



# MISSISSIPPI POWER & LIGHT COMPANY

*Helping Build Mississippi*

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August 18, 1981

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/L-860.0  
Hydrogen Action Status Report  
AECM-81/298

Please find the subject Status Report attached. The items identified in the report consist of concerns identified during Mississippi Power & Light Company's (MP&L) review of other plants' igniter evaluations submitted to the NRC; as well as NRC concerns identified during an informal meeting with the NRC on July 22, 1981.

It should be noted that in addition to utilizing CLASIX-3, a modified version of CLASIX, to perform containment response analyses, MP&L has engaged the firm Combustion and Explosives Research, Inc., specifically Drs. Lewis and Karlovitz, to advise MP&L in the areas of hydrogen control, potential for transition to detonation, burn characteristics, mixing/distribution and general behavior of hydrogen. In this, Drs. Lewis and Karlovitz will also serve as advisors on the necessity for testing as well as contributing to the evaluation of tests previously run in areas compatible with or applicable to a Mark III Containment, specifically the Grand Gulf Nuclear Station.

It is the intent of this report to present the additional work MP&L and its consultants intend to perform. This work consists of a number of individual action items which have been divided into ten (10) major categories as follows:

- Section:
- 1.0 Hydrogen Ignition System Description
  - 2.0 Hydrogen Ignition System Operation
  - 3.0 Hydrogen Igniter Testing and Inspection
  - 4.0 Accident (Hydrogen Generation) Scenarios
  - 5.0 Hydrogen Behavior
  - 6.0 Containment Response
  - 7.0 Containment Ultimate Capacity
  - 8.0 Equipment Survivability
  - 9.0 Testing Program
  - 10.0 Other Concerns

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It is MP&L's intent to complete the action items in Sections 1.0, 3.0, 4.5, 6.1, 7.0, 8.1, 9.0 and 10.0 and submit same to the NRC the week of September 28, 1981. It is also our intent to complete and submit to the NRC those action items in Sections 2.0, and 4.1 through 4.4 the week of October 19, 1981. The remaining Sections 5.0, 6.2 through 6.7 and 8.2 will be completed and submitted by the end of December 1981. Material which has been previously submitted will be included, as necessary, in order to ensure completeness and continuity. It is MP&L's intent to provide a single document by December 31, 1981, that will contain all pertinent information on the hydrogen control program at Grand Gulf, including previously submitted material.

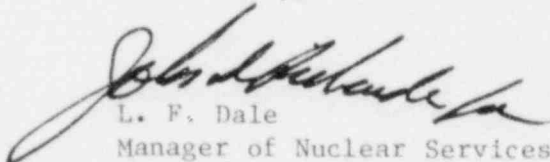
In addition to the submittals of September, October and December, it is MP&L's intent to submit by the end of August a description of the integrated scenario (base case) for future analyses as well as two bounding cases to supplement our June 19, 1981 submittal and by mid-October a status report will be submitted. MP&L will update this status report on an as-needed basis when making one or all of the above submittals.

Based upon the work performed utilizing the MAKCH results and CLASIX-3, MP&L has selected, on a preliminary basis, the following parameters as a base case (integrated scenario):

- A. Stuck Open Relief Valve
- B. 8 volume % ignition with 85% burnup
- C. Flame Speed of 6 FPS
- D. One Spray Train
- E. Purge and Igniter Systems started in 20 minutes
- F. 7 to 9 SRVs opened to yield an approximately uniform distribution

It is MP&L's opinion that the issue discussed herein and the attached information are responsive to the NRC's concerns and the information, as it becomes available, will be presented to the NRC in a timely manner while maintaining a constant dialogue on the Hydrogen Issue.

Yours truly,

  
L. F. Dale  
Manager of Nuclear Services

RMS/SHH/JDR:dn  
Attachments

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

Mr. Victor Stello, Jr., Director  
Office of Inspection & Enforcement  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

<u>Number</u>	<u>Action Item</u>	<u>Schedule</u>
1.0	Hydrogen Ignition System (HIS) Description	September 1981
1.1	Clarify igniter locations (centerline)	September 1981
1.2	Provide a list of all compartments which have dual igniters.	September 1981
1.3	Igniter identification: a) Vendor b) Model c) Qualification Program d) Design Criteria	September 1981
1.4	Discuss design adequacy of assembly for pool swell, drywell negative pressure transient, etc.	September 1981
1.5	Discussion of the operation of the HIS under moist wetwell environments.	September 1981
1.6	Discuss the impingement of break spray (or of SRV discharge) on igniters.	September 1981
1.7	Evaluate whether the sheet-flow into the wetwell impinges on the igniters directly.	September 1981
1.8	Evaluate raising igniter surface temperature.	September 1981
1.9	Evaluation of seven days operability as a design basis.	September 1981
1.10	Provide a more detailed description of the HIS and its power supplies.	September 1981
2.0	Hydrogen Ignition System (HIS) operation.	
2.1	Discuss emergency procedures for HIS initiation prior to water level at or below the "Top of Active Fuel" (TAF) and additional guidance to the operator to aid him in responding to situations where there is significant hydrogen generation.	October 1981

<u>Number</u>	<u>Action Item</u>	<u>Schedule</u>
3.0	Hydrogen Igniter testing and inspection.	
3.1	Evaluation of operation of igniter during pool swell events and the need for testing.	September 1981
3.2	Define an igniter selection program; i.e., how will actual igniters to be installed be selected?	September 1981
3.3	Provide a detailed description of the igniter test program (including seven day operability and immersion testing).	September 1981
4.0	Accident Scenarios.	
4.1	Provide a list of accident scenarios considered in the design of the Grand Gulf HIS.	October 1981
4.2	Clarify or confirm ADS availability and actuation: a) Discuss emergency procedures. b) Discuss TMI-related ADS modification. c) Discuss depressurization times of ADS in relation to design scenario.	October 1981
4.3	Discuss operation of the Containment Spray System (CSS) and how ECCS functions are effected by use of CSS.	October 1981
4.4	Provide a description of the scenario used in the Grand Gulf analysis, including a description of the MARCH analysis.	October 1981
4.5	Describe the operation of the Combustible Gas Control System (CGCS) during burns (including a discussion of the logic for the purge compressors and the vacuum breakers).	September 198

<u>Number</u>	<u>Action Item</u>	<u>Schedule</u>
5.0	Hydrogen Behavior	A schedule will be provided for Section 5.0 action items in October 1981.
5.1	Discuss mixing in wetwell, including effects of barriers, if any, and local releases.	
5.2	Discuss the potential for and effects of transition to detonation.	
5.3	Discuss the likelihood and possible consequences of hydrogen detonation in the Grand Gulf containment.	
5.4	Evaluate hydrogen distribution and mixing.	
5.5	Provide plots of gas concentrations.	
6.0	Containment Response.	
6.1	Provide additional information on containment cross-sectional flow area:  a) Overall  b) Gratings, solid floor	September 1981
6.2	Reanalyze the Drywell Break case with the integrated scenario.	December 1981
6.3	Conduct sensitivity studies: a) Burn Parameters, varying:  1. Flame Speed  2. Burn Fraction  3. Propagation Criteria  4. Ignition Point  b) Spray Parameters, varying:  1. Number of trains  2. Amount of spray into wetwell	December 1981

<u>Number</u>	<u>Action Item</u>	<u>Schedule</u>
	c) Heat Sink Parameters, varying: <ol style="list-style-type: none"> <li>1. Convective heat transfer</li> <li>2. Beam length</li> </ol>	
	d) Convective flow, evaluation: <ol style="list-style-type: none"> <li>1. Flow between Wetwell and Containment</li> </ol>	
	e) Gas properties, varying: <ol style="list-style-type: none"> <li>1. Cp during one burn, and</li> <li>2. Cv during one burn</li> </ol>	
6.4	Provide verification of CLASIX-3.	December 1981
6.5	Provide further discussion on the burn parameters.	December 1981
6.6	Provide a discussion of how oxygen in the wetwell is replaced.	December 1981
6.7	Discuss flame speeds used in the analysis.	December 1981
7.0	Containment Ultimate Capacity	
7.1	Provide further information on strengthening upper containment personnel airlock.	September 1981
8.0	Equipment Survivability	
8.1	Provide a description of the Grand Gulf equipment survivability program.	September 1981
8.2	Provide the status of the equipment survivability program.	December 1981

<u>Number</u>	<u>Action Item</u>	<u>Schedule</u>
9.0	Testing Program	
9.1	Review other testing programs and recommend a testing program to support Grand Gulf in those areas where currently complete or "in progress" tests are not adequate.	September 1981
10.0	Other Concerns	
10.1	Evaluate the possibility and effects of secondary fires.	September 1981