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January 17, 1985

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Quad Cities Station Units 1 and 2
Response to Request for Information
NRC Docket Nos. 50-254/265

Reference (a): Request for Information-Nuclear Power Plant Biofouling D. B. Vassallo letter to D. L. Farrar dated November 15, 1984

Dear Mr. Denton:

Reference (a) requested that we provide information concerning the Quad Cities Station program for surveillance and control of asiactic clams in plant water systems.

The attachment to this letter contains our response to those questions. Please address any additional questions that you or your staff may have concerning our response to this office.

One original and fifteen copies are being provided for your use.

Very truly yours,

Greg Alexander

Greg Alexander
Nuclear Licensing Administrator

Attachment

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ATTACHMENT

The maintenance staff at Quad Cities Station is aware of the potential for fouling of plant heat exchangers and components by Asiatic Clams. This response will address the methods used to detect flow blockage caused by Asiatic Clams and methods used to control accumulation of Asiatic Clams. There are five systems that use Mississippi River water for cooling at Quad Cities Station. These systems are the main condenser circulating water system, the plant service water system, the Residual heat removal (RHR) service water system, the diesel generator cooling water system, and the fire protection system. The circulating water and service water systems are in continuous operation; while the RHR service water, fire protection, and diesel generator cooling water systems are only run on an as-needed basis, normally abot once per month.

I. The following described the surveillance and inspections performed to detect flow blockage and fouling of equipment:

A. The Circulating Water system is monitored for differential pressure. A high differential pressure is indicitive of flow blockage. In addition, the efficiency and overall performance of the main condenser are monitored. A loss of efficiency is indicitive of bio fouling.

B. Major heat exchangers in the Service Water system are routinely inspected for presence of fouling or flow blockage. The following is a list of major heat exchangers and inspection invervals:

1. Recirculation Motor-Generator Set Oil Coolers (8) - Once per 3 years

2. Reactor Building Closed Cooling Water Heat Exchangers (5) - Once per 3 years

3. Turbine Oil Coolers (4) - Once per operating cycle (18 months)

4. Turbine Building Closed Cooling Water Heat Exchangers (4) - Once per 3 years

5. Stator Cooling Water Heat Exchangers (4) - Once per 3 years

C. Flow rate testing of the RHR Service Water System is performed once every 3 months. This test consists of verifying that the system flow is greater than 3500 gpm against a system pressure of 198 psig. Flow blockage in

the system would be reflected by degraded performance. The performance of these tests is tracked by the Inservice Testing (IST) program, and a drop in system performance would result in corrective action, if necessary. In addition to this, the heat exchangers are inspected every three years for evidence of blockage.

D. The Diesel Generator Cooling Water System provides cooling water to the heat exhangers on the emergency diesel generators. These heat exchangers are inspected for flow blockage every operating cycle (18 months). In addition to this, a flow performance test of the systems is conducted quarterly, with the results tracked by the IST program.

E. The following testing is performed to verify that no flow blockages have occurred in the fire protection equipment:

1. The diesel-driven fire pumps are tested for adequate flow rate every operating cycle (18 months).

2. Flushing of external fire hydrants is performed twice per year.

3. Sprinkler head, nozzle, and wet pipe fire suppression systems are inspected once per year.

The above actions have proved adequate in detecting and clearing accumulations of Asiatic Clams and other biofouling agents before significant flow blockage of major heat removal equipment has occurred.

II. The following are the methods used to control Asiatic Clams in plant water sytems:

A. The control of biofouling agents in the circulating water system consists of periodic flow reversals and treatment with a biocide. In addition, the main condensers are cleaned every operating cycle to remove any fouling that has accumulated.

B. Control in the Service Water System presently consists of removal of accumulations during inspections. The system was equiped to inject chlorine dioxide (ClO_2); however, ClO_2 has proved to be an ineffective biocide. Installation of a new biocide injection systm on the Service Water System is in progress. The new system will

use a bromine-based biocide, which is thought to be more effective than chlorine. When this system is installed, it should provide protection from intrusion of Asiatic Clam larvae. Injections of quantities of biocide sufficient to provide effective control for adult Asiatic Clams is not possible because the residual levels would far exceed the levels allowed by the plant discharge permit. Continuous biocide injection is also not permitted by the plant discharge permit.

C. Control in the RHR Service Water System consists of removal of accumulated shells during routine inspections. No biocide is injected in this system at this time, and no plans for biocide injection are being made. The Station feels that the risks of chloride or bromide intrusion into the reactor coolant through potential heat exchanger tube leaks far outweigh the benefits which would be obtained.

D. Control in the Deisel Generator Cooling Water System consists of cleaning the heat exchangers during inspection. The ECCS pump room coolers are also fed by this system. The present design of the coolers does not permit disassembly and inspection of the cooling water side. A modification to replace these room coolers with ones which can be readily inspected is being investigated. No plans for biocide injection in this system are presently being considered.

E. Control in the Fire Protection System is by periodic flushing of the system. Because of the large pipe diameters and lack of heat exchangers in the system, no problems due to blockage by Asiatic Clams have been encountered in this system.