

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 RALPH E. ARCHITZEL

REGARDING HIGH JACKET WATER TEMPERATURE TRIP BYPASS

I, Ralph E. Architzel, having first been duly sworn, hereby
depose and state as follows:

1. I am employed as Chief of the Special Projects Section,
Plant Systems Branch, Office of Nuclear Reactor Regulation, U.S.
Nuclear Regulatory Commission, Washington, D.C.

I attended the U.S. Naval Academy, Annapolis, Maryland, and
received a B.S. degree with a major in Physics/Applied Science in
1971. I later attended George Washington University and received
a Masters in Engineering Administration in 1983.

In my present position, I direct and supervise personnel
responsible for the regulatory oversight and licensing reviews
for issues relating to fire protection (10 CFR Part 50.48),

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control room habitability, plant ventilation systems, diesel generators, radioactive waste systems, and special projects assigned to the Plant Systems Branch. These responsibilities include review and approval of safety evaluations of licensee submittals involving plant modifications and related changes to the technical specifications issued with each operating license.

Prior to assuming my present assignment in 1988, I led teams of engineers performing inspections of the engineering and design of nuclear power plants. These inspections were multi-discipline in nature and used senior experienced engineers to critically examine detailed aspects of the design/design process at nuclear plants in order to draw conclusions regarding their adequacy.

Prior to 1983, I was assigned as the Senior Resident Inspector at the Calvert Cliffs Nuclear Power Plant. I was responsible for supervising and conducting inspections of operations at this two-unit pressurized water reactor. My previous duty within the NRC prior to 1980 included assignment as a reactor principal inspector for two operating boiling water reactors and several research reactors in the Region I Office. This position was the primary inspection focal point for nuclear power plants before the start of the NRC Resident Inspector program. I also served as a procedures, training, maintenance, and quality assurance inspector while at the Region I Office.

Between 1971 and 1976, I served on board submarines in the U.S. Navy. This service included the supervision of operations, maintenance, and testing of nuclear power plants.

2. I have been requested to review statements concerning the Georgians Against Nuclear Energy (GANE) petition to intervene dated July 23, 1990, and its undated Amendment To Petition For Leave to Intervene. The statements reviewed were the Applicants' (Georgia Power Company, et al.) Supplemental Statement Concerning Matters Raised by the Board During the Prehearing Conference, dated November 14, 1990, and the Georgians Against Nuclear Energy (GANE) Response to Georgia Power's Supplemental Statement, dated December 10, 1990.

3. During staff review of the Applicants' Supplemental Statement, a question was raised regarding reliance on the diesel generator high jacket water temperature (HJWT) trip during a postulated control room fire. That question required the staff to obtain further information to assess and resolve the matter. As a result of this question and other questions raised by GANE in their response concerning operator response during postulated events, I led a staff visit on December 17-18, 1990, to the Vogtle Electric Generating Plant (Vogtle) to clarify the issues involved. The staff on the team included Patrick M. Madden, Senior Fire Protection Engineer; Richard P. Correia, Senior Operations Engineer in the Human Factors Assessment Branch; Om P. Chopra, Senior Electrical Engineer; Darl S. Hood, NRC Project Manager, and myself.

Details addressing the specific areas of fire protection, human factors, and electrical engineering considerations are contained in the respective affidavits of Messrs. Madden,

Correia, and Chopra.

4. The Applicants' Supplemental Statement noted that the worst case scenario that related to the HJWT trip within the design basis was a control room fire coincident with a loss of offsite power. Previously this postulated scenario, which assumes one division of on-site AC power is lost due to the fire, relied on the HJWT trip to protect the remaining diesel generator from the consequential effects of a spurious closure of nuclear service cooling water (NSCW) valves (HV 1668 A and B) returning flow to the cooling water tower and the tower basin. I reviewed the Applicants' Control Room Fire Alternate Shutdown Evaluation, X4C23015035, originally dated March 29, 1988. Note 61 of this document evaluated the spurious closure of valves HV 1668 A and B stating that diesel generator overheating as a result of no NSCW flow is precluded by an integral HJWT trip. As a result of the Applicants' technical specification change, operators are relied upon to take action within 30 minutes to restore full NSCW flow to the remaining diesel generator for this postulated scenario. The Applicants now credit partial NSCW flow from two of three pumps through the cooling tower basin bypass relief valve. Although this aspect was not pointed out in the application for a technical specification change dated May 25, 1990, our site review of the Applicants' calculations and simulations indicated that there is adequate time to accomplish the required actions with significant margin in the analyses.

5. During our site visit, the staff identified several

concerns regarding the method in which the HJWT trip bypass had been implemented at Vogtle.

The trip was effectively blocked by closure of isolation valves in each of three independent sense lines that detect high jacket water temperature. We noted that closure of these valves also blocked the HJWT trip alarm. This aspect is not obvious in that the trip itself requires a coincidence of two of the three sensors, whereas the trip alarm annunciates a malfunction when any one sensor exceeded the 200 degrees F setpoint. A high jacket cooling water temperature outlet and inlet alarm (setpoints 190 and 175 degrees F, respectively) remained in operation. Other alarms for trips that are bypassed automatically on an accident signal remain active to aid operator action. Operators we questioned concerning the status of the HJWT trip alarm thought it remained in operation, although they were aware that the trip itself had been bypassed. This could cause confusion during an event because the operators may rely on the HJWT trip alarm, versus high jacket water temperature alarm, to take immediate action. (Other similar alarms that are bypassed also have warning alarms prior to the trip alarm, such as the low jacket cooling water pressure at 8 psig with a trip and alarm at 6 psig.) Annunciator response procedures were not consistently developed for the trips that could be bypassed. In addition the procedures lacked proper guidance to an operator in the event that the annunciator actuated during an accident. The Applicants told us that operators would be informed immediately

that the HJWT trip alarm was not operable and further stated that annunciator procedures would be appropriately revised by January 31, 1991. In addition, in order to make the design and alarms consistent with the other trip alarms on the diesel generator, the Applicants committed to complete modifications that had been initiated to reestablish the annunciation of the HJWT trip alarm.

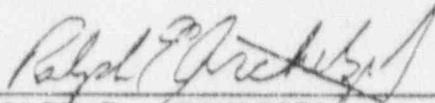
6. The staff was satisfied concerning adequacy of time for operator action during the postulated control room fire scenario. In addition, we examined the Applicants' basis for bypass under other potential scenarios, such as a failure of the three-way valve that bypasses the NSCW/jacket water heat exchanger. The Applicants' Supplemental Statement indicated that ample time was available to take action from the control room to prevent overheating of the diesel generator's jacket water, including operation of the second diesel generator, assuring cooling water flow, or a manual trip of the diesel generator from the control room. GANE indicated, without providing any technical basis, that the rate of temperature rise could be as high as 25 degrees F per minute with the three-way valve bypassing flow. The Applicants could not substantiate this heatup rate but noted that FSAR Table 9.5.5-2, Diesel Generator Cooling Water System Failure Modes and Effects Analysis, stated that upon failure of the thermostatic bypass valve the engine will start and operate about three minutes. The other train's diesel generator would remain operational for this single failure. We asked the

Applicants to determine the time available for the operator to take action in lieu of an automatic HJWT trip under such worst-case conditions. The Applicants obtained information from the diesel engine vendor concerning calculations for a foreign utility's same model diesel engine under conditions of a loss of cooling for the jacket cooling water. The Applicants informally calculated that the temperature would rise 10 degrees in 1.03 minutes for their engine under maximum accident loads. Thus, about one minute is available for a control room operator, following receipt of the high jacket cooling water inlet alarm at 190 degrees F, to take appropriate action until the temperature reaches the HJWT trip setpoint of 200 degrees F. Additional margin to engine damage is still available under these conditions in that jacket water cooling is not likely to be a problem until the temperature reaches 212 degrees F (vented system), and the 175 degrees F jacket cooling water heat exchanger outlet alarm would likely annunciate much sooner than the inlet alarm. The Applicants consider that adequate time is available for the operator to react appropriately, such as by tripping the diesel generator from the control room provided the other train and loads are operable, to allow the HJWT trip to be bypassed. I agree with the Applicants' position in that operators can reasonably be expected to recognize the alarm, assess diesel generator and plant conditions by observing control room indications, and take appropriate actions within the available time. Moreover, a high degree of confidence in this assessment

is not needed because the other diesel generator will be available under single failure scenarios to safely shutdown the plant.

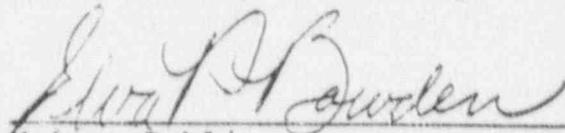
It is my opinion that the License Amendments for Vogtle which permitted bypass of the HJWV trip switches on the diesel generators (55 FR 32337, August 8, 1990) do not cause safety problems in relation to mechanical systems and fire protection aspects. It is our further opinion that the two license amendments which are the subject of this Affidavit were correctly issued.

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



RALPH E. ARCHITZEL

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



Notary Public

My commission expires: 12/1/91