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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 )  
MUNICIPAL POWER AGENCY )

Docket Nos. 50-400 OL  
50-401 OL

(Shearon Harris Nuclear Power Plant, )  
Units 1 & 2) )

AFFIDAVIT OF C. S. HINNANT

County of Wake )

State of North Carolina )

SS:

C. S. Hinnant, being duly sworn according to law, deposes and says:

1. I am employed by Carolina Power & Light Company ("CP&L") as Manager, Start-up. My business address is Shearon Harris Nuclear Power Plant, Box 165, New Hill, South Carolina 27562-0165. A statement of my background and qualifications is affixed hereto as Attachment A. I have a B.S. degree in electrical engineering and extensive professional experience in the area of nuclear power plant construction, operation, and start-up. I have personal knowledge of the matters stated herein and believe them to be true and correct.

2. This affidavit is made in support of Applicants' Motion for Summary Disposition of Eddleman Contention 45.

3. The purpose of this affidavit is to address that aspect of Eddleman Contention 45 that may be deemed to question the adequacy of Applicants' testing of the main steam, the feedwater and the ECCS systems and their components relative to water hammer prior to commercial operation of SHNPP.

4. In this affidavit I will (a) describe Applicants' Initial Test Program and its objectives and (b) show that that testing program is adequate to verify all aspects of the design of the main steam, feedwater and ECCS systems and their components including those aspects of design specifically relevant to water hammer.

5. Applicants' Initial Test Program is described in detail in Chapter 14 of the Shearon Harris Nuclear Power Plant (SHNPP) Final Safety Analysis Report (FSAR) in accordance with 10 CFR § 50.34(b)(6)(iii). The Initial Test Program meets the requirements of 10 CFR Part 50, Appendix B, Section XI and NRC Regulatory guide 1.68.

6. The Initial Test Program is conducted in three sub-programs: the Component Testing and Initial Operation Program; the Preoperational Test Program; and the Start-up Power Test Program. FSAR Section 14.2.i.2.

7. The primary objective of the Component Testing and Initial Operation Program is to satisfy all prerequisites to preoperational testing of each particular system. This program includes such tests and checks as instrument calibration, electrical continuity and megger checks as necessary, pump and motor rotation and vibration checks, hydrostatic testing, cleaning, and flushing.

8. The Preoperational Testing Program begins upon completion of component testing and includes successful completion of hot functional testing of the Reactor Coolant System. The primary objective of this program is to verify that equipment and systems perform in accordance with design and safety requirements. The preoperational tests which will be performed are described in FSAR Section 14.2.12.

9. The Start-up Power Test Program begins with initial core loading and encompasses initial criticality, zero power operation and ascension to full power and the 100-hour warranty run. The objectives of this program are to verify nuclear parameters of the reactor; to verify that the plant will operate without endangering the public health and safety; and to detect any design deficiencies of any plant equipment or systems.

10. Chapter 14 of the FSAR currently lists 81 preoperational test abstracts and 31 Start-up test abstracts. To implement these abstracts, Applicants will prepare approximately 150 preoperational test procedures and 115 Start-up test procedures.

11. Preoperational test procedures to carry out each preoperational test are prepared by the appropriate SHNPP start-up engineer who draws from the system/component design documents, the FSAR, architect-engineer design criteria, applicable codes and standards and NRC Regulatory Guides in this effort.

12. To ensure that preoperational test procedures and test results in fact demonstrate the capability of each system to perform its design basis, all procedures and results must be reviewed and approved unanimously by a Joint Test Group (JTG). The JTG includes a representative from the Start-up Group, the Operations Group, and the Nuclear Plant Engineering Department.

13. Start-up Power Tests are prepared by the SHNPP Start-up Group in accordance with specifications provided by Westinghouse, the NSSS supplier where applicable.

14. Start-up Power Test procedures and test results are reviewed and recommended for approval by representatives of the Start-up Group, Westinghouse, as appropriate, and the Nuclear Safety Review Committee. The procedures and test results must be approved by the SHNPP Manager-Operations.

15. Preparation of preoperational test procedures began approximately 36 months prior to fuel loading. It is our objective to have each procedure available for review at least 60 days prior to the date of its scheduled use. We intend to have start-up procedures available for review at least 60 days prior to fuel loading.

16. The entire Initial Test Program is designed to provide assurance that SHNPP can be operated in accordance with design requirements and technical specifications by satisfying the following objectives:

- (a) To provide assurance that each system's performance is in accordance with the design;

- (b) to train and familiarize plant operating and technical personnel in the operation of the facility; and
- (c) to assure to the extent practical that plant operating and emergency procedures are adequate.

17. As stated in Section 11 of the SHNPP Start-up Manual, the purpose of a preoperational test is to provide a safe and systematic method of demonstrating and documenting that plant equipment and systems perform as designed.

18. This purpose is accomplished through:

- (a) Verification of automatic operation of instrumentation, switches and system operation logic;
- (b) verification of pump operation, flowrate, design head and performance curve; and
- (c) verification that operations specific to the system occur properly.

19. There are no NRC regulations or regulatory guides which specifically require preoperational testing for water hammer.

20. It is inherent in the nature of a preoperational test, however, that any abnormal system conditions, such as water hammer, will be revealed to the test engineer. The testing program provides ample opportunity to observe the operation of systems in all modes in which water hammer events resulting from system design configuration might occur.

21. In addition, Applicants' approach to Initial Testing is conducive to detecting any design deficiency, including one that could lead to water hammer, because all testing is directed and performed by test teams composed of personnel with diverse areas of experience including operating staff, start-up engineers, plant operators and maintenance personnel.

22. In addition, preoperational tests supporting FSAR test abstracts 14.2.12.1.25 (Safety Injection System Performance), 14.2.12.1.26 (Hi-Head Safety Injection System Check Valve), 14.2.12.1.27 (Safety Injection Accumulator), 14.2.12.1.34 (Auxiliary Feedwater System), 14.2.12.1.50 (Main Steam System) and 14.2.12.1.51 (Feedwater System) specifically consider the possibility of abnormal events such as water hammer. Start-up test Summary 14.2.12.1.31 address the problem of Condensation Induced Water Hammer in the steam generators during plant operation. The specific procedures supporting these test abstracts are under preparation and will be available for review as stated in paragraph 15 of this affidavit.

23. In the event that an abnormal condition or design deficiency is detected during testing, the test engineer will participate in necessary corrective actions in accordance with the SHNPP Start-up Manual.

24. In summary, the Initial Test Program described in the FSAR and in this affidavit and as implemented by Applicants is established to ensure that all equipment and systems at SHNPP will perform in accordance with their design bases, including those relevant to water hammer and to detect any design deficiencies that may exist. This program is consistent with the requirements of Section XI of 10 CFR Part 50, Appendix B. It is my judgment that the Initial Test Program is entirely adequate to verify all design aspects of the main steam, feedwater and ECCS systems and their components relative to water hammer.

C. S. Hinnant  
C. S. Hinnant

Subscribed and sworn to  
before me this 25<sup>th</sup>  
day of May, 1984.

Lane P. Hunt  
Notary Public

My Commission Expires: 2-13-88

TABLE 13.1.3-2

Clayton Scott Hinnant  
Superintendent - Startup & Test

Education & Training

- A. BS Degree in Electrical Engineering - North Carolina State University, 1968.
- B. Nuclear Orientation and Basic Nuclear Reactor Theory - Newport News Shipbuilding, Atomic Power Division, January, 1969.
- C. Undergraduate courses required for Masters in Business Administration Program - Christopher Newport College, June, 1971.
- D. Graduate Work - College of William and Mary, January, 1972.

Professional Societies

Institute of Electrical and Electronics Engineers  
American Nuclear Society

Experience

- June 1962 - Television Repairman - Kyle Radio and Television, Lucama, NC
- June 1968 - Engineer - Newport News Shipbuilding and Drydock, Electrical Design Section - Newport News, VA
- October 1972 - employed as an Electrical Engineer in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC
- May 1974 - employed as a Senior Engineer in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC
- July 1974 - employed as Startup and Test Supervisor in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC
- April 1975 - employed as Maintenance Supervisor in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC
- May 1976 - employed as Engineering Supervisor I in the Nuclear Generation Section of the Bulk Power Supply Department, Southport, NC
- July 1976 - employed as an Engineer at Babcock and Wilcox, Lynchburgh, VA
- September 1977 - employed as Project Engineer - Electrical in the Nuclear Construction Section of the Power Plant Construction Department. Located at the Harris Site, New Hill, NC

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TABLE 13.1.3-2 (Cont'd)

Clayton Scott Hinnant  
Manager- Startup & Test

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August 1978 - employed as Principal Engineer - Electrical in the Nuclear Construction Section of the Power Plant Construction Department. Located at the Harris Site, New Hill, NC

August 1979 - employed as Resident Engineer - Electrical in the Harris Site Management Section of the Power Plant Construction Department. Located at the Harris Site, New Hill, NC

February 1981 - employed as Superintendent - Startup & Test in the Harris Plant Section of the Nuclear Operations Department.

August 1982 - employed as Manager - Startup and Test in the Harris Plant Section of the Nuclear Operations Department.

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