessary to perform the plant backfits to support the test program (e.g., installation of appropriate flow and temperature measuring instrumentation) before the 1991 refueling outage.

4. Implement necessary backfits during the 1991 refueling outage.

5. Implement the component cooling heat exchanger test program within one month of attaining full power after the 1991 refueling outage.

B. Closed-cycle Component Cooling System

At Maine Yankee, our component cooling system is the intermediate system used between the safety class items (structures, systems, or components) and the system rejecting heat to the ultimate heat sink. Therefore, for the purpose of addressing the Generic Letter, our component cooling system is part of the service water system. The component cooling system is a closed-cycle system (as defined in the Generic Letter).

Maine Yankee will evaluate the condition of the component cooling system, to determine the need to extend the service water test program (and inspection and maintenance program addressed below) to this system. This evaluation will include:

- Review of any available test records;
- Review of corrective and preventive maintenance records, for safety class components;
- Review of appropriate chemistry records.

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By December 31, 1990, we plan to complete this evaluation, document its results and recommend any appropriate follow-up actions. By that date, Maine Yankee will report the results of this evaluation with any proposed actions and schedule for implementation.

RECOMMENDED ACTION III:

Ensure by establishing a routine inspection and maintenance program for open-cycle service water system piping and components that corrosion, erosion, protective coating failure, silting, and biofouling cannot degrade the performance of the safety-related systems supplied by service water. The maintenance program should have at least the following purposes:

A. To remove excessive accumulations of biofouling agents, corrosion products, and silt;

B. To repair defective protective coatings an corroded service water system piping and components that could adversely affect performance of their intended safety functions.

This program should be established before plant startup following the first refueling outage beginning 9 months after the date of this letter. A description of the program and the results of these maintenance inspections should be documented. All relevant documentation should be retained in appropriate plant records.

MAINE YANKEE RESPONSE III:

Maine Yankee currently has routine inspection and maintenance requirements for various components in our service water system (open-cycle service water system as defined in the Generic Letter). We also conduct periodic inservice inspections and testing as required by our Inservice Inspection and Testing programs. In addition, we periodically monitor the condition of key components under our Supplemental Equipment Reliability Program, which supplements mandatory (i.e., licensing required) programs for equipment vital to plant reliability.

In response to this Generic Letter, we plan to evaluate our current service water system inspection and maintenance programs, and their documentation requirements, during our vertical audit on the system. This review will provide recommended improvements, if appropriate. We will provide a summary of recommended improvements and schedule for implementation by December 31, 1990.

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RECOMMENDED ACTION IV:

Confirm that the service water system will perform its intended function in accordance with the licensing basis for the plant. Reconstitution of the design basis of the system is not intended. This confirmation should include a review of the ability to perform required safety functions in the event of failure of a single active component. To ensure that the as-built system is in accordance with the appropriate licensing basis documentation, this confirmation should include recent (within the past 2 years) system walkdown inspections. This confirmation should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter. Results should be documented and retained in appropriate plant records.

MAINE YANKEE RESPONSE IV:

Maine Yankee is in the process of conducting a vertical audit of the service water and component cooling systems. We have recently completed an up-to-date thermal analysis (using a computer model) of the systems which has verified the adequacy of the systems to meet design basis requirements. The results show that the systems perform as presumed as part of original design basis assumptions including much more conservative inputs and a plant thermal uprate from 2440 to 2700 MWT.

Part of our vertical audit will be to review the intended safety function of the service water and component cooling systems. An element of this review will be to confirm that the service water and component cooling systems perform their intended safety functions as described in Maine Yankee's Final Safety Analysis Report (FSAR). This confirmation will include a review of the ability to perform required safety functions in the event of failure of a single active component (i.e., pump, valve, or electrical control or actuation component). This confirmation (except for actual heat exchanger performance verification, addressed under Recommended Action II) is planned to be completed by December 31, 1990. Also, Maine Yankee plans to conduct, and document, a walkdown inspection of the service water system and component cooling system by December 31, 1990.

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RECOMMENDED ACTION V:

Confirm that maintenance practices, operating and emergency procedures, and training that involves the service water system are adequate to ensure that safety-related equipment cooled by the service water system will function as intended and that operators of this equipment will perform effectively. This confirmation should include recent (within the past 2 years) reviews of practices, procedures, and training modules. The intent of this action is to reduce human errors in the operation, repair, and maintenance of the service water system. This confirmation should be completed before plant startup following the first refueling outage beginning 9 months or more after the date of this letter. Results should be documented and retained in appropriate plant records.

MAINE YANKEE RESPONSE V:

As part of Maine Yankee's vertical audit of the service water and component cooling systems we will review the maintenance practices, training, and operating and emergency procedures associated with these systems. This review will be conducted in accordance with our System Review Plan to determine:

- The adequacy of system maintenance to ensure system operability.
- The adequacy of normal and emergency operating procedures, accessibility of valves, labelling of equipment, etc. to ensure proper system operation during normal and accident conditions.
- The adequacy of operator and maintenance technician training to ensure proper worker qualifications.

This review will provide recommended improvements, if appropriate. We will provide a summary of recommended improvements and schedule for implementation by December 31, 1990.