MISSISSIPPI POWER & LIGHT COMPANY
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November 30, 1984

NUCLEAR LICENSING & SAFETY 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
License No. NPF-29
File 0260/0272/0756
Quarterly Status Report -
September 30, 1984, "Degraded
Core Accident Hydrogen
Control Program"
AECM-84/0510

The Nuclear Regulatory Commission (NRC) staff in Supplement No. 4 of the Safety Evaluation Report (SER) requested that Mississippi Power & Light (MP&L) submit to the NRC quarterly reports on the status of the "Degraded Core Accident Hydrogen Control Program." In response to that request MP&L is herewith submitting the fifth of these status reports. This report covers the time period since July 1, 1984, through September 30, 1984.

Subsequent installments of these reports will be submitted no later than 60 days following the end of the quarter to ensure that the NRC is kept up to date on program status.

Should you have any questions concerning this report, please contact us.

Yours truly,

L F Dale

for L. F. Dale
Director

MJM/JRH/SHH:rw
Attachment

cc: See Next Page

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cc: Mr. J. B. Richard (w/a)
Mr. R. B. McGehee (w/o)
Mr. N. S. Reynolds (w/o)
Mr. G. B. Taylor (w/o)

Mr. Richard C. DeYoung, Director (w/a)
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Washington, D. C. 20555

Mr. J. P. O'Reilly, Regional Administrator (w/a)
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Quarterly Status Report for Quarter Ending September 30, 1984

"Degraded Core Accident Hydrogen Control Program"

Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416 and 50-417

Mississippi Power & Light Company

Quarterly Status Report - September 30, 1984

"Degraded Core Accident Hydrogen Control Program"

1.0 Introduction

This quarterly status report is submitted to comply with a requirement in Supplement Number 4 to NUREG 0831, Safety Evaluation Report Related to the Operation of Grand Gulf Nuclear Station Units 1 and 2. This requirement specifies that Mississippi Power & Light (MP&L) should provide quarterly reports outlining the status of the on-going research program to address degraded core hydrogen control requirements. This report covers the third calendar quarter of 1984 ending September 30, 1984.

This report includes brief summaries of the submittals made by MP&L during this quarter along with summaries of meetings between the NRC staff and MP&L. MP&L is participating in the Hydrogen Control Owners Group (HCOG) which is conducting generic research and completing generic analyses to resolve the degraded core hydrogen control issue. Since the work completed by HCOG complements MP&L's program to resolve this issue, this report also includes summaries of meetings between the HCOG and the NRC. The summaries of these meetings included in this report do not reflect a formal HCOG position with respect to any issue and represent only the MP&L interpretation of the meetings.

2.0 Summary of MP&L Submittals

MP&L made no submittals to the NRC on the Degraded Core Accident Hydrogen Control Program during the third calendar quarter of 1984 ending September 30, 1984.

3.0 Summary of Meetings

HCOG and NRC meeting on August 28 and 29, 1984

The HCOG met with the NRC on August 28 and 29, 1984, to review the role of the ¼ scale test program in the overall HCOG program, to discuss the development of the ¼ scale test matrix and attempt to resolve the NRC's concerns with demonstrating equipment survivability. The use of the BWR Core Heatup Code hydrogen release time histories for input to the ¼ scale test program was also discussed.

HCOG reviewed the objectives of the ¼ scale test program in the overall HCOG program. The first objective is to define the full scale thermal environment in areas of the wetwell and upper containment, where equipment which is required to survive the effects of hydrogen combustion is located. The second objective of the test program is to assess hydrogen mixing in the wetwell and upper containment prior to and during the hydrogen combustion transient.

HCOG reviewed the development of the ¼ scale test matrix. The ¼ scale testing will be performed in three phases. Shakedown tests will be performed to verify operation of the facility systems and instrumentation. Scoping tests will be performed to assess the effects of variations in several key parameters, and production tests will be performed to provide data for defining the full scale thermal environments produced by diffusion flames.

Several objectives for the scoping tests were reviewed. Tests will be performed to assess the repeatability of test data. A test will be performed to confirm the threshold hydrogen flowrate for establishing steady diffusion flames. The effect on threshold flowrate and thermal environment at the HCU floor due to concurrent injection of steam and hydrogen will be evaluated. The scoping tests should confirm that the thermal environment at the HCU floor produced by hydrogen release from spargers is limiting relative to the thermal environment produced by release from both spargers and simulated LOCA vents. Finally, the scoping tests should confirm that the presence of grating near the suppression pool surface does not significantly affect gas temperatures at the HCU floor.

HCOG discussed their position on the possibility of including full scale equipment in the ¼ scale test facility, which the NRC suggested may help address their concerns over the survivability of equipment in the containment following hydrogen combustion. HCOG does not believe that inclusion of equipment in the ¼ scale facility will demonstrate equipment survivability for equipment in a Mark III containment. Successful equipment operation following exposure to ¼ scale tests does not necessarily demonstrate equipment survivability at full scale.

The HCOG also does not believe that demonstration of equipment survivability will be possible in the ¼ scale test due to non-prototypical thermal loading which will exist during the scaled tests; and demonstration of equipment survivability for non-prototypical conditions would not be meaningful. Such a demonstration would not benefit the Mark III plants. A detailed evaluation of Nevada Test Site (NTS) data will be completed by HCOG to confirm that the NTS testing has no negative implications for Mark III plants. The HCOG will protect, relocate or test equipment as necessary to assure that the equipment survives the predicted full scale thermal environment. Finally, inclusion of equipment in the ¼ scale test facility to validate HCOG's approach for predicting equipment response would provide limited added benefit. The current ¼ scale program will involve validation of the method for predicting equipment response against the observed response for a sphere calorimeter.

HCOG discussed the system reflood flow rates considered in selecting hydrogen release histories for input to the ¼ scale test facility. The reflood flow rates should be selected from systems identified in the emergency procedures. The systems which are assumed to provide flow to the vessel should be capable of being made operable and

injecting into the vessel in time to prevent significant core melt. The maximum time allowable for recovery of large flow primary injection system or alignment of large flow alternate injection system was discussed. HCOG, discussed proposed release histories calculated with the BWR Core Heatup Code for input to the ¼ scale test facility.

HCOG presented a summary of their plans for using the ¼ scale test data. The ¼ scale test facility will be used to measure radial, circumferential, and vertical gas temperature profiles and velocity distributions in the wetwell and upper containment. The total and radiative heat flux at selected locations in the wetwell will be measured. Standard methods such as use of Hottel charts will be applied to confirm that the planned approach of calculating radiative heat flux is adequate as opposed to measuring radiative heat flux at all locations. The intent is to use the same methods that were used to evaluate data from the 1/20 scale tests. These methods were discussed in a letter from MP&L to the NRC dated August 23, 1983.

The NRC was urged to continue to submit requests for additional information to HCOG since there are advantages in addressing questions generically. In order to demonstrate HCOG's commitment to responding to NRC needs, HCOG intends to prepare a detailed program plan identifying all actions remaining to be completed. This program plan provides an overview to the NRC of all tasks which must be completed, some requiring future NRC-HCOG interaction.

The HCOG and NRC discussed a tentative date for the next meeting between HCOG and the NRC. This meeting would be held at EPRI's offices in Palo Alto, California to review the BWR Core Heatup Code.

4.0 Test Program Status

The summaries and status of the HCOG test program as stated here do not reflect the HCOG position with respect to any test program and represent only an MP&L interpretation of these programs.

4.1 ¼ Scale Test Program Status

Completed installation of all major insulation on the inside of the ¼ scale test facility and completed the inner tank ventilation system. Instrument procurement and assembly is in progress.

4.1.1 Planned activities for the 4th Quarter of 1984

Complete construction of the ¼ scale test facility and installation and calibration of all instrumentation. Start shakedown tests to verify operation of the facility systems and instrumentation.