

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

DOCKETED
USNRC

'85 JUL 30 A10 00

In the Matter of)
)
GEORGIA POWER CO.)
 et al.)
)
(Vogtle Electric Generating Plant,)
 Units 1 and 2))

Docket Nos. 50-424
50-425
(OL)

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

AFFIDAVIT OF HUKAM C. GARG IN SUPPORT
OF NRC STAFF RESPONSE TO APPLICANTS'
MOTION FOR SUMMARY DISPOSITION OF CONTENTION 10.3

I, Hukam C. Garg, being duly sworn, state the following:

1. I am employed by the U.S. Nuclear Regulatory Commission as an Equipment Qualification Engineer in the Equipment Qualification Branch, Division of Engineering, Office of Nuclear Reactor Regulation. I am responsible for the technical reviews, analyses and evaluations of the adequacy of the environmental qualification of electric equipment important to safety and safety-related mechanical equipment whose failure under postulated environmental conditions could adversely affect the performance of safety systems in nuclear power plants.

Prior to my present position, I was employed by Gilbert/Commonwealth Associates from 1973 -1980. My most recent position was Supervising Engineer for the Instrumentation and Control Section. In this

8507310061 850726
PDR ADDCK 05000424
G PDR

position I was responsible for the instrumentation and control aspects, including the equipment qualification for nuclear power plants. I had previously worked for Fluor Power Inc., formerly Pioneer Service and Engineering Company (1969 - 1973), in the design of electrical systems for nuclear power plants.

I am the Staff's technical reviewer for the Vogtle Plant. I have knowledge of the matters set forth herein and believe them to be true and correct.

2. I give this affidavit in response to Applicants' Motion for Summary Disposition of Joint Intervenor's Contention 10.3. That contention challenges the adequacy of testing single conductors for the environmental qualification of multiconductor cable configurations.
3. The testing of single conductor configurations for the purpose of environmentally qualifying multiconductor cable configurations is a widely accepted testing method. Its use in nuclear applications is authorized by NRC Regulatory Guide 1.131, which adopts by reference IEEE Standard 383-1974.
4. The Applicants in their Motion have accurately described the tests performed by Sandia National Laboratories. The two Sandia tests were performed on a total of eight different multiconductor cable samples. Of these eight cables, one cable showed dramatically inferior results when tested in a multiconductor configuration. This cable consisted of ethylene-propylene rubber (EPR) insulation on the inner conductors

with a thermoplastic chlorinated polyethylene (CPE) outer jacket. The other seven cables, consisting of EPR or cross-linked polyolefin inner insulation with hypalon or neoprene outer jackets suffered no greater degradation in the multiconductor configuration when compared to the single conductor configuration. The Sandia test results do not call into question the adequacy of single conductor testing for the environmental qualification of any of the multiconductor configurations other than the one using a thermoplastic CPE outer jacket. The Staff continues to believe that IEEE Standard 383-1974 properly allows for such single conductor testing for multiconductor cables with hypalon or neoprene outer jackets.

5. The Staff is continuing to review the Sandia tests in order to determine the propriety of using multiconductor cables with thermoplastic CPE outer jackets. The Sandia results for these cables may have been overstated for the following reasons:
 - a) The failures reported for the jacketed, multiconductor configuration seem to be the result of moisture absorption by the conductor insulation with subsequent dimensional swelling of the insulation and splitting of the jacket material. It is believed that high steam pressure used during the testing was in large part responsible for the moisture intrusion into the insulation and the resulting swelling.
 - b) The failures occurred at 8 days and 14 days into the LOCA profile indicating that the moisture absorption is time dependent.
 - c) The test was performed at saturated steam conditions which imposed a pressure of approximately 110 psia inside the test chamber. This test pressure is approximately twice the pressure that would result from a LOCA.

- d) Given the time dependent nature of the moisture absorption and the extremely high test pressure used when compared to pressures that the cable would experience during a LOCA, it is reasonable to conclude that the observed moisture absorption would occur much more slowly under actual LOCA pressures. The resultant moisture absorption under actual LOCA conditions may be less than the amount required to cause failure.
 - e) The failures were observed on cable that had been artificially aged to a condition equivalent to 40 years of service.
 - f) The results of material property tests conducted as part of the test program show that the extent of moisture absorption is directly related to the age of the cable.
 - g) The particular cable in question (Anaconda Flame Guard FR-EP) has only been marketed since 1977. Therefore, none of this cable is approaching an aged condition equivalent to the cable that failed.
 - h) There were no observed similar failures when the test was performed in a single conductor configuration or in a sequential radiation/LOCA exposure. Both of these methods are presently allowed by qualification standards.
6. Further investigations into the cable failure are planned. The simultaneous test on the multiconductor configuration will be repeated at a more realistic pressure of approximately 65 psia in three months, consistent with the completion of the modifications to the Sandia test facilities allowing superheated steam conditions in the test chamber. Further Staff action with respect to the multiconductor cables with thermoplastic CPE outer jackets is dependent on the results of these planned tests.
7. I have reviewed the Statement of Material Facts appended to Applicants' Motion. I fully agree with all the statements

contained in the Applicants' Statement of Material Facts except for items 14, 15 and 17.

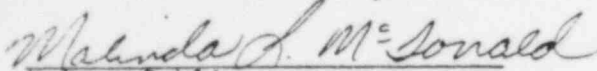
With respect to items 14, 15 and 17, the Staff is unable at this time to comment on the cables used at Vogtle as the environmental qualification submittal for the plant has not yet been made.

However, in their Motion, the Applicants have made sworn statements that no multiconductor cables with thermoplastic CPE outer jackets are being used at Vogtle, and the Staff will verify that no multiconductor cables with CPE outer jackets are used at Vogtle during its review and audit of the Vogtle environmental qualification program.

8. Based on the above statements and the present NRC position as set forth in Regulatory Guide 1.131, it is my professional judgment that single conductor cable testing is adequate to establish the environmental qualification of the multiconductor cables that the Applicants state will be used at the Vogtle facility.


Hukam C. Garg

Subscribed and sworn to before
me this 25th of July, 1985


Notary Public

My commission expires: 7/1/86

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

DOCKETED
USNRC

'85 JUL 30 A10:06

In the Matter of)
)
GEORGIA POWER CO.)
 et al.)
)
(Vogtle Electric Generating Plant,)
 Units 1 and 2)

Docket Nos. 50-424
50-425
(OL)

OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

CERTIFICATE OF SERVICE

I hereby certify that copies of "NRC STAFF RESPONSE TO APPLICANTS' MOTION FOR SUMMARY DISPOSITION OF CONTENTION 10.3 (CABLE IN MULTICONDUCTOR CONFIGURATION)", "NRC STAFF RESPONSE TO APPLICANTS' STATEMENT OF MATERIAL FACTS AS TO WHICH NO GENUINE ISSUE EXISTS TO BE HEARD REGARDING CONTENTION 10.3" and "AFFIDAVIT OF HUKAM C. GARG IN SUPPORT OF NRC STAFF RESPONSE TO APPLICANTS' MOTION FOR SUMMARY DISPOSITION OF CONTENTION 10.3" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class or, as indicated by an asterisk, through deposit in the Nuclear Regulatory Commission's internal mail system, this 26th day of July, 1985.

Morton B. Margulies, Esq., Chairman*
Administrative Judge
Atomic Safety and Licensing Board
Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Gustave A. Linenberger, Jr.*
Administrative Judge
Atomic Safety and Licensing Board
Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Oscar H. Paris*
Administrative Judge
Atomic Safety and Licensing Board
Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Bradley Jones, Esq.
Region 1 Counsel
U.S. Nuclear Regulatory Commission
Suite 3100
101 Marietta Street
Atlanta, GA 30303

Bruce W. Churchill, Esq.
David R. Lewis, Esq.
Shaw, Pittman, Potts & Trowbridge
1800 M Street, N.W.
Washington, D.C. 20036

Douglas C. Teper
1253 Lenox Circle
Atlanta, GA 30306

Atomic Safety and Licensing
Board Panel*
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Laurie Fowler, Esq.
218 Flora Ave. NE
Atlanta, GA 30307

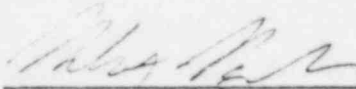
Docketing and Service Section*
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Atomic Safety and Licensing
Appeal Board Panel*
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

James E. Joiner, Esq.
Troutman, Sanders, Lockerman,
& Ashmore
127 Peachtree Street, N.E.
Candler Building, Suite 1400
Atlanta, GA 30043

Ruble A. Thomas
Southern Company Services, Inc.
P.O. Box 2625
Birmingham, AL 35202

Tim Johnson
Executive Director
Campaign for a Prosperous Georgia
175 Trinity Avenue, S.W.
Atlanta, GA 30303



Robert G. Perlis
Counsel for NRC Staff