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July 11, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

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OFFICE OF SECRETARY
DOCKETING & SERVICE
BRANCH

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
GEORGIA POWER COMPANY, <u>et al.</u>)	Docket Nos. 50-424 0 L
)	50-425 0 L
(Vogtle Electric Generating)	
Plant, Units 1 and 2))	

APPLICANTS' STATEMENT OF MATERIAL FACTS
AS TO WHICH NO GENUINE ISSUE EXISTS
TO BE HEARD REGARDING CONTENTION 12
(COOLING TOWER DRIFT)

Pursuant to 10 C.F.R. § 2.749(a), the Applicants state in support of Applicants' Motion for Summary Disposition of Joint Intervenors' Contention 12 that no genuine issue exists to be resolved with respect to the following material facts:

1. In Contention 12 the Joint Intervenors contend that the Applicants have not adequately assessed the amount of salt that will be released from the cooling towers at the Vogtle Electric Generating Plant ("VEGP") and the damage that will result to the surrounding area.

2. Units 1 and 2 of VEGP are each equipped with a natural draft cooling tower. Those towers will cool water heated during operation of the plant by exposing the warm water to cool ambient air in such a way that heat is

transferred from the warm water to the cooler air.
Affidavit of Daniel H. Warren ("Warren Affidavit") at
¶¶ 6-10.

3. The operation of the natural draft cooling towers at VEGP will result in the emission from those towers of water droplets entrained in the warm air rising out of the top of the towers. Those water droplets are commonly referred to as the "drift" from the cooling towers. Those droplets that exit the cooling towers contain the same dissolved solids as the water that circulates through each of those towers. Those dissolved solids are dispersed into the area around the towers when the droplets either fall to the ground or evaporate. The dispersed dissolved solids are commonly referred to as the "salt drift" from the cooling towers, although only some of those dissolved solids are salts. Id. at ¶ 11.

4. Using its FOG computer model, NUS Corporation has predicted the maximum off-site drift deposition rate that will occur during operation of VEGP to be 1.7 pounds per acre per year to the east of the cooling towers. Affidavit of Morton I. Goldman ("Goldman Affidavit") at
¶¶ 10-27.

5. Dr. William Dunn, who has coauthored a study performed for the Nuclear Regulatory Commission ("NRC") evaluating mathematical models used to predict cooling tower drift deposition, has evaluated the adequacy of NUS

Corporation's FOG model. Dr. Dunn found the FOG model to be one of the "better performing" models. Id. at ¶¶ 14-17.

6. A drift deposition rate of 1.7 pounds per acre per year is far below any level that could cause harm to vegetation. Id. at ¶ 27; Affidavit of Nora A. Blum ("Blum Affidavit") at ¶¶ 12-21.

7. At the construction permit stage, the Applicants estimated the maximum drift deposition rate from the VEGP cooling towers to be 305 pounds per acre per year for two towers. The Applicants derived that estimate by simply calculating the drift emission rate and dividing the total amount of drift emitted in a one year period by the amount of land surface within a one mile radius of the towers. Warren Affidavit at ¶ 15.

8. Several unrealistic assumptions caused the Applicants' estimate at the construction permit stage of the drift deposition rate to be overly conservative. First, in calculating that estimate, the Applicants assumed that all of the dissolved solids contained in the drift would be deposited in an area within a one mile radius of the cooling towers. Id. at ¶ 16. Second, the Applicants used a drift rate of 0.03%, which corresponded to the drift rate guaranteed in the contract between Georgia Power Company and Custodis-Cottrell (formerly Research-Cottrell), the tower supplier. Based upon subsequent testing and technical analysis, Custodis-Cottrell now would expect that

the drift rate for natural draft cooling towers with drift eliminators of the same design as those at VEGP would be 0.004% or less. Id. at ¶ 17.

9. In addition to these unrealistic assumptions, other factors caused the Applicants' initial estimate to overstate significantly the drift deposition rate. In calculating the total dissolved solids present in the water from the Savannah River, the Applicants used the maximum level found in sampling programs, which was 76 mg/liter, rather than the average level of 60 mg/liter. Also, the Applicants assumed that the cooling towers would be operated at eight cycles of concentration rather than the expected average operating rate of four cycles of concentration. Id. at ¶ 18.

10. In response to questions from the NRC staff concerning the Operating License Stage Environmental Report ("OL-ER"), the Applicants reevaluated their estimate of the maximum drift deposition made at the construction permit stage. Noting the very conservative assumptions underlying that earlier estimate, the Applicants submitted new estimates, which were determined using a different methodology, of 31 pounds per acre per year on-site and 21 pounds per acre per year off-site for the maximum drift deposition rates. Blum Affidavit at ¶¶ 3-7. The Applicants later revised those estimates to a maximum on-site

rate of 17 pounds per acre per year and an off-site rate of 15 pounds per acre per year. Id. at ¶¶ 8-10.

11. The Applicants derived these new estimates not by actually modeling the performance of the VEGP cooling towers, but by predicting maximum drift deposition rates for VEGP based upon extrapolation to VEGP conditions of drift deposition rates estimated using models by other plants having similar cooling towers and meteorological environments. The first set of revised estimates (31 pounds on-site and 21 pounds off-site) was determined using drift deposition rates predicted for four plants, Shearon Harris 1-4, Grand Gulf 1 and 2, Susquehanna 1 and 2, and Beaver Valley 1, and drift deposition pattern information from one plant, Susquehanna 1 and 2. Id. at ¶¶ 5-7. The second set of revised estimates (17 pounds on-site and 15 pounds off-site) resulted from the use of drift deposition rate and drift deposition pattern information from an additional plant and from a reduction in the expected drift rate for the VEGP cooling towers based upon information received from the tower supplier from the rate of 0.015% used in calculating the first set of revised estimates to 0.008%. Id. at ¶¶ 8-11.

12. The bounding methodology by which the Applicants derived these revised estimates did not entail actually modeling the drift deposition from the VEGP cooling

towers, and that methodology was not intended to predict accurately for all conditions the drift deposition rates that will actually be experienced. Instead, by using that methodology the Applicants intended to derive an estimate that would very likely exceed, and therefore provide an upper bound for, the maximum drift deposition rates that would be experienced at VEGP. Id. at ¶ 11; Warren Affidavit at ¶ 21. The results of the computerized modeling study subsequently performed by NUS Corporation demonstrate that these estimates also were overly conservative.

13. In Contention 12 the Joint Intervenors also allege that chlorine gas will be released from the cooling towers as a result of the chlorination of the water circulating in those towers.

14. At VEGP chlorine gas will be injected into the water that ultimately reaches the natural draft cooling towers at two points, by the river water chlorination system and by the circulating water chlorination system. Warren Affidavit at ¶¶ 12-13. Both of these chlorination systems are located several thousand feet from the cooling towers. Goldman Affidavit at ¶ 30.

15. The chlorine injected into the water by either the river water chlorination system or the circulating water chlorination system will be in the form of chlorine gas dissolved in water. That chlorine gas will completely

hydrolyze within a few seconds, long before the chlorinated water reaches the cooling towers. Id. at ¶¶ 29-33.

16. No conditions will exist in the circulating water system at VEGP that would hinder or reverse this hydrolysis process. Because of the magnitude of the hydrolysis constant, no measurable amount of chlorine gas will remain in solution if the pH of the chlorinated water is more than 3.0 and the total chloride concentration is less than 1000 mg/liter. The pH of the circulating water system at VEGP will be maintained between 7.0 and 8.0, and the chloride concentration will be far less than 1000 mg/liter. Id. at ¶¶ 31-32.

17. The water circulating in the natural draft cooling towers at VEGP will contain no measurable chlorine gas, and no measurable chlorine gas could be released from the cooling towers. Id. at ¶ 33.

18. The chlorination of the circulating water will not significantly add to the drift deposition from the VEGP natural draft cooling towers. The chlorination process will result in a maximum additional "chloride" deposition of less than one pound per acre per year. Id. at ¶ 34-43.

19. Even taking into consideration the maximum potential addition to the drift minerals resulting from chlorination of the circulating water, the maximum drift

deposition rate off the plant site resulting from the operation of the VEGP natural draft cooling towers would be less than three pounds per acre per year. Id. at ¶¶ 27, 43.

20. No scientific study addressing the effects upon vegetation of either salt or cooling tower drift has found any harm to occur to vegetation from a drift deposition rate of the low magnitude that will occur at VEGP. For both crops and native trees, the predicted maximum off-site drift deposition rate for VEGP of less than three pounds per acre per year, which includes the additions from chlorination, is well below both the lowest values found in greenhouse and field studies to cause leaf damage to vegetation and the highest values found to have no effect on vegetation. Blum Affidavit at ¶¶ 12-21.

21. A maximum off-site drift deposition rate of less than three pounds per acre per year is well below the rate of 18 pounds per acre per year identified in Regulatory Guide 4.11 as the rate below which no need exists for chemical analyses of the soils, plants, and animals in areas subject to the drift. That rate is also substantially lower than the rate of 11 to 22 pounds per acre per year identified in NUREG-0555 as generally not damaging to plants.

22. Drift deposition resulting from the operation of the cooling towers at VEGP will not adversely effect the surrounding environment.

Respectfully submitted,

James E. Joiner

James E. Joiner, P.C.
Charles W. Whitney
Kevin C. Greene
Hugh M. Davenport
TROUTMAN, SANDERS, LOCKERMAN
& ASHMORE

George F. Trowbridge, P.C.
Bruce W. Churchill, P.C.
David R. Lewis
SHAW, PITTMAN, POTTS &
TROWBRIDGE

Counsel for Applicants

Dated: July 11, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	
GEORGIA POWER COMPANY, <u>et al.</u>)	Docket Nos. 50-424
)	50-425
(Vogtle Electric Generating)	
Plant, Units 1 and 2))	

CERTIFICATE OF SERVICE

I hereby certify that copies of Applicants' Statement of Material Facts as to Which No Genuine Issue Exists to Be Heard Regarding Contention 12 (Cooling Tower Drift), dated July 11, 1985, 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 11th day of July, 1985.

James E. Joines
James E. Joines
Attorney for Applicants

Dated: July 11, 1985

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of)	
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)	50-425
(Vogtle Electric Generating Plant,)	
Units 1 and 2))	

SERVICE LIST

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

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

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

Bernard M. Bordenick, Esquire
Office of Executive Legal Director
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Atomic Safety and Licensing Board
Panel
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

*Douglas C. Teper
1253 Lenox Circle
Atlanta, Georgia 30306

*Laurie Fowler
Legal Environmental Assistance
Foundation
218 Flora Avenue, N. E.
Atlanta, Georgia 30307

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

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

Bradley Jones, Esquire
Regional Counsel
U. S. Nuclear Regulatory
Commission
Suite 3100
101 Marietta Street
Atlanta, Georgia 30303