UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	Docket Nos. 50-443 OL-01
PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, et al.	)	50-444 OL-01
	)	On-site Emergency Planning and Safety Issues
(Seabrook Station, Units 1 and 2)	)	

AFFIDAVIT OF NORMAN WAGNER

I, Norman Wagner, being first duly sworn, hereby affirm that the responses to the questions set forth herein are correct to the best of my knowledge and belief:

Q1: Mr. Wagner, by whom and in what capacity are you employed?

A1: I am employed by the Nuclear Regulatory Commission as a Reactor Systems Engineer in the Plant Systems Branch of the Division of Engineering and Systems Technology.

Q2: Have you prepared a statement of your professional qualification?

A2: Yes, a statement of my professional qualifications is attached as an exhibit to this affidavit.

Q3: Mr. Wagner, what is the purpose of your affidavit?

A3: My affidavit relates to the question whether NECNP's Contention IV raises issues which must be resolved prior to the reauthorization of low power (5% rated power) operations at the Seabrook Station. My response discusses the cooling systems which might be affected by aquatic organisms or debris. The methods to be employed by Applicants to detect and prevent blockage resulting from intrusion of marine species or debris are discussed in the affidavit of my colleague, Dr. Michael Masnik.

Q4: Mr. Wagner, NECNP Contention IV states:

> The Applicant must establish a surveillance and maintenance program for the prevention of the accumulation of mollusks, other aquatic organisms, and debris in cooling systems in order to satisfy the requirements of GDC 4, 30, 32, 35, 36, 39, and 39, which require cooling systems. The design, construction, and proposed operation of Seabrook fail to satisfy these requirements.

Please explain which, if any, cooling systems may be affected by the direct infiltration of mollusks, other aquatic organisms, or debris.

A4: Only two cooling systems might be affected by the infiltration of aquatic organisms or debris: the station service water (SW) and the circulating water (CW) system. The function of the service water (SW) system is to remove heat from various sources in the plant and to transfer that heat to the ultimate heat sink (the Atlantic Ocean or the Cooling Tower). The circulating water (CW) system provides cooling water to the main condensers in order to transfer rejected heat to the Atlantic Ocean. The CW system, however, is not needed

or used to shut the plant down in the event of an emergency, and thus is not a "safety-related" system.

Q5: Are the service water and circulating water systems necessary from the viewpoint of plant safety?

A5: As my answer to the previous question indicates, only the SW system is a safety-related one. This is because during normal operations the SW system provides cooling water to both safety-related and non-safety related systems; during operation after an accident the SW system supplies water only to safety-related systems designed to mitigate the course of an accident and to shut the plant down. The CW system, however, is not required for accident mitigation or for plant shutdown following an accident. Thus, it is a non-safety related system.

Q6: Mr. Wagner, please explain how Applicants plan to control biofouling, i.e. fouling of by marine species, of the SW and CW systems?

A6: As documented in the Seabrook Final Safety Analysis Report (FSAR), Applicants intend to inject sodium hypochlorite (NaOCL) into the intake tunnel and intake transition structure of the service water and circulating water systems. As Mr. Masnik explains in his affidavit, the injection of NaOCL will destroy any marine species and thus should prevent intrusion of those species into either the SW or

CW cooling systems. In addition, Applicants may align the circulating water system so that hot condenser water is discharged into the intake tunnel if such action appears to be necessary to prevent biofouling.

Q7: Mr. Wagner, how likely is it that debris will intrude into the service water system?

A7: Debris is unlikely to enter the service water system because the three inlet tunnels to the system are located approximately 50-60 feet below mean sea level. Only in the event of a great storm could the bottom be churned up so as to cause sand and other debris to be lifted up and possibly admitted into an inlet tunnel.

The reason this is unlikely to occur is because most such debris would settle at the bottom of the 3 mile long inlet tunnel and at the bottom of the inlet structure at the end of the inlet tunnel. Any remaining debris most likely would be trapped by the travelling screens in the service water pump house which are capable of screening out objects as small as 3/8 inches square. In addition, the basket type strainers located within the SW system are capable of screening out objects larger than 3/8 inches in size and thus should prevent the fouling of any of the heat exchangers in the SW system.

In addition to the foregoing, the Seabrook Station is designed to enable the operators to monitor service water pump discharge header

pressure, primary component cooling water (PCCW) heat exchanger temperatures, and PCCW flow rates. This capability allows operators to ascertain any degradation of heat exchanger capability resulting from any fouling of the system caused by debris and to take prompt corrective action in the unlikely event that degradation of the system of sufficient magnitude warrants such action.

Finally, as described more fully in the Affidavit of Winthrop E. Leland, who is the Chemistry and Health Physics Manager at the Seabrook Station, the system flow resistance for each SW train is checked at least 4 times each year (quarterly) when the SW pump surveillance tests are conducted. Further, according to Mr. Leland, all service water heat exchangers are on line and are monitored during these tests and the SW pump differential pressure is verified to remain within an acceptable band for the required flow rate. I agree that these action further minimize the possibility that the SW system will experience any degradation caused by the infiltration of debris.

Q8: Mr. Wagner, will the intrusion of debris prevent safe operation of the Seabrook plant, Units 1 and 2 at the power level of 5%?

A8: No. The means by which debris is prevented from entering the Seabrook SW system and the surveillance techniques used to determine intrusion of debris into the SW systems described above are sufficient to permit safe operation of the Seabrook Plant, Units 1 and 2, not only for low power operations, but for full power operations as well.

Q9: Mr. Wagner, is the chlorination method which Applicants propose to employ to prevent the accumulation of aquatic organisms in the service water system adequate to permit safe operation of the Seabrook Plant, Units 1 and 2, at a power level of 5%?

A9: My review of Applicants' intake chlorination and distribution system indicates that it has been designed to permit safe operation of the Seabrook Station at either full or low power level and I am unaware of anything which would suggest that this system will not perform as intended at either 5 percent or 100 percent power level.

Q10: Mr. Wagner, does this complete your affidavit?

A10: Yes it does.

Norman Wagner

Norman Wagner

Sworn to and subscribed before me
this 12 th day of January 1988:

Elaine C. Demeritt

My Commission expires: July 1, 1990

My name is Norman Wagner, my education and experience are as follows:

1. Education
   a. Bachelor of Chemical Engineering
      CCNY, 1948
   b. Master of Science
      Univ. of Cincinnati, 1952
   c. Miscellaneous courses in nuclear engineering at:
      (1) Columbia University, circa 1956
      (2) Knolls Atomic Power Lab,circa 1960
      (3) Nuclear Regulatory Commission
         a. BWR Basic - circa 1980
         b. PWR (CE) Basic - 1987

2. Experience

   a. Nuclear Regulatory Commission - 1975 to present
   b. Knolls Atomic Power Laboratory (GE) - 1959-62, 1971-1975
   c. Atomic Power Dev. Associates (Fermi-1) 1964-1969
   d. United Nuclear Corp. 1962-1964
   e. Columbia University - Heat Transfer Laboratory - 1955-58
   f. Job Shopper
      1. 1969-70 Curtis Freight Corp.
      2. 1970 Westinghouse Electric Corp.
   g. Miscellaneous Positions - not in nuclear field prior to 1955

In both the positions with Knolls Atomic Power Lab., I was involved with testing of nuclear reactor components. While with the United Nuclear Corp., I was a member of the team designing a fast reactor core for a liquid-metal cooled reactor. While with Columbia University, I managed a group of engineers and technicians involved in heat transfer research for nuclear reactors. This task group designed test equipment and performed the testing. At Atomic Power Dev. Assoc., I analyzed components and had repairs and modifications made as needed for Fermi 1, a sodium-cooled reactor. Since coming to the Nuclear Regulatory Commission, I have been involved in reviewing licensee's proposed reactor system and plant system designs to assure their compliance with applicable criteria. In this position, I became aware of the potential for biofouling of open-cycle cooling systems and the problems that result from such biofouling.