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ACCESSION NBR: 9002060045    DOC. DATE: 90/01/29    NOTARIZED: YES    DOCKET #  
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SUBJECT: Responds to Generic Ltr 89-13, "Svc Water Sys Problems Affecting Safety-Related Equipment."

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January 29, 1990

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Gentlemen:

Docket 50-305  
Operating License DPR-43  
Kewaunee Nuclear Power Plant  
Response to Generic Letter 89-13

- References:
- 1) Service Water System Problems Affecting Safety-Related Equipment (Generic Letter 89-13) received August 2, 1989.
  - 2) NRC Public Meeting on Generic Letter 89-13 held on December 5, 1989.
  - 3) Operating Experience Feedback Report - Service Water System Failures and Degradations, NUREG-1275 Vol. 3 dated November 1988.
  - 4) NRC Draft Generic Letter on Service Water dated December, 1988.
  - 5) Cooling Water System Degradation Due to Aquatic Life, INPO SOER 84-1 dated March 28, 1984.
  - 6) Biofouling Agent: Zebra Mussel, NRC Information Notice 89-76 dated November 21, 1989.
  - 7) Heat Exchanger Testing and Analysis Guidelines for Service Water Systems, EPRI Service Water Working Group, Draft Report, July 1989.

On July 18, 1989, the NRC issued Generic Letter 89-13 (reference 1) which required all licensees to develop a program to address the concerns associated with service water systems. The NRC supplemented the Generic Letter with open regional meetings, including one in Region III on December 5, 1989 (reference 2). The Generic Letter contains several recommended actions which should be

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completed prior to startup following the first refueling outage beginning 9 months or more after the date of the Generic Letter. This corresponds to the 1991 refueling outage at the Kewaunee Nuclear Power Plant (KNPP) which is tentatively scheduled to begin in March of 1991. The Generic Letter also required that a description and schedule of the program that addresses the requirements be submitted within 180 days of receipt of the Generic Letter. This serves as Wisconsin Public Service Corporation's (WPSC) response to meet the 180 day reporting requirement.

WPSC recognized the need for making improvements to the service water system prior to NRC issuance of Generic Letter 89-13. WPSC's increased attention emanated from previous NRC and INPO correspondence (references 3-5) as well as observations and self-assessments made by KNPP staff. This increased attention resulted in the scheduling of a safety system functional inspection (SSFI) of the service water system for early 1990 (currently ongoing) and the formation of a temporary service water working group. WPSC also became an active member in the EPRI Service Water Working Group (SWWG) and Service Water Assistance Program (SWAP). Because of this preparation, WPSC has already begun work to address the requirements of the Generic Letter. The attachment to this letter describes WPSC's program to address the requirements of the Generic Letter including the actions already underway, and a schedule for implementation. If there are any questions on WPSC's program please contact a member of my staff.

Sincerely,



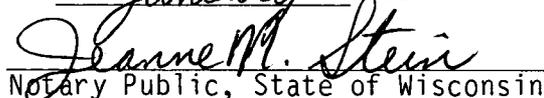
C. R. Steinhardt  
Assistant Vice President-Nuclear Power

PMF/jms

Attach.

cc - Mr. Patrick Castleman, US NRC  
US NRC, Region III

Subscribed and Sworn to  
Before Me This 29<sup>th</sup> Day  
of January 1990



Jeanne M. Stein  
Notary Public, State of Wisconsin

My Commission Expires:  
June 23, 1991

Attachment

To

Letter from C. R. Steinhardt (WPSC) to Document Control Desk (NRC)

Dated

January 29, 1990

NRC 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. Enclosure 1 of the Generic Letter was included to provide a program that meets the objectives for recommended action I. The specific actions in enclosure 1 are:

- A. The intake structure should be visually inspected, once per refueling cycle, for macroscopic biological fouling organisms, sediment and corrosion. Any fouling accumulations should be removed.
- B. The service water system should be continuously chlorinated whenever the potential for a macroscopic biological fouling species exists. Chlorination, within State and Federal regulation limits, should also be done at fresh water plants without clams to help prevent microbiologically influenced corrosion (MIC).
- C. Redundant and infrequently used cooling loops should be flushed and flow tested periodically at the maximum design flow to ensure that they are not fouled or clogged. Other components should be tested on a regular basis for the same reason. Service water cooling loops should be filled with chlorinated or equivalently treated water before layup. Systems that use raw service water as a source, such as fire protection systems, should also be treated prior to layup.
- D. Samples of water and substrate should be collected annually to determine if Asiatic clams have populated the water source.

WPSC RESPONSE

WPSC has yet to observe macroscopic biofouling at KNPP; however, there is a large amount of recent documentation on this subject, including NRC Information Notice 89-76 (reference 6). This documentation makes it clear that the potential macroscopic biofouling due to zebra mussels exists for all plants on the Great Lakes. In addition, pipe samples that were taken recently from low flow areas of the service water system showed no evidence of microbiologically influenced corrosion. WPSC's responses to the four specific actions of enclosure 1 are:

- A. WPSC has performed annual inspections on the external framework and gridwork of the intake structure in Lake Michigan, but has not specifically inspected for macroscopic biofouling. We believe that macroscopic biofouling would have been detected via these inspections had there been any significant buildup. The intake structure inspection will be expanded to include specifically looking for macroscopic biological fouling organisms.
  
- B. Currently the service water system at KNPP is not chlorinated. A study is underway to determine what, if any, long-term corrective actions are necessary for the KNPP service water system. One of the options under consideration is to add a chemical addition system. However, in deference to our environmental stewardship, WPSC will not release contaminants into the environment unless there is technical justification to do so. This study will be completed by June of 1990, and any modifications to the system will be recommended following completion of this study.
  
- C. Currently, WPSC is performing a safety system functional inspection on the service water system. If the system design review verifies that the design is adequate and the piping inspections (see response to action III) show no significant corrosion buildup, then a flushing and layup program will not be recommended. Chemically treated flushing and layup programs will only be implemented in cases where there is a significant level of corrosion buildup. Testing will be accomplished with a combination of the current inservice testing program and the forthcoming service water performance testing program (see response to NRC Recommended Action II).

The fire protection system and the service water system at KNPP use the same raw water source. The fire protection system main header is coated with a bituminous liner which has proven to be very corrosion resistant at KNPP. In addition, KNPP annually cycles all of the significant valves in the fire protection system, and performs a fire pump flow test which not only tests the fire pumps, but also flushes all of the main fire protection piping.

- D. WPSC will implement a program to annually sample water and substrate to determine if any form of macroscopic biological fouling organisms have populated the KNPP raw water source. The first sample will be done this summer during the peak breeding time for zebra mussels.

#### NRC Recommended Action II

Conduct a test program to verify the heat transfer capability of all safety-related heat exchangers cooled by open-cycle service water. The test program should consist of an initial test program and a periodic retest program.

#### WPSC RESPONSE

WPSC will install instrumentation and conduct a performance test on nearly all of the safety-related heat exchangers cooled by open-cycle service water prior to restart following the 1991 refueling outage. The testing program will be based on the EPRI-SWNG "Heat Exchanger Testing and Analysis Guidelines for Service Water Systems" (reference 7). The only safety-related heat exchangers that are not being instrumented (both temperature and flow) are the safety injection pump lube oil coolers. Installing instrumentation on these heat exchangers would be difficult because of their small size (approximately 10 gpm service water flow); therefore, a periodic maintenance and inspection program will be performed. WPSC is currently evaluating if only one of the two residual heat

removal pump pit fan coil units needs to be instrumented. These are also small heat exchangers that have similar operating conditions and geometries.

Flow instrumentation will not be installed on the control room air conditioning condensers and the diesel generator lube oil coolers and water jacket coolers. The control room air conditioning condensers will have temperature instrumentation on the service water inlets and outlets. Instrumentation will not be installed on the freon piping because of the manufacturer's recommendation. Service water temperature rise and a periodic cleaning program will replace a complete heat transfer capability test.

The diesel generators' water jacket and lube oil coolers will also have temperature instrumentation installed on the service water inlets and outlets. Additional instrumentation will not be installed because the diesels are not operated continuously (approximately 2 hours/month, SP 42-047) and because the engine coolant's properties will be difficult to determine. The coolant is a mixture of Dearborn 537 and distilled water and the properties necessary to determine the heat transfer coefficient are not readily available. Service water temperature rise monitoring and frequent cleanings will replace heat transfer capability tests.

#### NRC Recommended Action III

Ensure by establishing a routine inspection and maintenance program for open-cycle service water system piping and components that corrosion, erosion, silting and biofouling cannot degrade the performance of the safety-related system supplied by service water.

#### WPSC RESPONSE

A study was conducted to determine those areas in the service water system that are most susceptible to corrosion buildup. Visual inspections were performed

on some of the isolable sections and very little corrosion buildup was found. The ongoing inspection program using both visual and radiography techniques will continue to monitor corrosion buildup and will help determine if, and when, a cleaning program needs to be implemented. In addition, pipe samples have been sent to an offsite laboratory for a corrosion buildup chemical analysis. The results of this analysis will serve as the basis for determining whether system chemical cleaning is necessary and for selecting a chemical cleaning agent. A cleaning program will be developed and ready to be implemented when, and if, the inspections determine that cleaning is warranted.

NRC Recommended Actions IV & V

- IV. Confirm that the service water system will perform its intended function in accordance with the licensing basis for the plant.
- 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.

WPSC RESPONSE

WPSC began a self-initiated internal safety system functional inspection of the service water system on January 8, 1990. This project will provide a thorough review of the licensing and design bases and the maintenance, operating and training practices. In addition, the service water SSFI will provide a substantial amount of resources in resolving the other recommended actions of the Generic Letter. The seven week inspection will cover several areas including mechanical design, electrical design, operations, maintenance, testing, quality assurance, and configuration and material condition. Recommended actions IV and V are also required to be performed on closed loop cooling systems; i.e., com-

ponent cooling water (CCW). Therefore, WPSC will perform a SSFI on the CCW System prior to startup following the 1991 refueling outage.