January 11, 1990

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
GEORGIA POWER COMPANY, et al.	)	Docket Nos. 50-424
	)	50-425
(Vogtle Electric Generating Plant, Units 1 and 2)	)	ASLBP No. 90-617-03-OLA
	)	
Facility Operating License No. NPF-68 Amendment No. 31, July 10, 1990 and Facility Operating License No. NPF-81 Amendment No. 11, July 10, 1990	)	

AFFIDAVIT OF PATRICK M. MADDEN

REGARDING HIGH JACKET WATER TEMPERATURE TRIP BYPASS

I, Patrick M. Madden, having first been duly sworn, hereby depose and state as follows:

1. I am employed as Senior Fire Protection Engineer, Plant Systems Branch, Division of Systems Technology, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, D.C.

I attended Oklahoma State University, Stillwater, Oklahoma, and received a B.S degree in Fire Protection and Safety Engineering Technology in 1976.

In my present position, I am responsible for reviewing and evaluating nuclear power plant fire protection programs and the effects of fire and fire suppression systems on the structures, systems and components important to nuclear power plant safety.

In addition, I am responsible for ensuring that these programs are within the limits imposed by NRC rules and regulations. I am the NRC's expert on fire protection issues.

Prior to assuming my current position in August 1990, I was assigned to NRC Region II and held the positions of Senior Reactor Engineer, Resident Inspector, and Fire Protection Engineer/Inspector.

Between 1976 and 1984, I was employed as a Fire Protection Engineer with Bechtel Power Corporation in Gaithersburg, Maryland. In this position, I specialized in nuclear fire protection, 10 CFR 50.48, Appendix R, compliance and the fire effects analysis of safe shutdown capability.

2. On December 17-18, 1990, I went to Vogtle Electric Generating Plant (Vogtle) to participate in a team audit of the plant modification implemented by Design Change Packages 90-V1N0138-0-1 and 90-V2N0166-0-1, By-pass of Diesel Generator High Jacket Water Temperature Trip. The audit focused on the various operating scenarios where bypassing the high jacket water temperature trip on the emergency diesel generators could affect their operation.

3. One of the scenarios identified by Georgia Power Company (Applicants), was associated with a fire in the control room. NRC Standard Review Plan 9.5.1, Fire Protection Program, recommends that alternative shutdown capability independent from the area of concern (i.e., control room) be provided. The Applicants have provided this capability at their Vogtle plant. The "B" remote shutdown panel provides an

alternative method which relies on "B" train shutdown systems to bring the plant to cold shutdown. This alternative shutdown capability is physically and electrically independent from the control room.

In the design of the alternative shutdown capability, I verified that the Applicants considered the guidance of Generic Letter (GL) 86-10, position 5.3.10, Design Basis Transients. Under this guidance, the alternative shutdown capability design, coincident with a loss-of-offsite power (LOOP), should not be adversely affected by any one spurious actuation signal resulting from a fire in any plant area (Note for this scenario the fire is in the control room). From my review of the Applicants' Fire Event Safe Shutdown Evaluation (FESSE) calculation (X4C2301S035), it was assumed that a fire in the control room could cause spurious operation of nuclear service cooling water (NSCW) valves HV-1669A (NSCW to cooling tower return) and HV-1669B (NSCW cooling tower by-pass). The Applicants' FESSE considered that these valves could spuriously close prior to reestablishing valve control from the "B" remote shutdown panel. The spurious closure of these valves coincident with a LOOP could reduce NSCW flow to the "B" emergency diesel generator jacket water heat exchanger. This, along with the assumed auto start of the "B" diesel on the LOOP demand, could have affected the alternative shutdown method. The Applicants' FESSE took credit for the high jacket water trip to protect the diesel. The Applicants did not take credit for the service water flow through the NSCW system relief valve PSV-11766 in their FESSE. This valve is a 8"x10" size. It is

located in the NSCW system at the most remote point just upstream of valve HV-1669B and discharges to the cooling tower basin. This valve provides overpressure protection for the NSCW system and also allows flow through the system to protect the NSCW pumps in the event of spurious closure of valves HV-1669A and HV-1669B. I reviewed the Applicants' calculation X4C1202P03, Rev. 1, NSCW System Overpressure Protection, and verified the relief flow capacity of valve PSV-11766. The Applicants' calculated maximum flow through this valve is 7212 gpm at 130 psi with two pumps in operation.

4. I also reviewed the Applicants' calculation X4C1202S27, Rev. 0, NSCW Temperature to Diesel, using the relief valve flow characteristics under LOOP condition and the steady state heat loads of the auxiliary component cooling water heat exchanger, and verified that the NSCW temperature would not exceed 100°F. In addition, in calculation X4C1202S026, Rev. 0, NSCW Flow to the Diesel, the Applicants verified under reduced NSCW flow conditions that a minimum of 718 gpm service water flow to the jacket w r heat exchanger will be available. The diesel vendor, Cooper Industries, by letter dated July 25, 1990, certified that the diesel engine could operate for a period of 30 minutes with a cooling water flow of 500 gpm at a temperature of 100°F.

5. In reviewing the fire in the control room scenario, I also evaluated the actions associated with regaining control of NSCW valves HV-1669A and HV-1669B. The Applicants use Abnormal Operating Procedure (AOP) 18038-1, Operation From Remote Shutdown

levels, to achieve safe shutdown conditions and to implement their alternative shutdown capability in the event of a control room fire. I reviewed Revision 12 of the Applicants' procedure, and verified that after the diesel generator has restored power to the shutdown buses (if the fire causes a LOOP), the NSCW pumps are immediately started and NSCW flow is verified. The Applicants, using the Vogtle simulator, have run the fire in the control room scenario, requiring the implementation of AOP 18038-1. I reviewed the results of the Applicants' simulation under LOOP conditions (documented in a December 14, 1987, interoffice memorandum between E. J. Kozinsky and J. E. Swartzwelder) and determined that it required 6 minutes and 56 seconds, from the time the control room was evacuated, to fully restore power to the shutdown buses and establish on-site power capability. The capability to start the required NSCW pumps and verify NSCW system flow can be accomplished from the "B" remote shutdown panel. In addition, the control of NSCW valves HV-1669A and HV-1669B is transferred from the control room via transfer switch to the "B" remote shutdown panel. Once the transfer has been completed, these valves, if required, can be repositioned to their shutdown required (open) position.

6. Therefore, based on my review of the additional information and simulation presented to the audit team by the Applicants, I have determined, for the fire in the control room scenario, that the reduced NSCW cooling water flow resulting from the spurious closure of NSCW valves HV-1669A and HV-1669B would not preclude safe shutdown capability. In addition, full NSCW

flow would be restored to the diesel generator in a timely manner (prior to 30 minutes) and the jacket water temperature, under this scenario and reduced NSCW flow condition, would remain within the limits certified by the diesel generator vendor.

The foregoing is true and correct to the best of my knowledge and belief.

PATRICK M. MADDEN

Subscribed and sworn to before
me this 11th day of January, 1991

Notary Public

My commission expires: 12/1/91