MISSISSIPPI POWER & LIGHT COMPANY
Helping Build Mississippi
P. O. BOX 1640, JACKSON, MISSISSIPPI 39205

June 7, 1982

NUCLEAR PRODUCTION DEPARTMENT

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Mr. Denton:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416 and 50-417
File: 0260/0756
Sensitivity of Containment Response to Heat Sink Nodalization
Ref: 1) AECM-82/155
2) AECM-81/336
3) HGN-001
4) AECM-82/24
AECM-82/231

Reference 1 provided your staff with additional information pertaining to several issues raised by the NRC staff during telephone conversations on April 12th and 13th, 1982. One of the concerns identified by the NRC was an apparently excessive discrepancy in the results for the drywell break base cases submitted in References 2 and 3. Mississippi Power & Light (MP&L) indicated in Reference 1 that this discrepancy was a result of differing assumptions regarding energy input rates to the drywell for the two drywell break cases. The analysis in Reference 3 (as endorsed for GGNS by Reference 4) assumes that the energy released from the primary system is split equally between the break inside the drywell and the relief valves which discharge to the suppression pool and are opened early in the transient.

The NRC informally requested MP&L to determine if the discrepancies might be produced by excessive sensitivity of the containment response model to heat sink nodalization. MP&L has completed additional analyses to assess the effects of varying the number of nodes in the concrete walls in the drywell.

These analyses were completed with the TAP-A[1] heat transfer computer program. The CLASIX-3 computer program was not used because of the excessive costs of running the program and because the heat transfer models incorporated in the CLASIX-3 program are very similar to the TAP-A models. Initially, TAP-A was run to verify that the code produced the same results as CLASIX-3. The analysis was conducted for the interval from 5500 seconds to 6500 seconds using temperature distributions from the drywell break base case transient DA-1 from Reference 3. The specific wall analyzed was the reactor pedestal mat which is a three foot thick, bare concrete wall.

B001

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[1]TAP-A, A Program for Computing Transient or Steady-State Temperature Distributions, B. L. Pierce and H. J. Stumpf, WANL-TME-1872, December 1969.

The CLASIX-3 results for drywell ambient temperature and the heat transfer film coefficient were used as boundary conditions in TAP-A. There were some minor differences between the two programs but the nodal arrangement in TAP-A was made as similar as possible to that of CLASIX-3. The initial temperature distribution for TAP-A was the same as the CLASIX-3 results at 5500 seconds. After 1000 seconds of transient, the results from TAP-A differed from those of CLASIX-3 by less than 2.08% in temperatures and by less than 1.80 % in surface heat transfer rate. This demonstrates that the two programs produce the same results.

For the second run of TAP-A, the number of nodes was increased by approximately a factor of 10. The initial temperatures for these additional nodes were interpolated from the initial temperature profile of the first run. The only other change was to decrease the time step by a factor of 10. This was required to ensure stability. The results of the two TAP-A runs after a 1000 second transient indicated temperature differences of less than 0.68% and a surface heat transfer rate difference of 1.09%.

These comparisons conclusively demonstrate that the heat sink nodal arrangement utilized in CLASIX-3 for the subject transient is adequate and that increasing the number of nodes in the walls would have a negligible effect on the results and conclusions. This additional information should resolve this issue and permit completion of the interim evaluation.

Yours truly,

J. D. Richardson for

L. F. Dale
Manager of Nuclear Services

RWE/SHH/JDR:rg

cc: Mr. N. L. Stampley
Mr. R. B. McGehee
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