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Writer's Direct Dial Number:

August 25, 1983

Director
Division of Engineering and Quality Assurance
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

54-219

Dear Sir:

Subject: Oyster Creek Nuclear Generating Station
IE Bulletin No. 81-03
Request for Additional Information

On December 23, 1982, GPU Nuclear (GPUN) received your letter dated December 20, 1982, requesting additional information concerning our initial response to IE Bulletin No. 81-03 Flow Blockage of Cooling Water to Safety Components by Corbicula sp. (Asiatic Clam) and Mytilus sp. (Mussel) dated May 29, 1981.

Subsequently, GPUN initiated appropriate action to adequately respond to your request. The following are the "Actions to be taken by Licensees" as described in the bulletin and GPUN's responses to the additional information requested. The numbering method is consistent with that used in the bulletin and your December 20, 1982 letter:

2. If it is unknown whether either of these species is present in the local environment or is confirmed that either is present, determine whether fire protection or safety-related systems that directly circulate water from the station source or receiving water body are fouled by clams or mussels or debris consisting of their shells. An acceptable method of confirming the absence of organisms or shell debris consists of opening and visually examining a representative sample of components in potentially affected safety systems and a sample of locations in potentially affected fire protection systems. The sample shall have included a distribution of components with supply and return piping of various diameters which exist in the potentially affected systems. This inspection shall have been conducted since the last clam or mussel spawning season or within the nine month period preceding the date of this bulletin. If the absence of organisms or shell debris has been confirmed by such an inspection or another method which the licensee shall describe in the response (subject to NRC evaluation and acceptance), no further action is necessary except for times 4 and 5 of actions applicable to holders of an operating license.

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Response

As a result of the need to further investigate biofouling of the Containment Spray Heat Exchangers and in order to close out this item, GPUN has formulated a program to ascertain additional information as to the impact of biofouling of associated components of the Containment Spray Heat Exchangers. However, the results of this program are not available at the time of this submittal. It is expected that the results of these additional investigations will be ready prior to start-up from the current maintenance/refueling outage.

4. Describe methods either in use or planned (including implementation date) for preventing and detecting future flow blockage or degradation due to clams or mussels or shell debris. Include the following information in this description:
 - a. Evaluation of the potential for intrusion of the organisms into these systems due to low water level and high velocities in the intake structure expected during worst case conditions.

Response

Cooling water for the station is drawn from Barnegat Bay through the South Branch of Forked River and the intake canal. Screening of the cooling water is provided in the form of trash racks for filtering out large debris, and traveling water screens. Each traveling screen consists of screen pannels (.38 inch mesh openings) attached to two continuous chains riding on head-and-foot sprockets. A screen wash system removes fish, invertebrates, aquatic plants and debris from screens; all of this material is carried by a sluiceway which discharges into the discharge canal. Because there are no other screening devices in the cooling water, the .38 inch mesh of the traveling screens determines the maximum size of an object that can enter the cooling water system. As indicated in our initial response, the blue mussel (Mytilus edulis) is present in the Barnegat Bay area but the Asiatic clam (Corbicula sp.) is not. Additionally, the blue mussel is common in Barnegat Bay during the spring, however, it is uncommon during the remainder of the year. All of the individuals that have been found in benthic samples in the intake and discharge canals have been juveniles, as this species cannot survive summer ambient temperatures in the bay, and die before reaching adulthood.

Samples of the biofouling organisms on the containment spray heat exchanger tube sheets were obtained on two occasions, August and December, 1982. The analysis of the sample obtained in August revealed that blue mussels accounted for 21% of the sample volume. Shell lengths ranged from .47 to 1.02 inches. In December, blue mussel shells accounted for 14% of the sample by volume, with the largest shell measuring .98 inches in length. No live mussels were found during either of these inspections.

As a result of investigations concerning biofouling it can be suggested that blue mussels may gain access to the safety related cooling water systems via four routes:

1. Shell debris or live mussels smaller than the .38 inch mesh of the traveling screens may pass directly through the screens. The blue mussel "prefers" to be attached to hard substrates rather than being dispersed in the water column, although small individuals are commonly found attached to floating marine algae. This algae is impinged upon the traveling screens in great abundance, carrying with it many small mussel shells.
2. Live mussels or shell debris larger than the .38 inch mesh may pass through damaged sections of the screens where the wire has become stretched or broken. However, it is unlikely that mussels enter the system in this manner since the screens undergo periodic maintenance to promote efficient operation.
3. Microscopic mussel larvae may pass through the traveling screens, settle and grow within the cooling water systems. In the absence of biocidal treatment, blue mussels will thrive within the cooling water systems due to the presence of hard substrates for attachment and the continuous flow of water which provides food and dissolved oxygen. Treatment of the cooling water with a biocide (presently chlorine) will aid in controlling the entry of organisms through this means .
4. Mussel larvae passing through the traveling screens may settle and grow on the intake structure, prior to the point of chlorination. Subsequently, the organisms die as a consequence of high summer water temperatures, the resulting shell debris could be drawn into the cooling water system.

As indicated by our inspections of the Containment Spray Heat Exchangers, all of the mussels found on the tube sheets were larger than the .38 inch mesh of the traveling screens, indicating that they entered the system through routes 3 and 4 (as larvae). By letter dated September 27, 1982, from the New Jersey Department of Environmental Protection, chlorination is authorized for the heat exchangers, thereby providing a method to more effectively control biofouling through this avenue of entry. Generally, however, the potential does exist for significant accumulations of blue mussels between the intake traveling screens and the point of chlorination. The shell debris resulting from the death of these organisms could cause significant flow blockage problems in the heat exchangers.

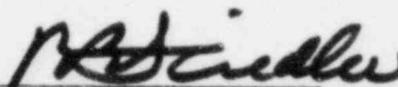
- 5.e. Provide results and conclusions of chlorination feasibility study as they become available.

Response

GPUN conducted an evaluation of the Containment Spray Heat Exchanger Biofouling. This evaluation addressed 1) evaluation of deposit sample analyses, 2) recommendations for control strategies, and 3) evaluation of treatment or system modifications. One recommendation that is under consideration is to provide an oxidant injection point immediately before the Containment Spray Heat Exchangers. This recommendation will be weighed against the results of a follow up study to evaluate alternatives to control biofouling, taking into consideration current environmental concerns, such as the U.S. Environmental Protection Agency ruling for chlorine minimization, to reduce the impact on the receiving water. The availability of the results of this evaluation will be dependent upon contractor availability and start date. However, it is expected that this information will be ready prior to start-up from the current maintenance/refueling outage.

If you have any further questions, please do not hesitate to contact Mr. Douglas Moore of our Licensing and Regulatory Affairs Department at (609) 971-4630.

Very truly yours,



Peter B. Fiedler
Vice President and Director
Oyster Creek

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