Georgia Power Company
Route 2, Box 299A
Waynesboro, Georgia 30830
Telephone 404 554-9961
404 724-8114

Southern Company Services, Inc.
Post Office Box 2625
Birmingham, Alabama 35202
Telephone 205 870-6011

Vogtle Project

March 29, 1985

Director of Nuclear Reactor Regulation
Attention: Ms. Elinor G. Adensam, Chief
Licensing Branch #4
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

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NRC DOCKET NUMBERS 50-424 AND 50-425
CONSTRUCTION PERMIT NUMBERS CPPR-108 AND CPPR-109
VOGTLE ELECTRIC GENERATING PLANT - UNITS 1 AND 2
REQUEST FOR SUPPLEMENTAL INFORMATION
DSER OPEN ITEM 8

Dear Mr. Denton:

During a meeting with your staff on February 12, 1985, additional information was requested. Attached for the review of your staff is the requested information on well monitoring in the clay marl stratum.

If your staff requires any additional information, please do not hesitate to contact me.

Sincerely,

J. A. Bailey

J. A. Bailey
Project Licensing Manager

JAB/sm
Enclosure
xc: D. O. Foster
R. A. Thomas
G. F. Trowbridge, Esquire
J. E. Joiner, Esquire
C. A. Stangler
L. Fowler
M. A. Miller
L. T. Gucwa
G. Bockhold, Jr.

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LONG-TERM GROUNDWATER MONITORING

Introduction

The NRC staff has stated their request for additional wells at VEGP in Section 2.5.4.5 of the Draft SER documented below.

> "Because of the primary importance of the groundwater regime in the solution process and the resulting potential for ground subsidence, the staff will require adequate monitoring of both groundwater levels and settlement during the life of the Vogtle Project."
>
> "The observation wells which will be active as indicated in the applicant's response to Q241.10 need to be supplemented with additional wells closer to the main plant complex and be located in both the upper water table aquifer and in the clay marl stratum at representative depths. The staff requires that the applicant provide a plant which locates, as requested, the additional wells and the pertinent information on well installation and monitoring that is requested in Q241.10."

The installation of wells in the clay marl was discussed in our meeting in Bethesda on February 12, at which time the staff requested a written discussion of the topic. The following text is the response to that request.

Discussion

Groundwater levels will be monitored at VEGP as described in the Groundwater Monitoring Supplement. However, it is not apparent how these data could provide meaningful information on "--the solution process and the resulting potential for ground subsidence." We are not aware of any method for detecting dissolution by using observation well data. The process of dissolving and removing calcareous material from a pure limestone by groundwater percolation requires periods measured in hundreds of years. Due to the clay content of a marl, dissolution would require far greater time priods.

A review of the report "Foundation Considerations in Siting of Nuclear Facilities in Karst Terrains and Other Areas Susceptible to Ground Collapse" (NUREG/CR-2062) has been made. Plant Vogtle is not founded on karst terrain nor an area susceptible to ground collapse. Nevertheless, several of the important tests and exploration methods described in that report to detect the results of dissoluition (underground openings) were used at Vogtle. No evidence of dissolution of the marl foundation layer was found in those investigations.

Although the marl is classified as a carbonate rock, it is not one that is considered susceptible to dissolution. On page 11 of NUREG/CR-2062, the following is stated:

> "The noncarbonate and nonsoluble components of limestones mainly include chert, grains (clasts) of quartz, feldspar, and clay minerals. Generally, carbonate rocks that may present serious cavity problems contain only a few percent of these "insoluble" minerals. When the insoluble fraction approaches approximately 20 to 30 percent of the total rock, the soluble character of the rock may become significantly less pronounced."

Twenty-one samples of the Blue Bluff Marl have been studied for mineral composition using x-ray diffraction and petrographic analyses (Studies of Postulated Millett Fault, Appendices G and I). The insoluble content of these samples ranged from 55 percent to 100 percent with an average of 85 percent. The clay content of the samples averaged 45 percent.

The marl is effectively impermeable as determined by over 80 in situ permeability tests conducted in the marl as part of site investigations. This lack of permeability precludes the occurrence of groundwater percolating through the marl and, thus, the opportunity to cause dissolution.

The marl was deposited in the middle Eocene epoch over 45 million years ago. Subsequently, the Utley limestone was deposited. Since that disposition, percolation of groundwater through the limestone resulted in significant dissolution and development of cavities. Although the marl is in immediate contact with the limestone, the dissolution process did not extend into the marl. It is reasonable to expect that if dissolution has not occurred during the past 45,000,000 years, even during the period of dissolution in the Utley, it will not occur during the next 40 years of plant operation.

Observation wells or piezometers open to the marl cannot be expected to provide information on solution activity. A change in the hydrostatic pressure or water level with time could be the result of one, or a combination of several phenomena, the least likely of which would be solution activity. The determination of the cause would be difficult.

Conclusions

1) The clay marl stratum has not shown any indication of solution activity in the last 45,000,000 years; 2) The marl has been shown to be effectively impermeable with numerous packer tests; and 3) observation wells cannot provide direct evidence of solution activity. Because of these facts, we believe there is no basis for a requirement to install wells in the clay marl stratum.

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