September 6, 1985

Docket Nos: 50-424
and 50-425

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Mr. Donald O. Foster
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Dear Mr. Foster:

Subject: Clarification of Meterological Calculations Needed for Toxic Gas Evaluation of Chemicals (Open Item 4)

During telephone conference calls between the NRC and representatives of Georgia Power Company on August 22 and 29, 1985, it became apparent that your staff needed additional clarification to understand the NRC staff's requests for meteorological modeling in the event of a chlorine release. This information is related to SER Open Item 4, "Toxic gas evaluation of chemicals."

The enclosure contains a detailed discussion of the meteorological analyses to be submitted to the staff and should provide the needed clarification. If there any questions regarding this information, contact the Project Manager, Melanie Miller, at 301-492-4259.

Elinor G. Adensam, Chief
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Division of Licensing

Enclosure:
As stated

cc: See next page

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Vogtle Electric Generating Plant

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ENCLOSURE

Clarification of Meteorological Calculations for

Chlorine Release at Vogtle

The analysis of the potential consequences in the control room of the rupture of a one ton chlorine tank provided in your May 20, 1985, letter transmitting additional information relative to the open item on the toxic gas evaluation of chemicals appears to be overly conservative. In order to scope the degree of conservatism of this analysis from a diffusion point of view, provide the free field analysis of the chlorine concentrations that would result at the control room air intake as a result of the rupture of a one ton chlorine tank using the same release assumptions previously provided in your May 20 submittal but utilizing each of the three following diffusion techniques for the puff portion (25%) of the release:

1. Using 5% diffusion conditions with the Pasquill-Gifford parameters and the following equation:

$$\chi/Q_I = [6.28\ (\sigma_{xy}^2 + \sigma_I^2)H]^{-1}$$

where χ/Q_I = unit concentration at cloud center, m^{-3}

σ_{xy} = standard deviation of the gas concentration in the horizontal alongwind and horizontal crosswind directions (σ_x assumed = σ_y), meters

H = intake height, meters

σ_I = initial standard deviation of the puff, meters

$$= \left(\frac{Q_I}{7.87 X_o}\right)^{1/3}$$

where Q_I = puff release quantity, grams

X_o = the density of chlorine gas ($3209 gm/m^3$)

2. Using the most conservative stability condition (unstable conditions), centerline, puff diffusion parameters (page 22 of NUREG-0570), ground release, the intake height and the equation (2.2-1) of NUREG-0570.

3. Using stable puff diffusion conditions (page 22 of NUREG-0570), ground release, centerline, intake at the ground, building wake and the following equation:

$$\chi/Q_I = [\ 3.14\ (\sigma_{xy}^2 + \sigma_I^2)(\sigma_z^2 + \sigma_I^2)^{\frac{1}{2}} + CA]^{-1}$$

All terms except the following are defined above:

σ_z = standard deviation of the gas concentration in the vertical direction, meters

$C = \frac{1}{2}$

A = Cross-sectional area of the containment building above the adjacent structures, m^2