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February 28, 1983  
BECO Letter No. 83-61

Mr. Edward L. Jordan, Director  
Division of Engineering and Quality Assurance  
Office of Inspection and Enforcement  
Region I  
U.S. Nuclear Regulatory Commission  
631 Park Avenue  
King of Prussia, Pa. 19406

License No. DPR-35  
Docket No. 50-293

Subject: Response to Request for Further Information Concerning IE Bulletin  
81-03

Reference: NRC letter dated January 21, 1983 from Mr. Edward L. Jordan to Mr.  
A.V. Morisi (BECO ltr. # 1.83.009).

Dear Sir:

This responds to your request for additional information concerning the results of the chlorine minimization study for the control of Mytilus edulis (blue mussel) contained in the Reference letter.

We have provided a brief summary of our actions and the results achieved, and of tentative further actions to deal with mussel fouling of cooling systems for safety systems. In addition, we have attached a report, Biofouling Control Studies at Pilgrim Nuclear Power Station, April 1981 - April 1982. This report was prepared by Marine Research, Inc., and provides data which we believe supports our request to the Environmental Protection Agency (EPA) for continuous chlorination of Pilgrim's Salt Service Water System (SSWS).

Background

The "Mussel Control Program" (MCP) as it now exists was initiated in March, 1982, and was implemented to provide a coordinated, integrated program aimed at reducing mussel fouling as PNPS. The purpose was to monitor fouling organisms and then control and reduce the rate of mussel fouling.

In late 1980 and early 1981, Boston Edison developed a proposed SSWS chlorination program as part of the Cooling System Betterment Program. In April, 1981, after several months of proposals and discussions, the EPA gave BECO permission to continuously chlorinate the SSWS in order to attempt to control mussel fouling in safety related systems.

In late 1981, the Mussel Control Program was developed to control the biofouling problem at Pilgrim.

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The main tasks of the Mussel Control Program, the problems each task was intended to solve, and the status of each are contained in the following:

- 1) SSWS Continuous Chlorination: This is to prevent the setting and growth of mussel larvae in the SSWS intake piping, pumps, and service lines, thereby eliminating buildup of mussels in all parts of the SSWS including the heat exchangers.

This system has been running continuously, with only minor disruptions, since late April, 1982. It has resulted in virtually no mussel buildup, insuring adequate flow in the safety related SSWS. It has also greatly reduced the maintenance of the SSWS pumps and heat exchangers, as well as reducing the need to backwash these systems.

- 2) Heat-treated backwashes: These are to "cook" mussels attached to walls of the intake structure both inboard and immediately outboard of the traveling screens, preventing them from growing and ultimately becoming dislodged and intruding into the CWS intake tubes and into the SSWS.

The heated backwashes work very well using temperatures of about 105°F and times of approximately 1/2 hour. We have followed each heated backwash by biologist-diver observations which have confirmed that the mussels were killed. Therefore, mussels did not have a chance to grow on the intake bay walls during the summer of 1982.

In August, we observed an accumulation of mussels outboard of the trash racks, which we believe is because the heated water cannot extend out that far. The divers were immediately called in to scrape the walls clean of mussels.

- 3) Side-stream mussel monitors (SSMM): These devices were installed to enable easy observance of the setting and growth rate of mussels in both natural (unchlorinated) and chlorinated environments. The SSMM allow rapid observation of mussel fouling conditions approximating those found in the heat exchangers.
- 4) Mussel larvae samples: These are to sample for the numbers of mussel larvae which are available in the water column, allowing BECo to be aware of spawning peaks. This knowledge insures that biofouling control techniques such as chlorination of SSWS and heat treat backwashes, are conducted during the most critical times of the mussel spawning season.

#### Benefit

The problems related to mussel fouling in the SSWS were nearly eliminated in 1982 when compared to those during the summer of 1981 as well as to previous years. As stated above, this has reduced the maintenance of pumps and heat exchangers in the SSWS system, served to ensure adequate flow through the system, and reduced the need to backwash. We believe such results demonstrate the efficacy of our actions in ensuring that mussel intrusion will not degrade the SSWS system's ability to perform its designed function.

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Future Plans

During 1983, we plan to continue refining the MCP to make it more permanent and more easily controlled by cognizant individuals. We are relocating the Orion chlorination monitors and the side-stream mussel monitors. In the case of the chlorination monitors, this relocation is to address our monitoring commitment to the EPA.

An important part of the 1983 program is the SSWS chlorination and Mussel Monitoring Program. Cognizant individuals will be responsible for calibrating chlorination monitoring equipment, and recording chlorine concentrations on a weekly basis. Also, observations on mussel setting in the side-stream monitors, numbers of mussel larvae, and biologist-diver observations after the heat-treat backwashes will be performed.

We believe this submittal is responsive to your request, and hope that it aids you in closing out this issue. Should you require further information on IE Bulletin 81-03, please contact us.

Very truly yours,

*W.D. Hamington*

Attachment: Final Report Biofouling Control Studies at Pilgrim Nuclear Power Station, April 1981 - April 1982