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 OL
	)	and 50-425 OL
(Vogtle Electric Generating Plant, Units 1 and 2)	)	

STATE OF GEORGIA
ss
COUNTY OF FULTON

AFFIDAVIT OF STEPHEN J. CEREGHINO
AND WILLIAM V. CESARSKI

Stephen J. Cereghino and William V. Cesarski, being duly sworn according to law, depose and say as follows:

1. (SJC) My name is Stephen J. Cereghino. I am employed by Bechtel Western Power Corporation in the position of Nuclear Engineering Group Supervisor. My business address is Bechtel Western Power Corporation, 12440 East Imperial Highway, Norwalk, California 90650. A summary of my professional qualifications is attached as Exhibit "A" to this affidavit.

2. (WVC) My name is William V. Cesarski. I am employed by Westinghouse Electric Corporation in the position of Senior Engineer in the Equipment Qualification

Department of the Generation Technology Services Division. My business address is Westinghouse Electric Corporation, R&D Center - Building 701, 1310 Beulah Road, Pittsburgh, Pennsylvania 15255. A summary of my professional qualifications is attached as Exhibit "B" to this affidavit.

3. (SJC, WVC) The purpose of our affidavit is to respond to the Atomic Safety and Licensing Board's letter of October 24, 1986, which asked for some additional information pertaining to the environmental qualification of ASCO solenoid valves. The Licensing Board's letter inquires into two areas: (1) the temperature margins in the qualification of three specified types of ASCO solenoid valves qualified by thermal lag analysis; and (2) the normal ambient and fluid temperatures recommended in ASCO specification sheets. We have personal knowledge of the information presented herein and believe it to be true and correct.

I. Margins

4. (SJC, WVC) The Licensing Board's letter identifies three models of ASCO valves qualified in certain instances by thermal lag analysis -- the model NP-8316 valve, the model NP-8320 valve, and the model NP-8321 valve. Each is discussed in turn below.

A. The Model NP-8316 Valve

5. (SJC, WVC) As noted in the Applicants' Testimony of George J. Baenteli, *et al.*, ff. Tr. 517, at page 54,

model NP-8316 solenoid valves are used in safety-related applications at VEGP both inside and outside containment. Outside containment, only one NP-8316 valve is located in a main steam isolation valve (MSIV) area, and it performs no safety-related function for any steam line or feed line break in the MSIV area. At the time of the Licensing hearing, a Westinghouse thermal lag analysis was used to qualify model NP-8316 ASCO valves for applications inside the VEGP containment. In this analysis, a Westinghouse generic main-steam-line-break/loss-of-coolant-accident (MSLB/LOCA) profile with a 400°F peak temperature was used to determine the worst case temperature conditions to which the NP-8316 valves used inside containment at VEGP would be exposed under MSLB/LOCA conditions. This approach provided meaningful margin, since the Westinghouse generic MSLB/LOCA profile was known to be at least 40°F greater than Vogtle specific MSLB/LOCA conditions. This 40°F margin considerably exceeded the 15°F margin recommended by IEEE-323-1974.

6. (SJC, WVC) Subsequent to the hearing, a Vogtle-specific MSLB/LOCA profile was derived following the methodology of NUREG-0588. *See* NUREG-0588, Appendix B, "Methodology to Determine the Containment Environment Response." This Vogtle-specific MSLB/LOCA profile has a 320°F peak temperature. *See* Letter from R. Conway to H. Denton (October 24, 1986) (transmitting *inter alia* revised FSAR Figure 3.11.B.1-1, sheet 9 of 12). Thus, the Westinghouse generic

MSLB/LOCA profile that was used in performing the thermal lag analysis for model NP-8316 valves used inside containment in fact had an 80°F margin. Moreover, the current Vogtle-specific MSLB/LOCA profile now obviates the use of thermal lag analysis for the NP-8316 valve. The peak in-containment MSLB/LOCA temperature is 26°F less than the qualification temperature of the model NP-8316 established in the Isomedix qualification testing.

7. (WVC) The Licensing Board's letter asks what is the precision or uncertainty of the cited temperature. The 346°F qualification temperature in the Isomedix qualification program was determined by actual thermocouple measurement and should be accurate to one degree. The temperature profiles and the temperature computed by thermal lag analysis have not been assigned uncertainty values, because they are conservative upper-bound values.

B. The Model NP-8321 Valvve

8. (SJC, WVC) With respect to the model NP-8321 ASCO valve, thermal lag analysis was necessary only for MSIV areas. (See Baenteli, et al., ff. Tr. 517, at 56-57.) Before the hearing, the Westinghouse Owner's Group had released generic mass and energy release data for main steam line breaks with superheated blowdown outside containment. WCAP-10961, "Steamline Break Mass/Energy Releases for Equipment Environmental Qualification Outside Containment"

(Oct. 1985). The generic data was known to represent conditions more extreme than would occur at VEGP. This generic data was used to determine pressure, temperature, and velocities in the VEGP MSIV areas. A thermal lag analysis using the modeled parameters produced a peak valve temperature of 332°F. The model NP-8321 valve is qualified to a 346°F valve temperature under the Isomedix program. The 14°F difference between the calculated peak temperature and the qualification temperature, coupled with the knowledge that the generic data represented conditions more extreme than would occur at VEGP, provided assurance that the peak valve temperature would in fact be at least 15°F less than the qualification temperature.

9. (SJC, WVC) After the hearing, a Vogtle-specific evaluation of main steam line breaks with superheated blowdown outside containment was performed, and Vogtle-specific mass and energy release data were obtained. These data were then used to recalculate the pressures, temperatures and velocities in the VEGP MSIV areas. The Vogtle-specific data resulted in a calculated, worst case, peak ambient temperature 22°F less than that previously calculated using the Westinghouse generic data. A thermal lag analysis using the revised, worst case, Vogtle-specific MSLB profile produced a peak NP-8321 valve temperature of 326°F, which is 20°F less than the qualification temperature for the valve. This margin exceeds the 15°F margin recommended by IEEE-323-1974.

10. (WVC) Again, no uncertainty values have been assigned to the MSLB profiles or to the temperatures calculated by thermal lag analysis, but these values are conservative upper bounds. As noted in paragraph 6 above, the 346°F qualification temperature determined in the Isomedix qualification program should be accurate to one degree.

C. The Model NP-8320 Valve

11. (WVC) Under the joint ASCO/Westinghouse program conducted in 1982, the model NP-8320 ASCO valve is qualified to the MSLB/LOCA profile shown in Figure 10.5-2 of Applicants' testimony, which has a peak ambient temperature of 420°F. Test Report No. AQR-67368/Rev. 1 (Aug. 19, 1983) (WCAP-8687, Supp. 2, "Equipment Qualification Test Report -- ASCO Solenoid Valves" (Rev. 2, March 1983)). This qualification program has been accepted by the NRC Staff. Testimony of A. Masciantonio, ff. Tr. 576, at 16. The model NP-8320 valve was also qualified earlier to a 346°F valve temperature by Isomedix.

12. (SJC, WVC) Model NP-8320 valves are used in safety-related applications both inside and outside containment, including the MSIV areas. The most extreme conditions to which the NP-8320 valves might be exposed inside containment are easily enveloped by the conditions to which the NP-8320 valves were exposed in the ASCO/Westinghouse qualification testing program, with a margin of approximately 100°F

over the VEGP specific MSLB/LOCA profile shown in FSAR Figure 3.11.B.1-1, sheet 9 of 12 (amend. 27). As we discussed above, at the time of the licensing hearing, Applicants only had a profile for an MSLB outside containment that was based on generic data more extreme than that which would occur at VEGP. This profile contained peak ambient temperatures in excess of 420°F, and it was therefore necessary to demonstrate that actual valve temperatures under MSLB conditions would not exceed qualification temperature. The thermal lag analysis that had been performed on the model NP-8321 was used to accomplish this. The model NP-8320 is similar in weight to and has less surface area than the model NP-8321 valve, and is subject to less severe environmental conditions in the MSIV areas. The thermal lag analysis performed on the NP-8321 valve therefore enveloped the NP-8320, and 332°F was assigned as the peak valve temperature for NP-8320 valves in MSIV areas under worst case MSLB conditions.

13. (WVC) Applicants compared the 332°F peak valve temperature computed by thermal lag analysis against the 346°F qualification temperature derived under the Isomedix program rather than against the 420°F qualification temperature derived under the ASCO/Westinghouse program, because the 346°F Isomedix qualification temperature represents a valve temperature while the 420°F ASCO/Westinghouse temperature is a peak ambient temperature. The maximum peak valve temperature of 332°F calculated by thermal lag analysis

using generic MSLB mass and energy release data is 14°F less than the Isomedix temperature. As explained in paragraph 8 above, the use of generic MSLB mass and energy release data provided assurance that in reality the peak valve temperature would be at least 15°F less than the qualification temperature.

14. (SJC, WVC) The worst-case MSLB profile for pertinent MSIV areas that was calculated after the hearing on the basis of Vogtle-specific mass and energy release data no longer has peaks that exceed the ASCO/Westinghouse qualification temperature profile. The peak ambient temperature is 399°F -- 21°F less than the 420°F qualification temperature. Thus, thermal lag analysis is no longer necessary to qualify NP-8320 valves used in MSIV areas at VEGP. Nevertheless, the thermal lag analysis performed for the model NP-8321 using the revised MSLB profile based upon VEGP-specific release data continues to envelope the model NP-8320. This thermal lag analysis demonstrates that the peak valve temperature of model NP-8320 valves used in MSIV areas at VEGP will not exceed 326°F.

15. (WVC) Once more, the environmental profiles and the values computed by thermal lag analysis have not been assigned uncertainty values, but they are conservative upper bounds. Both the 346°F qualification temperature derived under the Isomedix qualification program and the 420°F temperature derived under the ASCO/Westinghouse program are based on actual thermocouple readings and should be accurate to one degree.

II. Ambient and Working Fluid Temperatures

16. (SJC) The Licensing Board's letter asks why the "working fluid" and "ambient" temperature values on ASCO specification sheets are compatible with VEGP temperature conditions. For all four model ASCO valves used at VEGP, ASCO specifies a maximum working fluid temperature of 180°F. For the model 206-381, NP-8316, and NP-8320 valves, ASCO recommends ambient temperatures up to 140°F; and for the model NP-8321, ASCO recommends ambient temperatures up to 180°F. As discussed below, the working fluid and ambient temperatures for these valves at VEGP will be considerably less than the ASCO specified temperatures.

17. (SJC) The "working fluid" for the ASCO valves at VEGP is instrument air. The VEGP Instrument Air System is designed to provide filtered, dried, and oil-free compressed air to ASCO solenoid valves. After the air is compressed, it passes through after-coolers. The calculated air temperature of instrument air leaving the after-coolers is 105°F.

18. (SJC) Instrument air in ASCO valves in the various areas of the plant may heat up to but cannot exceed the ambient temperatures of those areas. The maximum normal temperatures of plant areas have been calculated and are listed in FSAR Table 3.11.B.1-1 (amend. 27), and the maximum normal temperature in any area containing a safety-related ASCO valve is 120°F. Table 3.11.B.1-1 also lists for each of the plant areas the maximum abnormal temperature that

would exist in the event the Heating, Ventilation, and Air Conditioning (HVAC) System operation were interrupted. The maximum abnormal temperature in areas containing safety-related ASCO valves is 135°F.

19. (SJC, WVC) The maximum ambient temperatures -- and hence the maximum working fluid temperature -- in areas containing safety-related ASCO valves are therefore below the temperatures specified by ASCO. The maximum ambient temperature at VEGP is also below the temperature simulated in the testing by both Isomedix and Westinghouse by thermal aging; thermal aging of the ASCO valves during environmental qualification simulates continuous exposure to 140°F over the qualified life of the valve.

20. (SJC, WVC) If by some unknown mechanism, the ambient or working temperature exceeded specification temperatures, abrupt failure of the valves would not occur. During the thermal aging portion of environmental qualification testing, ASCO valves were subjected to temperatures in excess of 250°F for hundreds of hours, and were periodically cycled during this time. Furthermore, the environmental qualification program has demonstrated that these valves can withstand MSLB/LOCA conditions (including high temperatures) and continue to function for at least a year thereafter.

III. Conclusion

21. (SJC, WVC) For these reasons, we are confident that the ASCO solenoid valves have been environmentally qualified with sufficient margin for use at VEGP, and will function appropriately under normal and accident conditions.

Stephen J. Cereghino
Stephen J. Cereghino

William V. Cesarski
William V. Cesarski

Sworn to and subscribed before me this 28th day of October, 1986.

M. Harrison
Notary Public

Notary Public, DeKalb County, Georgia
My Commission Expires Aug. 14, 1989
(Notarial Seal)

EXHIBIT "A"

STEPHEN J. CEREGHINO

EDUCATION: B.S., United States Naval Academy
Naval Nuclear Power School
Naval Nuclear Power Training Unit
MBA, Business Administration, Whittier College

SUMMARY: 7 Years: Bechtel engineering responsibilities in licensing and systems integration on the Vogtle project.

6 Years: Various training, operational and maintenance responsibilities associated with the naval nuclear propulsion program.

EXPERIENCE: Mr. Cereghino is Project Vogtle's Nuclear Group Supervisor. In this capacity, he provides technical guidance and assistance in the licensing and design of Plant Vogtle. As licensing engineer, he coordinates the inter-discipline activities of project personnel and coordinates with the client, NSSS and NRC personnel to ensure consistent application of licensing commitments. Mr. Cereghino supervises the administration of the NSSS contract, including such activities as: NSSS vendor data review, evaluation of NSSS proposals, and coordination of A/E-NSSS interface activities. In the systems integration area, Mr. Cereghino is responsible for the analytical evaluation of potential plant hazards, such as: radiation, pressure, temperature, flooding, internal missiles and seismic interactions.

Prior to joining Bechtel, Mr. Cereghino was an officer in the United States Navy. His shipboard engineering assignments were as Reactor Controls Officer and Main Propulsion Assistant. He routinely supervised the operation of the reactor plant during all modes of operation, and directed the chemistry control and radiation protection programs for ships company. Mr. Cereghino's last assignment with the Navy was as a Division Director at the Naval Nuclear Power School; as such, he coordinated the instruction of Reactor Principles to enlisted plant operators. Before leaving the Navy, Mr. Cereghino successfully qualified to assume the responsibilities of Chief Engineer of a naval nuclear propulsion plant.

PROFESSIONAL AFFILIATIONS:

Professional Registration: Mechanical Engineering, State of California

EXHIBIT "B"

Summary of Professional Qualifications and Experience

William V. Cesarski

Senior Engineer

Plant Engineering Division
Westinghouse Electric Corporation

My name is William V. Cesarski. My business address is Westinghouse Electric Corporation, R & D Center-Building 701, 1310 Beulah Road, Pittsburgh, Pennsylvania 15235. I am employed by Westinghouse Electric Corporation ("Westinghouse") as a Senior Engineer in the Equipment Technology Department of the Plant Engineering Division.

I graduated from the United States Military Academy in 1964 with a Bachelor in Engineering Science degree. I was awarded an Atomic Energy Commission Graduate Fellowship while at West Point and used the AEC fellowship to obtain a Master of Science Degree in Nuclear Engineering from Massachusetts Institute of Technology in 1966. In 1972 I also received a Master of Science Degree in Industrial Management from New York University. After spending eight years in the U. S. Army, I joined Westinghouse in 1972 as an engineer in the Plant Apparatus Division. While working at WPAD, I obtained experience in nuclear valve and refueling equipment design, testing and procurement for the Naval Nuclear Program. In 1981 I joined the Westinghouse Nuclear Equipment Division and have had lead engineer responsibility for the IEEE qualification testing of numerous NSSS valve and motor components. I have conducted numerous qualification test programs and authored numerous Westinghouse qualification test reports on components such as valve motor operators, valve limit switches, solenoid valves, valve position indication devices, pump motors and pump assemblies. I am presently a Senior Engineer and act as a lead engineer in the Equipment Qualification Technology Department of the Plant Engineering Division responsible for electro-mechanical equipment qualification.

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)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of the Affidavit of Stephen J. Cereghino and William V. Cersarski, dated October 28, 1986, were served upon those persons on the attached Service List by deposit in the United States mail, postage prepaid, or where indicated by an asterisk by hand delivery, this 30th day of October, 1986.

Bruce W. Churchill, P.C.

Dated: October 30, 1986

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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Before the Atomic Safety and Licensing Board

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In the Matter of)
)
GEORGIA POWER COMPANY, et al.) Docket No. 50-424
) 50-425
(Vogtle Electric Generating Plant,)
Units 1 and 2))

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