MISSISSIPPI POWER & LIGHT COMPANY
Helping Build Mississippi
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NUCLEAR PRODUCTION DEPARTMENT

August 31, 1981

Mr. Robert L. Tedesco
Assistant Director of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Tedesco:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416 and 50-417
File 0262/0755/1-860.0
Hydrogen Control
AECM-81/336

On June 19, 1981, in letter AECM-81/221, Mississippi Power & Light Company (MP&L) transmitted a report describing and evaluating the hydrogen control measures being implemented at the Grand Gulf Nuclear Station (GGNS).

The attached report consists of an amended and expanded submittal which supercedes the June 19 report. The changes fall into three categories:

1. Two additional bounding cases have been added bringing the total number of containment response cases analyzed in the report to six;

2. Gas concentrations (of hydrogen, oxygen, nitrogen, and steam) in each volume (drywell, wetwell, and containment) have been provided for each of the six cases;

3. Minor typographical errors and deletions in the June 19 report have been corrected.

Changes in the text have been delineated by change bars in the right hand margin. In addition, each page is dated either 6/81 for pages which contain no new material or corrections or 8/81 for pages which do contain new information or corrections.

Bcc: Limited distribution

The two new bounding cases (Cases 5 and 6) described in detail in Appendix D of the attached report are very conservative cases in which it is assumed that containment spray is not available. Case 5 also assumes that there is no ignition in the wetwell leading to global burns in the containment. Such an analysis appropriately models a situation where there is oxygen depletion in the wetwell (although the gas concentration information supplied does not support such a hypothesis).

The results of these cases along with the results of the first four cases demonstrate that containment integrity is not threatened by the hydrogen release associated with the postulated occurrence of a 75% clad water reaction when the GGNS Hydrogen Ignition System (HIS) is used for mitigation of the event.

As described in the status report submitted by letter AECM-81/298 on August 18, 1981, substantial additional work is underway in a variety of areas to resolve further concerns related to hydrogen control at GGNS. In particular, a commitment was made to complete the action items listed in Sections 1.0, 3.0, 4.5, 6.1, 7.0, 8.1, 9.0, and 10.0 of the attachment to the August 18 status report and submit information to the Nuclear Regulatory Commission (NRC) during the week of September 28, 1981. All efforts are being made to expedite this work to allow submittal no later than September 11, 1981. In the case of action item 7.0 on containment ultimate capacity, most, if not all, of the information has already been provided in responses to informal questions on this subject. In addition, the response to action item 6.1 on cross-sectional flow areas is in the final stages of preparation, and, if possible, will be submitted no later than September 4, 1981.

To the extent possible, the remaining action items which were scheduled for submittal in October and December 1981 will also be expedited. An updated schedule will be provided by September 30, 1981.

A commitment was also made in letter AECM-81/298 to provide a description of the GGNS integrated scenario bo be used as a base case for further containment response analysis. The integrated scenario which is described below is fundamentally similar to the stuck open relief valve cases previously submitted, particularly Case 3. Based on evaluation of the analyses done to date, a review of the GGNS Emergency Procedures, and concerns raised by the NRC during informal conversations, the assumptions have been modified to represent a consistent integrated scenario:

1. The burn parameters (representing realistic values based on the recommendation of MP&L consultants) are:

    a. ignition at 8 volume % of hydrogen
    b. burnup of 85% of hydrogen in the volume or until only 5 volume % of oxygen remains
    c. propagation of burns to adjoining volumes if they contain at least 8 volume % of hydrogen
    d. flame speed of 6 fps

2. The initiating event is a transient followed by a stuck open relief valve (SORV) and an inability to maintain water level in the reactor. This is believed to be one of the more probable scenarios for hydrogen generation.

3. The igniters (HIS) and drywell purge (CGCS) are initiated 20 minutes into the scenario. In fact, the GGNS Emergency Procedures are being changed to incorporate a requirement for initiation of the HIS and CGCS based on water level in the reactor. For computational ease (since CLASIX-3 does not track reactor water level), it is assumed that this occurs at 20 minutes. This is also consistent with taking no credit for operator action for the first 20 minutes of an accident.

4. Prior to generation of hydrogen, at least seven but no more than nine safety relief valves will be open. In the event that reactor water level cannot be maintained above the core midplane, the GGNS Emergency Procedures call for the operator to open either seven or eight safety relief valves depending on the details of the specific event. This provides additional cooling due to increased steam flow over the uncovered fuel and extends the length of time before fuel damage. If the SORV was not one of valves opened by the operator, there could then be as many as nine valves open. These valves are distributed around the suppression pool and yield an approximately uniform distribution of hydrogen into the suppression pool.

5. Following the first hydrogen burn, it is assumed that one train of containment spray is operating. Current GGNS Emergency Procedures call for manual actuation of containment spray if containment temperature reaches 185 F. This will occur at the first hydrogen burn. The Emergency Procedures are being modified so that once containment spray is actuated, it will be left on as long as the HIS is energized. Only one train is assumed to be available for conservatism. In addition, if Residual Heat Removal System (RHR) trains A and B were both available, this assumption allows for the possibility that it might be desirable to use one of the trains for Low Pressure Core Injection.

Yours truly,

L. F. Dale
Manager of Nuclear Services

SHH/JDR:sh
Attachment

cc: (See Next Page)

cc: Mr. N. L. Stampley
Mr. G. B. Taylor
Mr. T. B. Conner

Mr. Victor Stello, Jr., Director
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