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RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards addl info re design of fuel handling bldg retaining wall in response to SER Open Item 1 & NRC 840404 concerns.

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APR 19 1984

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Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
UNIT NO. 1 - DOCKET NO. 50-400
DESIGN OF RETAINING WALL

Dear Mr. Denton:

Carolina Power & Light Company hereby submits additional information concerning the Shearon Harris Nuclear Power Plant design of the Fuel Handling Building Retaining Wall. This information is in response to Safety Evaluation Report Open Item 1 and additional NRC concerns on the design of the Retaining Wall expressed in the meeting in Bethesda, Maryland on April 4, 1984.

If you have further questions or require additional information, please contact my staff.

Yours very truly,

M. A. McDuffie
Senior Vice President
Nuclear Generation

JHE/ccc (9888GAS)
Attachment

cc: Mr. B. C. Buckley (NRC)
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## ATTACHMENT

### NRC CONCERN

Justify the soil bearing capacity used for the design of the lower two rows of deadmen, or review the design for the soil bearing capacity as determined by the procedure given in NAVFAC Design Manual DM-7.

### RESPONSE

For the static load combination, the present design had conservatively used a minimum factor of safety of 1.5 over the allowable soil bearing capacity (ultimate capacity divided by 2), which in fact provided a factor of safety of more than 3 over the ultimate.

The design has now been reviewed for the soil bearing capacity as determined by Figure 11-1 of NAVFAC DM-7, for $\tan \phi' = 0.6 \tan \phi$. The lower two rows of deadmen have a minimum factor of safety of 2.24 over the ultimate soil bearing capacity, which is more than the factor of 2 required by Figure 10-14 of NAVFAC DM-7. The minimum factor of safety over the ultimate soil bearing capacity for the dynamic load combination is 1.76.

### NRC CONCERN

Verify if there is enough distance between the deadmen and the retaining wall to develop the bearing capacity of the soil used for design of the lower two rows of deadmen.

### RESPONSE

The deadmen are located at an adequate distance from the retaining wall to develop the ultimate soil bearing capacity used for the design of deadmen. The potential soil failure surfaces for possible rotation of deadmen due to the horizontal pull for the ultimate bearing capacity of the soil (without any reduction of $\phi$) do not interfere with the active wedge failure plane behind the retaining wall. The ultimate soil bearing capacity with reduced $\phi$ (i.e., $\tan \phi' = 0.6 \tan \phi$) has a factor of safety of more than 2 for the static condition, which includes full hydrostatic pressure on the wall due to groundwater level at Elevation 251 feet (no relief in hydrostatic pressure is taken for the drainage system provided behind the retaining wall). Therefore, the deadmen are adequately designed.

### NRC CONCERN

Monitoring system should be provided to measure the horizontal movement of retaining wall at the base. The monitoring frequency should be as required by NRC Regulatory Guide 1.127, Position C.4.

### RESPONSE

The drawings of the retaining wall will be revised to reflect the monuments being installed for monitoring horizontal movement of the retaining wall at the base. The frequency of monitoring will be in accordance with Position C.4 of Regulatory Guide 1.127 (Rev. 1).