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June 24, 1981

Mr. Boyce H. Grier, Director
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Region I
631 Park Avenue
King of Prussia, Pennsylvania 19406



Dear Mr. Grier:

NRC IE BULLETIN NO. 81-03 DATED APRIL 10, 1981
"FLOW BLOCKAGE OF COOLING WATER TO SAFETY SYSTEM
COMPONENTS BY CORBICULA SP. (ASIATIC CLAM) AND
MYTILUS SP. (MUSSEL)"
HOPE CREEK GENERATING STATION UNITS 1 AND 2

The subject bulletin refers to mollusk infestation causing reduction of cooling water flow to safety system components. The bulletin provides a brief history of the utility industry's involvement with these two mollusk species and requires a step-wise action program for licensees.

In responding to this bulletin, PSE&G has utilized the information determined in their investigation of this bulletin for the Salem Generating Station. The Hope Creek Generating Station is in close proximity to the Salem Generating Station.

Item 1 (Construction Permit Holders)

This item requires completion of Items 1-4 of the operating licensing holders requirements.

Item 1 (Operating License Holders)

A review was performed of the existing ecological study results to determine if either organism was present in any of the samples in the vicinity of Artificial Island. No Asiatic clam, Corbicula sp., or mussel, Mytilus sp. has been collected in the Delaware River near Artificial Island (RM 40-60) in the benthos sampling conducted since 1969 as part of the Salem Environmental Monitoring Program (See An Ecological Study of the Delaware River in the Vicinity of Artificial Island, 1969-1976, and the Salem Nuclear Generating Station Annual Nonradiological Environmental Operating Reports, 1977-1978). Sampling from 1969 through 1971 was conducted over a wide range of substrate, primarily with ponar dredges. Since 1978 no specimens have been observed in

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samples collected as part of the ongoing Radiological Monitoring Program for Salem.

Additionally, no Asiatic clam or mussel has been observed in intake entrainment and impingement sampling at Salem Unit 1 since the initial startup of Salem Unit 1 in December, 1976. Although the 3/8 inch mesh traveling screens located in the Circulating Water System intake structure sample only the larger therefore older mollusks, they are an important secondary sampling method capable of detecting established populations. Although bivalves are not presently included among the designated taxa in the impingement monitoring program, the occurrence of an unusual bivalve or group of bivalves greater than 3/8 inch would have been noted.

Items 2 and 3 (Operating License Holders)

These items are not applicable since no Asiatic clams or mussels were found.

Item 4 (Operating License Holders)

The potential for intrusion of the Asiatic clam and the mussel into the local environment, and into the Hope Creek intakes, is largely dependent upon river flow which is necessary for organism transport and which determines the salinity. The salinity and thermal tolerances and/or preferences of the indicated species must be met before intrusion and colonization can occur.

Based on the salinity tolerance of the mussel, Mytilus sp., no intrusion into the local environment would be expected. Further, in the unlikely event that a "stray" did invade the local environment and/or Hope Creek intake, it could not survive and reproduce in the low salinity regimes (6 to 8 ppt mean, 1 to 18 ppt range) which occur during much of the year. Mytilus edulis, the blue mussel, has been reported by Maurer et al. (1974) to occur in the Delaware Bay at salinities of 20-35 ppt. Salinity levels near Artificial Island only reached the lower end of this salinity range once, during a period of unusually low fresh water runoff.

The potential for intrusion of the Asiatic clam into the local environment is not expected to be high. The closest known established populations are presently located in the tidal freshwater reaches of the Delaware River between Burlington and Trenton, New Jersey (RM 118-132) (Crumb, 1977). Transport into the local environment from this region would most likely occur as a result of high runoff (low salinity)

conditions. Corbicula sp. has been reported in low salinity regions of the James River, Virginia (Diaz, 1974), in 5-7 ppt salinities (Britton 1981A, personal communication) and elsewhere (Evans et al., 1979).

Corbicula sp. has spread throughout North America, principally south of 40° Latitude (Britton and Morton, 1979). Its distribution range is primarily dictated by its low tolerance to low water temperature. Corbicula sp. (Britton 1981B, personal communication) is cold-limited and will perish in large numbers in more northerly localities following severe winter freezes. Because winter (December through March) water temperatures in the vicinity of Artificial Island typically reach levels at or below the lower lethal temperature of Corbicula sp. (i.e., 2°C; Mattice and Dye, 1976) (Table 1), its permanent establishment in the vicinity of Hope Creek (Latitude 39° 27') at levels sufficient for severe fouling is unlikely. If marginal colonization in the vicinity did occur, population levels would probably be "controlled" by the typically low, ambient winter water temperature.

Detection of the Asiatic clam, Corbicula sp. and the mussel, Mytilus sp. will be assured by a slight modification of ongoing-sampling and monitoring programs sponsored by the Licensing and Environment Department. The examination of benthic samples currently collected semi-annually as part of the Salem Environmental Radiological Monitoring Program (six replicated samples, four stations, RM 40-60) is adequate to identify these species, if present. The Salem impingement monitoring program samples will also be scanned for any evidence of these two species. In addition, normal condenser maintenance at Salem requires condensers to be inspected monthly. The generally unfavorable ambient conditions and the potential rate of heat exchanger infestation, were viable organisms to enter, enable this combination of field and plant monitoring to provide adequate warning.

Item 2 (Construction Permit Holders)

This item is not applicable since no Asiatic clams or mussels were found.

Item 3 (Construction Permit Holders)

The radiological monitoring program is an ongoing program, and the most recent sample was taken September 23, 1980.

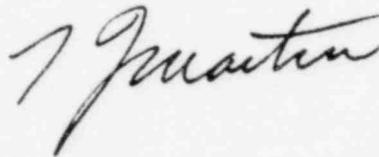
Mr. Boyce H. Grier

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Since the subject clam and mussel have not been found in any studies in the vicinity of Artificial Island, Items 3b, c, and d do not apply. Due to the absence of Corbicula sp. and Mytilus sp., no corrective actions are required. Our preventive actions are discussed above.

Very truly yours,



Attach. - Literature Cited

CC: Director, Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

NRC Resident Inspector
Hope Creek Site

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Table 1. PSE&G, Salem Generating Station mean intake temperature data for winter months averaging below 2.0°C 1977-1980.

<u>Month/Yr</u>	<u>Mean Temp. (°C)</u>
Jan. '78	1.3
Feb. '78	0.6
Mar. '78	1.8
Jan. '79	2.6
Feb. '79	0.9
Jan. '80	2.5
Feb. '80	1.9

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Literature Cited

- Britton, J. C. and B. Morton. 1979. Corbicula in North America: The evidence reviewed and evaluated. Pages 250-287 in Proceedings First International Corbicula Symposium, A Texas Christian University Research Foundation Publication. Edited by J. C. Britton. 313 pp.
- Crumb, S. E. 1977. Macrobenthos of the tidal Delaware River between Trenton and Burlington, New Jersey. Chesapeake Sci. 18(3):253-265.
- Diaz, R. J. 1974. Asiatic clam, Corbicula manilensis (Philippi), in the tidal James River, Virginia. Chesapeake Sci. 15:118-120.
- Evans, L. P., Jr., C. E. Murphy, J. C. Britton, and L. W. Newland. 1979. Salinity relationships in Corbicula fluminea (Muller) Pages 193-214 in First International Corbicula Symposium, A Texas Christian University Research Foundation Publication. Edited by J. C. Britton. 313 pp.
- Mattice, J. S. and L. L. Dye. 1976. Thermal tolerance of the adult Asiatic clam. Pages 130-135 in Thermal Ecology II. ERDA Symposium Series, CONF-750425, Symposium held at Savannah River Ecology Laboratory. Esch, G. W. and R. W. McFarlane, Editors.
- Maurer, D., L. Watling and G. Aprill. 1974. The distribution and ecology of common marine and estuarine pelecypods in the Delaware Bay area. Nautilus: 88(2) 38-44.

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