UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
CAROLINA POWER & LIGHT COMPANY	)	
AND NORTH CAROLINA EASTERN	)	Docket Nos. 50-400 OL
MUNICIPAL POWER AGENCY	)	50-401 OL
	)	
(Shearon Harris Nuclear Power Plant,	)	
Units 1 & 2)	)	

AFFIDAVIT OF WILLIAM T. HOGARTH IN SUPPORT OF SUMMARY DISPOSITION OF EDDLEMAN CONTENTION 75 (BIOFOULING)

STATE OF NORTH CAROLINA)
)
COUNTY OF WAKE)

William T. Hogarth, being duly sworn according to law deposes and says as follows:

1. I am Manager-Environmental Technology Section of Carolina Power & Light Company, and give this affidavit in support of Applicants' Motion for Summary Disposition of Eddleman Contention 75. I have personal knowledge of the matters set forth herein and believe them to be true and correct to the best of my information, knowledge and belief. A summary of my professional qualifications and experience is attached as Exhibit "A" hereto.

2. Eddleman Contention 75 in this proceeding asserts that one or more species of clam, oyster or other marine growth (e.g. barnacle) will prove resistant to biocides added to cooling tower water and thus be able to grow and live in the SHNPP condensers creating debris which would foul and block the condensers preventing the plant's access to its ultimate heat sink, with serious safety consequences. The purpose of this affidavit

is to summarize 1) the potential for biofouling at the Harris plant, and 2) the monitoring efforts, plant systems, and control procedures of the Applicants which will prevent biofouling, in support of Applicants' summary disposition motion.

Potential Biofouling Organisms at SHNPP

3. The SHNPP makeup reservoir is a freshwater impoundment. Contrary to allegations made in Contention 75, no marine organisms capable of biofouling the SHNPP cooling systems will survive in the Harris Reservoir. The only biofouling organism with the potential to reduce or block cooling water flow at the SHNPP is believed to be the Asiatic clam (Corbicula fluminea), a freshwater bivalve mollusk.

4. In response to NRC IE Bulletin No. 81-03 "Flow Blockage of Cooling Water to Safety Components by Corbicula sp. (Asiatic Clam) and Mytilus sp. (Mussel)," CP&L evaluated the potential for biofouling by these organisms at SHNPP. CP&L's replies to the NRC's request for information are attached as Exhibits "B" and"C". The NRC has not requested any further information related to biofouling from Applicants since those replies were submitted.

Biological Monitoring of Harris Reservoir

5. Beginning in February 1982, Applicants have conducted quarterly biological sampling in the Harris Reservoir designed to monitor the benthic macroinvertebrate community including the presence/absence of adult and advanced juvenile Corbicula clams. Sampling design included establishment of three permanent sampling transects — one each in the two main arms of the reservoir (White Oak Creek and Buckhorn Creek Branches) and one transect near the main dam. This design ensured that the three major areas of the main reservoir would be sampled, thereby increasing the probability of collecting Corbicula if they had been introduced into the reservoir. Sampling design also included the collection of samples from both shallow and deep areas along each transect. This design insured that two different habitats (deep and shallow) would be

sampled at each location thereby reducing the possibility of not detecting the organism if it preferentially colonized one area over the other.

6. In 1983, two additional sampling transects were added to the above mentioned program. One transect is located in the main reservoir near the mouth of the cooling tower makeup intake channel. The second transect is located in the auxiliary reservoir near the mouth of the emergency service water intake channel. Sampling at these two locations is conducted in the same manner and with the same frequency as sampling at the other transects mentioned above.

7. Given the quarterly biological monitoring of lake bottom samples collected from the main and the auxiliary reservoirs, it is highly likely that any populations of Asiatic clams already established would have been detected promptly. Likewise, the ongoing reservoir monitoring program ensures the rapid detection of any Asiatic clam invasion of either the main or the auxiliary reservoirs. The early detection of such an invasion virtually eliminates the possibility that these organisms could enter plant service water systems prior to the initiation of appropriate plant biofouling inspection and control procedures.

Results of Biological Monitoring Efforts Completed to Date

8. No Corbicula adults or juveniles have been detected in samples collected from February 1982 through May 1983.

9. In its commitments to NRC on reservoir monitoring, CP&L committed to increase ongoing benthic macroinvertebrate monitoring efforts in the area of plant intake structures if a clam population were to be detected in the reservoirs. This increase in monitoring effort has been implemented prior to any known clam invasion of either impoundment. Furthermore, CP&L has committed to an ongoing benthic macroinvertebrate monitoring program designed to detect any established populations of these organisms. These monitoring studies will give a clear indication of any potential

biofouling problems due to establishment of clam populations near plant intake structures. If a clam population is established in the area of the intakes, CP&L has committed to the periodic sampling of intake bays behind the traveling screens. This sampling will detect any accumulations of living Asiatic clams, clam shells or other debris which could possibly be entrained and cause flow reductions upon entering the plant cooling water systems. This commitment to the early detection of any Asiatic clam invasion ensures that appropriate plant biofouling inspection and control procedures will be initiated prior to clam biofouling of cooling water systems.

Plant Systems Designed to Prevent the Intrusion of Corbicula Fluminea

10. If and when Corbicula might become established in the Harris main and/or auxiliary reservoirs, the potential would exist for adults, larvae, and shells to be entrained into the service water system of the SHNPP. However, should this occur various design and operating conditions are expected to reduce the probability of flow reduction or blockage to safety system components by Corbicula.

11. No flow reduction or blockage problems should occur in the normal Service Water System (SWS). This system is designed to withdraw service water from the closed-loop Circulating Water System (CWS) at the cooling towers. Because the physical and chemical climate of the cooling towers will be unfavorable to Corbicula habitation; and because the service water is designed to be chlorinated to maintain a 0.5 ppm residual chlorine concentration at the heat exchanger outlet, Corbicula intrusion of the SWS is unlikely.

12. The Emergency Service Water System (ESWS) will withdraw water from the auxiliary reservoir or, if that source is unavailable, from the main reservoir. From either source, the emergency service water will be pumped to the normal SWS. Because the ESWS pumps will be operated monthly, no accumulation of silt or Corbicula will occur in the ESWS pipelines from the intake structure to the junction with the normal SWS.

Corbicula does not attach except in early larval stages, so any young adults that grow from larvae that settle there will be flushed through the system before growing large enough to reduce or block service water flow.

13. Potential for flow reduction or blockage in the SWS will result if there is an accumulation of silt and Corbicula adults and/or shells in the ESWS pump suction bays behind the traveling screens. (It is from these bays that the ESWS pumps withdraw cooling water.) The traveling screens' mesh size of 3/8" will prevent adults or larger shells from entering the ESWS intake bays. However, Corbicula in the larval or juvenile stages may be able to penetrate the small openings in the traveling screens and grow to adult size. Then, if significant buildups did occur in the bays, the adults or shells could be picked up by the ESWS pumps suction. Two factors which will reduce the likelihood of there ever being high Corbicula densities in the intake bays are the water depth and the monthly operation of the service water pumps. At normal water level, the depth at the ESWS intakes on the auxiliary reservoir and main reservoir will be 60 feet and 30 feet, respectively. Low oxygen levels at these depths during summer months should inhibit occurrence and growth of Corbicula. The monthly operation of the ESWS pumps should minimize the buildup of silt in the intake bays and thus also minimize favorable substrate for Corbicula larvae to settle and grow into adults. In addition, 1/16" self-cleaning strainers located at the discharge of the ESWS pumps would preclude any passage into the ESWS.

Asiatic Clam Monitoring Procedures Within Plant

14. Applicants intend to inspect key areas of the Harris plant to monitor for the presence of Asiatic clams. These key areas are most likely to include selected service water heat exchangers and selected vault areas located directly behind the traveling screens (to be sampled for clams and debris). Also, various flow reduction tests and heat differential tests should be a reliable means to detect water flow blockages in several of the plant's water supply systems.

15. These tests are designed to monitor plant service water systems for any flow reductions including those attributable to Asiatic clams.

Procedures for Controlling Asiatic Clams If They Gain Access to Plant Water Supply Systems

16. If the unfavorable physical and chemical climates present in plant cooling water systems do not eliminate any clams which might enter the plant's service water system, the application of continous chlorination to maintain a 0.5 ppm residual chlorine concentration at the heat exchanger outlet will effectively eliminate all adult and juvenile Corbicula from the system. This will prevent adult clams from reproducing within plant systems so that these organisms will not be able to develop an immunity to the above-mentioned chlorine concentrations.

17. Applicants consider continuous chlorination to be an effective biofouling control agent. The application of chlorine, however, would not preclude the use of other control strategies presently being developed or effectively employed by other utilities.

CONCLUSION

18. The "early warning" capability designed into our reservoir and plant monitoring procedures will allow sufficient time for any potential biofouling problems to be evaluated and controlled prior to the development of significant water flow reduction.

This the 31st day of August, 1983.

William T. Hogarth

William T. Hogarth

Sworn to and subscribed, before me, this the 31 day of August, 1983.

William T. Bryson

Notary Public

My commision expires: 8/8/87

WILLIAM T. HOGARTH

Social Security No.:

Current Position: Manager
Environmental Technology Section
Carolina Power & Light Company
Harris Energy & Environmental Center
Route 1, Box 327
New Hill, North Carolina 27562
Telephone: (919) 362-3276

Home Address:

I. Personal Data

Date of Birth:
Place of Birth: Jarratt, Virginia

II. Education

B.S.--University of Richmond, Richmond, Virginia--1963
M.S.--University of Richmond, Richmond, Virginia--1965
Ph.D.--North Carolina State University, Raleigh, North Carolina--1976
Program for Technical Managers--University of North Carolina--1983

III. Experience in Higher Education

Coordinator of General Biology Labs--University of Richmond

Laboratory Assistant in Comparative Anatomy, Ichthyology, and Ecology--University of Richmond

Graduate Research Assistant--Roanoke-Albemarle Striped Bass Project--North Carolina State University--1966-1972

Graduate Research Assistant--Chowan River Project--North Carolina State University--1966-1970

Research Assistant--Dolphin Aquaculture Project--North Carolina State University--1970-1972

IV. Honors

Williams Fellowship--University of Richmond

President--Beta Beta Beta--University of Richmond

Grant from Virginia Academy of Science for M.S. Research--University of Richmond

Treasurer--Phi Sigma Society--North Carolina State University

Sport Fishing Institute Grant for Ph.D. Research

Grant from North Carolina Wildlife Society

V. Field Experience

1963-1965--Sampling of James River tributaries in connection with M.S. research.

1965--Chesapeake Biological Laboratory--seven months--striped bass project.

1966-1972--Graduate student in charge of Roanoke-Albemarle striped bass project.

1966-1970--Periodic sampling of Chowan, Nottoway, and Blackwater Rivers.

1970-1972--Dolphin Aquaculture-Sea Grant Project--Hatteras, Bimini and Key West, Florida.

1966--Project on RV Eastward to determine feasibility of long-line fishing off Jamaica.

1967--Fishing expedition off San Juan to determine species abundance using long-line gear.

1973--Consultant to Roanoke-Albemarle project (March-May)--Collecting data on spawning migration of striped bass and preparing annual report.

1972-1980--Carolina Power & Light (CP&L) Company biologist - Project Manager of Cape Fear Estuary Study--$8 million comprehensive study by CP&L, University of North Carolina, North Carolina State University, and outside investigators to determine impact of once-through power plant cooling system on Cape Fear Estuary aquatic populations.

VI. Society Memberships

American Fisheries Society
American Society of Ichthyologists and Herpetologists
North Carolina Academy of Science
Society of Power Industry Biologists

VII. Current Technical Committees

Southeastern Electric Exchange Environmental Committee--Vice Chairman
Electric Power Research Institute Task Force on Environment
North Carolina Wildlife Resources Commission--Striped Bass Steering Committee
University of North Carolina--Water Resources Research Institute--Advisory Committee

VIII. Certification

Certified Fisheries Scientist--American Fisheries Society

IX. Current Responsibilities

As the Manager of the Environmental Technology Section, I am responsible for the formulation and implementation of a broad variety of biological and scientific programs necessary to identify and quantify actual and potential environmental impacts associated with the construction and operation of fossil, hydro, and nuclear power plants. Responsibilities include providing (1) reports to various regulatory agencies identifying the environmental impacts related to Company operations and (2) special technical expertise to the Company in support of various Company activities. This expertise is provided by a staff of 47 professional engineers and scientists and 37 technicians. Working in four laboratories at the Harris Energy & Environmental Center, this staff provides support in materials sciences, analytical chemistry, air quality, and biological areas.

As Manager - Environmental Technology, I am also responsible annually for the planning and development of the annual operations and maintenance and construction budgets for the section. I modify the scope of the budget as required to ensure that required programs are adequately funded and contingency funds are available for anticipated studies for the ensuing year. The budget for 1982 is over $4 million.

Regulatory requirements are the basis for most environmental programs and studies conducted by the section. Satisfactory Company compliance with these requirements, at minimum cost, requires frequent and positive interaction with these regulatory agencies. The Manager - Environmental Technology maintains close working relationships with the Environmental Protection Agency, the United States Fish & Wildlife Service, the National Marine Fisheries Service, the Nuclear Regulatory Commission, and various divisions of the North Carolina Department of Natural & Economic Resources and the South

Carolina Department of Health & Environmental Control to achieve satisfactory compliance.

As Manager - Environmental Technology, I am challenged to identify, as early as possible, potential problems and/or opportunities in Company environmental compliance; to analyze and evaluate compliance alternatives considering not only ecology but also engineering, construction, generation, legal opinions, and regulatory behavior; and to effectively manage the inherent potential for misunderstood communications between biologists and engineers.

X. Publications and Technical Reports

Hogarth, W. T. and W. S. Woolcott. 1966. The Mountain Stripeback Darter, Percina notogramma montuosa, N. sap. from Upper James River, Virginia. Chesapeake Science, 7(2):101-109.

Merriner, J. V., W. T. Hogarth and W. A. Foster. 1970. Occurrence of the Common Snook, Centropomus undecimalis (Block) (Pisces-Centropomidae) in North Carolina waters. The Journal of the Elisha Mitchell Scientific Society. 86(4):194-195.

Hassler, W. W., W. T. Hogarth and L. L. Liner, III. The status and abundance of the Striped Bass in the Roanoke River, North Carolina, for 1966.

Hassler, W. W., W. T. Hogarth, L. L. Liner, III and H. S. Millsaps, Jr. The status and abundance of the Striped Bass in the Roanoke River, North Carolina, for 1967.

Hassler, W. W., W. T. Hogarth and C. R. Stroud, Jr. The status and abundance of the Striped Bass in the Roanoke River, North Carolina, for 1968.

Hassler, W. W. and W. T. Hogarth. The status, abundance, and exploitation of the Striped Bass in the Tar River, North Carolina, for 1969.

Hassler, W. W., W. T. Hogarth and C. S. Manooch. The status, abundance, and exploitation of the Striped Bass in the Roanoke River and Albemarle Sound, North Carolina, for 1970.

Hassler, W. W., W. T. Hogarth and C. S. Manooch. The status, abundance, and exploitation of the Striped Bass in the Roanoke River and Albemarle Sound, North Carolina, for 1971.

Hassler, W. W., W. T. Hogarth and C. S. Manooch. The status, abundance, and exploitation of the Striped Bass in the Roanoke River and Albemarle Sound, North Carolina, for 1972.

Hassler, W. W. and W. T. Hogarth. 1977. The growth and culture of Dolphin, Coryphaena hippurus, in North Carolina. Acquaculture, 12 (1977).

Hogarth, W. T. Biology of the Wahoo, Acanthocybium solandri, off the North Carolina coast (in preparation).

Schwartz, Frank J., W. T. Hogarth and M. L. Weinstein. Marine and freshwater fishes of the Cape Fear Estuary, North Carolina, and their distribution in relation to environmental factors. Brimleyana No. 7:17-37. July 1981.

Manooch, Charles S. III, and W. T. Hogarth. Stomach contents and giant Nematodes from wahoo, Acanthocybium solanderi, collected along the South Atlantic and Gulf coasts of the United States. Bulletin of Marine Science, 33(2):197-212, 1983.

XI. Reports Responsible for at Carolina Power & Light Company

Impingement Report--Brunswick Steam Electric Plant. January 1974-January 1975.

Brunswick Steam Electric Plant Borrow Pit Studies. 1975.

H. B. Robinson 316 (a) and (b) Demonstration. 1976.

H. F. Lee 316 Demonstration. 1978.

Cape Fear 316 Demonstration. 1977.

Brunswick Steam Electric Plant--Cape Fear Studies. A 20-volume report set on the effects of the operation of the once-through cooling system on the Cape Fear Estuary aquatic populations.

Bioassay Studies--Roxboro Steam Electric Plant.

Trace Element Studies--CP&L System.

Many other reports concerned with site selection studies and biological monitoring programs.

Exhibit B

CP&L

Carolina Power & Light Company

July 10, 1981

Mr. J. P. O'Reilly
Region II
United States Nuclear Regulatory Commission
101 Marietta Street, NW
Atlanta, Georgia 30303

SHEARON HARRIS NUCLEAR POWER PLANT
UNIT NOS. 1, 2, 3, AND 4
DOCKET NOS. 50-400, 50-401, 50-402, AND 50-403
IE BULLETIN 81-03

Dear Mr. O'Reilly:

As requested by IE Bulletin 81-03, "Flow Blockage of Cooling Water to Safety System Components by Corbicula sp. (Asiatic Clam) and Mytilus sp. (Mussel)," Carolina Power & Light Company has evaluated the problem and its applicability to the Shearon Harris Nuclear Power Plant (SHNPP). It has been determined that the potential for biofouling exists since the Asiatic clam is present in the vicinity of the station. The results of seven consecutive years of field biological monitoring programs indicate Corbicula fluminea is present in the Cape Fear River. Corbicula fluminea has also invaded portions of Buckhorn Creek, which is the primary water source for the main reservoir. At present, field observations indicate that these clams inhabit areas of Buckhorn Creek downstream of the main dam. There is no indication that the clams are present in any area of the main reservoir nor are they present in any inflowing headwater streams.

The mussel (Mytilus sp.) does not inhabit any local environments and is probably restricted to coastal habitats which begin many river-miles downstream from the SHNPP.

Corbicula fluminea is expected to eventually be introduced into the Shearon Harris Reservoir; however, any introduction of clams should be detected by the ongoing benthic macroinvertebrate monitoring program. Once a clam population is detected in the reservoir, macroinvertebrate monitoring efforts will be increased in the area of plant intake structures. This monitoring will determine clam population dynamics including spawning periods and organism densities. These studies will give a clear indication of potential biofouling problems due to high clam densities near plant intake structures. At that time, power plant personnel will be informed that the potential for biofouling exists.

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Since at present SHNPP is still in the construction phase and there is no indication that the clams inhabit the reservoir, a control program other than environmental monitoring has not yet been finalized. Several control measures are being evaluated and upon detection of Corbicula fluminea in the reservoir, any protective actions deemed to be necessary will be acted upon.

If you have any further questions on this subject, please contact our staff.

Yours very truly,

E. E. Utley
Executive Vice President
Power Supply and
Engineering & Construction

ONH/jc (N#64)

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

Mr. E. Licitra (NRC)

E. E. Utley, having been first duly sworn, did depose and say that the information contained herein is true and correct to his own personal knowledge or based upon information and belief.

Franklin Murray
Notary Public

My commission expires: October 4, 1981

FRANKLIN MURRAY
NOTARY PUBLIC
WAKE COUNTY, N. C.

COPY

Exhibit C

CP&L

Carolina Power & Light Company

MAR 25 1983

SERIAL: LAP-83-86

Mr. James P. O'Reilly, Regional Administrator
United States Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 3100
Atlanta, GA 30303

SHEARON HARRIS NUCLEAR POWER PLANT
UNIT NOS. 1 AND 2
DOCKET NOS. 50-400 AND 50-401
IE BULLETIN NO. 81-03

Dear Mr. O'Reilly:

As requested by IE Bulletin No. 81-03, "Flow Blockage of Cooling Water to Safety Components by Corbicula sp. (Asiatic Clam) and Mytilus sp. (Mussel)," dated December 10, 1982, and in accordance with the schedule set forth in our February 8, 1983 letter, Carolina Power & Light Company hereby submits, in the attachment to this letter, responses to the requested additional information for the closing of the issue.

If you have any further questions on this subject, please advise.

Yours very truly,

Original Signed By
WALTER J. HURFORD
W. J. Hurford
Manager
Technical Services

PS/mag (6436PSA)
Attachment

cc: Mr. N. Prasad Kadambi (NRC)
Mr. G. F. Maxwell (NRC-SHNPP)
Mr. J. P. O'Reilly (NRC-RII)

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bcc: Mr. H. R. Banks
Mr. D. L. Bensinger
Mr. C. S. Bohanan
Mr. J. R. Bohannon
Mr. C. Carmichael (2)
Mr. N. J. Chiangi
Mr. A. B. Cutter
Dr. T. S. Elleman
Mr. G. L. Forehand
Mr. J. F. Garibaldi (Ebasco)
Dr. W. T. Hogarth
Dr. J. D. E. Jeffries
Mr. I. A. Johnson
Mr. L. I. Loflin
Mr. R. L. Mayton, Jr.
Mr. S. McManus
Mr. C. H. Moseley, Jr.
Mr. R. M. Parsons
Mr. J. J. Sheppard
Mr. Sheldon D. Smith
Mr. M. A. Weaver (Westinghouse)
Mr. J. L. Willis
Mr. R. C. Yates
Mr. T. A. Baxter (Shaw, Pittman, Potts & Trowbridge)
File: HI/A-2D
File: H-X-0550

REQUEST FOR ADDITIONAL INFORMATION

IE BULLETIN NO. 81-03

1.(4A) No discussion of instrusion potential if and when Corbicula sp. becomes established in reservoir. Please assess and respond.

If and when Corbicula sp. becomes established in the Harris main and/or auxiliary reservoirs, the potential will exist for adults, larvae, and shells to be entrained into the service water and fire protection systems of the SHNPP. However, various design and operating conditions are expected to reduce the probability of flow reduction or blockage to safety system components by Corbicula sp.

No flow reduction or blockage problems are expected to result in the normal Service Water System (SWS). This system is designed to withdraw service water from the closed-loop Circulating Water System (CWS) at the cooling towers. Because the physical and chemical climate of the cooling towers will be unfavorable to Corbicula sp. habitation; and because the service water is designed to be chlorinated to maintain a 0.5 ppm residual chlorine concentration at the heat exchanger outlet, Corbicula sp. intrusion of the SWS is not probable.

The Emergency Service Water System (ESWS) will withdraw water from the auxiliary reservoir or, if that source is unavailable, from the main reservoir. From either source, the emergency service water will be pumped to the normal SWS. Because the ESWS pumps will be operated monthly, no accumulation of silt or Corbicula sp. will occur in the ESWS pipelines from the intake structure to the junction with the normal SWS. Corbicula sp. does not attach, so any young adults that grow from larvae that settle there will be flushed through the system before growing large enough to reduce or block service water flow.

The greatest potential for flow reduction or blockage in the SWS will result from the accumulation of silt and Corbicula adults and/or shells in the ESWS pump suction bays behind the travelling screens. The travelling screens with a mesh size of 3/8" will prevent other adults or shells from entering the ESWS intake bays. If significant buildups occur, the adults or shells would be picked up by the ESWS pumps suction; however, 1/16" self cleaning strainers are located at the discharge of the ESWS pumps to preclude passage into the ESWS. Two factors which may reduce the likelihood of high Corbicula sp. densities in the intake bays are the water depth and the monthly operation of the service water pumps. At normal water level, the depth at the ESWS intakes on the auxiliary reservoir and main reservoir will be 60 feet and 30 feet, respectively. Low oxygen levels at these depths during summer months should inhibit occurrence and growth of Corbicula sp. The monthly operation of the ESWS pumps should minimize the buildup of silt in the intake bays thus minimize favorable substrate for Corbicula larvae to settle and grow into adults.

The potential intrusion by Corbicula sp. into the Fire Protection System (FPS) may be possible by makeup of water containing larvae. The larvae could settle in low points of the system where they may grow into adults. Also, as described for the ESWS, Corbicula adults and/or shells would be entrained from possible accumulations behind

travelling screens at the intake bays on the auxiliary reservoir. Any adults or shells that enter or develop in the FPS could then reduce or block flow through small pipes, valves, or sprinklers. Because the FPS pumps will be operated weekly for testing and because portions of the system will be flushed as often as quarterly; Corbicula larvae, and possibly adults and shells, would be entrained.

1.(4b) No information provided regarding planned control or detection methods. Please respond and describe inspection procedures and control technology under consideration.

Because the potential for Corbicula sp. intrusion of the SWS, ESWS, and FPS exists, the following inspection procedures and control measures will be planned:

SWS and ESWS

a. During normal refueling outages, selected service water heat exchangers will be inspected for the presence of Corbicula sp.

b. The SWS will be chlorinated as described in 1.(4a) above if Corbicula sp. or other biofouling is suspected or found in the SWS.

c. Once Corbicula sp. are found in the reservoir during regular environmental monitoring of the benthic macroinvertebrate populations, periodic sampling of the intake bays behind the travelling screens will be initiated.

d. If significant densities of adults or accumulation of shells are found in the intake bays, periodic treatment of the bays with oxygen scavenging chemicals [e.g., sodium-metabisulfate ($Na_2S_2O_5$)] will be initiated as required to control the Corbicula sp.

FPS

a. Low-point blowdown drains will be used to periodically inspect the FPS for evidence of Corbicula sp.

b. Once Corbicula sp. are known to inhabit the auxiliary reservoir, chlorination units will be installed at the intake pumps. Chlorine would be injected consistent with pump operation.

c. When Corbicula sp. are found in the auxiliary reservoir, the FPS intake bay behind the travelling screens will be inspected and treated as described for the ESWS intakes in (c) and (d) above.

2.(4b) No information provided regarding status of construction. Please respond and, if any systems have been filled, describe inspection procedures and results.

All fire protection systems have been filled and pressurized as needed to protect equipment already installed. With the exception of fire protection, no piping associated with those systems of interest

are presently filled at SHNPP. These systems may be filled for hydrostatic testing as early as May of 1983, and subsequently be flushed, drained, and thoroughly inspected no earlier than January 1984.

3.a Provide last sampling date and results.

Quarterly sampling of the benthic community developing in the Harris Reservoir was conducted during February, May, August, and November 1982. No Corbicula sp. were found in any of the samples collected indicating that the clams are not in the main reservoir.

Sampling planned for 1983 will include two new stations. One will be in the main reservoir near the mouth of the cooling tower makeup intake channel, and the other will be in the auxiliary reservoir near the mouth of the emergency service water intake channel.

3.e See 1.(4b) above for planned corrective and preventive actions.

(6436PSA mag)