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

June 16, 1983

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
License No. NPF-13
File 0260/L-860.0
Responses to NRC Requests for
Additional Information
AECM-83/0212

References:
1. Letter from Mr. R. W. Houston to Mr. J. D. Richardson dated February 3, 1983
2. Hydrogen Control Owners Group (HCOG) Letter HGN-011 from Mr. J. D. Richardson to Mr. R. W. Houston dated May 11, 1983

Reference letter 1 included a list of requests for additional information (RAIs) from the NRC concerning the Hydrogen Control Owners Group (HCOG) program. Reference letter 2 transmitted responses from the HCOG to the NRC for RAIs. Mississippi Power & Light Company (MP&L) endorses the responses provided by the HCOG in reference letter 2 for RAIs 1-6 and 10.

Attachment 1 to this letter contains responses which are specifically applicable to MP&L's Grand Gulf Nuclear Station (GGNS) for RAIs 7, 8, 9, 11 and 12.

Attachment 2 to this letter consists of 3 copies of the MP&L proprietary version of the CLASIX-3 Grand Gulf Drywell Break Sensitivity Summary, Report No. OPS-38A54 Rev. C, May 11, 1983, and 10 copies of the MP&L non-proprietary version of this report, Report No. OPS-39A82 Rev. A, May 11, 1983. These are submitted as supporting information for MP&L's plant specific response to RAI #7. The information submitted for RAI #7 should be considered applicable solely to Grand Gulf.

Also enclosed is an affidavit requesting withholding of those portions of the subject report which have commercial interest to MP&L. Specific references are made to 10CFR 2.790 of the Commission's regulations as the basis for requesting the withholding.

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Bool 1/9-Prop 1/10-NP

Prop Encls To: Reg Files-1 PM-2

MISSISSIPPI POWER & LIGHT COMPANY

The responses submitted with this letter in conjunction with the responses submitted by the HCOG should be adequate to resolve these RAIs pending completion of ongoing work on the hydrogen control emergency procedure guideline.

Yours truly,

L. F. Dale
Manager of Nuclear Services

JRH/SHH/JDR:lm
Attachments

cc: Mr. J. B. Richard (w/a)*
Mr. R. B. McGehee (w/o)
Mr. T. B. Conner (w/o)
Mr. G. B. Taylor (w/o)

Mr. Richard C. DeYoung, Director (w/a)*
Office of Inspection & Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. J. P. O'Reilly, Regional Administrator (w/a)*
Office of Inspection & Enforcement
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101 Marietta Street, N.W., Suite 3100
Atlanta, Georgia 30303

*Includes Attachment 1 Only

AFFIDAVIT

STATE OF MISSISSIPPI

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COUNTY OF HINDS

Before me, the undersigned authority, personally appeared J. P. McGaughy, Jr., who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Mississippi Power & Light Company (MP&L), acting as the authorized agent for the owners of the Grand Gulf Nuclear Station, and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information and belief:

(1) I am Vice-President, Nuclear, of MP&L and as such have been delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing or rulemaking proceedings, and am authorized to apply for its withholding on behalf of MP&L and the owners of the Grand Gulf Nuclear Station.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.790 of the Commission's regulations and in conjunction with MP&L's application for withholding the confidential, commercial information contained in the Grand Gulf Drywell Break Sensitivity Summary, Report No. OPS-38A54, Revision C, May 11, 1983, accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by MP&L, Nuclear, in designating information as a trade secret, privileged, confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.790 of the Commission's regulations, the following is furnished for the Commission's consideration in determining whether the information in the Grand Gulf Drywell Break Sensitivity Summary, sought to be withheld from public disclosure should be withheld.

(i) The confidential, commercial information sought to be withheld from public disclosure is owned exclusively by MP&L, as agent for the owners of the Grand Gulf Nuclear Station and has been held in confidence, with disclosure only for purposes of promoting cost-sharing.

FOPSsp

(ii) The information is of a type that is customarily treated as confidential and proprietary to MP&L and which is only disclosed to others for commercial purposes of cost-sharing or sale of rights to use such information. MP&L has a rational basis for determining the types of commercial information which should be customarily considered proprietary and held in confidence, and seeks confidential treatment, as a matter of policy, for information which is marketable exclusively by MP&L and which has potential commercial value to MP&L, until or unless such information is made public. The information sought to be withheld in this submittal falls within this category of confidential, proprietary information for the following reasons:

(a) The information was prepared by Offshore Power Systems, a part of Westinghouse Electric Corporation, specifically for the Grand Gulf Nuclear Station pursuant to contractual provisions which prohibit Offshore Power Systems and/or Westinghouse Electric Corporation from disclosing the information to third parties, absent MP&L's consent.

(b) The information reveals results of analyses and conclusions drawn from a study funded solely by MP&L specifically for the Grand Gulf Nuclear Station but which could be utilized by other BWR Mark III owners in order to avoid the expense of conducting separate analysis by such owners.

(c) If the information is made public, other utilities would have no incentive to share MP&L's costs in producing the information, and MP&L's ability to market the data or recover any portion of its costs would be severely diminished.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.790, it is to be received in confidence by the Commission.

(iv) The information is not available in public sources to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is bracketed in the Grand Gulf Drywell Break Sensitivity Summary, Report No. OPS-38A54, Revision C, May 11, 1983, transmitted by the MP&L application for withholding which accompanies this Affidavit.

Public disclosure of this information is likely to cause substantial harm to the commercial and/or competitive position of MP&L because it would enable other utilities to use the information to meet NRC requirements for

licensing documentation without purchasing the right to use the information from MP&L or without agreeing to share MP&L's costs in developing the information and would alleviate the need for other utilities to develop similar information for their specific plants.

The development of this information is the result of substantial MP&L effort and the expenditure of a considerable sum of money.

In order for other utilities to duplicate this information, a substantial analytical program would have to be performed with a significant manpower effort, (having the requisite talent and experience), and/or a considerable sum of money would have to be expended.

Witness my signature, this the 13th day of June, 1983.

J. P. McGaughy, Jr.

Sworn to and subscribed before me this the 13th day of June, 1983.

Notary Public

My Commission Expires:

February 13, 1985

ATTACHMENT 1

PLANT SPECIFIC RESPONSES TO REQUESTS FOR ADDITIONAL INFORMATION

7. It is our position that the analyses of the consequences of a small break in the drywell have not sufficiently considered the sensitivity to a number of parameters. Therefore, provide additional sensitivity studies on the following parameters:

   a. ignition criteria of 9-10% H_2 with 100% complete combustion;

   b. spray flow;

   c. minimum requisite O_2 concentration of 6% in the drywell; and

   d. burn time.

   Additionally, provide the results of evaluation to determine the effects of the assumed "drywell" spray.

   RESPONSE:

   Mississippi Power & Light (MP&L) concurs with the Hydrogen Control Owners Group response to this question which was submitted in reference 1. This response stated that the HCOG does not believe that additional sensitivity studies for the drywell break accident are warranted based upon the work which has been completed to date.

   Although MP&L does not believe that additional sensitivity studies are necessary to assure that a complete range of parameters have been evaluated for the drywell break accident, never-the-less, MP&L has completed several additional CLASIX-3 studies to address specific questions raised by the NRC staff. Attachment 2 to AECM-83/0212 titled "Grand Gulf Drywell Break Sensitivity Summary" [proprietary and non-proprietary versions] contains all of the drywell break accident analyses which have been completed with the CLASIX-3 computer code. Several of the cases contained in this report are replications of the drywell break accident cases submitted in reference 2.

   The cases discussed in the Grand Gulf Drywell Break Sensitivity Summary include studies with varying flame speeds (which affects the burn time), ignition criteria of 10% hydrogen concentration by volume, addition of an intermediate volume between the upper containment and the wetwell, and a simulation of a continuous burn in the drywell. The results from all of these sensitivity runs taken together did not show any unexpected behavior.

   A large number of permutations have been made in the base case input for the drywell break accident analysis using CLASIX-3. The completed sensitivity runs have shown results which correspond to the expected results. For example, when the burn initiation criteria is increased from 8% to 10% hydrogen concentration, the

peak temperatures and pressures produced by hydrogen combustion increase accordingly. When the flame speed is reduced from 6 ft/sec to 3 ft/sec, the peak temperatures and pressures produced by hydrogen combustion decrease accordingly.

MP&L therefore concludes that additional sensitivity runs are not required for the drywell break accident and that the runs which have been completed to address other questions from the NRC staff further reinforce this conclusion. In particular, MP&L does not believe that additional sensitivity runs to evaluate the effects of varying spray flow or the effects of varying the minimum concentration of oxygen required to support hydrogen combustion will yield useful information for evaluating the Hydrogen Igniter System.

REFERENCES:

1. Hydrogen Control Owners Group Letter HGN-011, dated May 11, 1983, from Hydrogen Control Owners Group to R. W. Houston.

2. CLASIX-3 Containment Response Sensitivity Analysis submitted with Letter HGN-001, dated January 15, 1982, from the Hydrogen Control Owners Group to H. R. Denton.

8. Provide an evaluation of the consequences of pool dynamic loads created by the combustion of hydrogen. It is necessary to address the effects on both structures and equipment. Your evaluation should consider the effects of combustion in the drywell and combustion in the wetwell and containment. For events which produce combustion in the containment and which cause pool water to spray into the drywell, your analysis should consider the effect of the sprayed water cooling the drywell and contributing to the differential pressure transient.

RESPONSE:

MP&L has previously provided discussions on the affects of hydrogen combustion on suppression pool dynamic loads. Reference 1 submitted additional sensitivity studies for the drywell break accident scenario. These cases included a very conservative study utilizing a flame speed of 12 fps. Reference 1 showed that even with the very conservative flame speed of 12 ft/sec, the resulting differential pressure transient was bounded by the existing LOCA differential pressure transient.

Reference 2 provided additional information on the effects of hydrogen combustion on pool dynamics. This letter and Reference 1 emphasized that global burns in the drywell, which would produce the most significant effects on pool dynamics, are not likely to occur. Instead, the drywell compartment is most likely to be subjected to relatively slow pressurizations produced by inverse diffusion flames which result from gradual reintroduction by the purge compressors of oxygen bearing atmosphere into the hydrogen and steam rich drywell. The slow pressurization will preclude both the global drywell burn and the relatively large wetwell burn which follows the drywell burn. On the basis of the information contained in Reference 1 and 2, MP&L concludes that no further evaluation of the effects of hydrogen combustion on pool dynamics is warranted.

MP&L is currently evaluating possible loads on essential equipment due to reverse pool swell produced by hydrogen combustion. This evaluation will include the effects of condensation in the drywell produced by the inflow of relatively cool suppression pool water. The results of this analysis will be submitted to the NRC at a later date.

REFERENCES:

1. Mississippi Power & Light Letter AECM-82/135, dated April 6, 1982, from L. F. Dale to H. R. Denton.

2. Mississippi Power & Light Letter AECM-82/294, dated June 25, 1982, from L. F. Dale to H. R. Denton.

9. Provide an evaluation of the effects of differential pressures between the containment and drywell on essential equipment (e.g., vacuum breaker system, purge compressor system) and structures.

RESPONSE:

Reference 1 contained a sensitivity study of the drywell break accident scenario which utilized an extremely conservative flame velocity of 12 fps. Reference 2 noted that 4 fps would be a much more reasonable flame velocity for the quiescent conditions which will exist in the drywell. The conclusions in Reference 1 showed that the resulting differential pressure transient is bounded by the existing LOCA differential pressure transient. Both References 1 and 2 conclude that no appreciable differential pressure transients are likely to occur since the combustion process in the drywell will most probably take the form of inverse diffusion flames. Consequently, MP&L believes that the existing design basis accident analyses (DBA) envelope the worst case bounding differential pressure transients which could result from hydrogen combustion. The existing evaluation of structures and equipment against DBA differential pressure transients are also adequate to assure that equipment and structures can withstand differential pressure transients produced by hydrogen combustion.

Reference 3 provided an evaluation of the capability of the drywell vacuum breakers to withstand differential pressure transients. Since the vacuum breakers are capable of withstanding a process flow pressure of 30 psi, as noted in Reference 3, they will be capable of withstanding even the unrealistically conservative differential pressure transient which would result from a single global drywell burn with a flame velocity of 12 fps. MP&L does not believe that any further evaluation of the drywell vacuum breakers is warranted.

MP&L had previously reached an agreement with the NRC staff that no additional evaluations of the drywell purge compressors was necessary. This agreement was documented in Reference 3. MP&L is completing a new evaluation of the drywell purge compressor's capability to withstand predicted differential pressure transients. This evaluation will be submitted to the NRC staff at a later date.

REFERENCES:

1. Mississippi Power & Light Letter AECM-82/135, dated April 6, 1982, from L. F. Dale to H. R. Denton.

2. Mississippi Power & Light Letter AECM-82/294, dated June 25, 1982, from L. F. Dale to H. R. Denton.

3. Mississippi Power & Light Letter AECM-82/309, dated July 6, 1982, from L. F. Dale to H. R. Denton.

11. Provide a discussion similar to that outlined in item 10 above for the actuation of the containment spray system and drywell purge compressors.

RESPONSE:

Mississippi Power & Light stated in reference 1 that a study is in progress to address issues related to spray actuation for accidents which may produce hydrogen burns. This study is also evaluating actuation criteria for the combustible gas control system including the drywell purge compressors and the hydrogen recombiners. As indicated in reference 1, the completed study will be submitted before the plant begins power ascension above 5%.

REFERENCES:

1. Letter AECM-83/58 from Mr. L. F. Dale to Mr. H. R. Denton dated January 28, 1983.

12. Provide an analysis of the concommitant effects of the largest credible containment detonation which could occur. Demonstrate that the effects of such an event could be safely accommodated by the structures and essential equipment. You may wish to consider a local detonation in the volume below the largest concrete/solid section of the HCU floor.

RESPONSE:

Mississippi Power & Light (MP&L) has addressed this question in reference letters 1 and 2. The largest credible containment detonation which could occur was conservatively estimated assuming that the entire volume under the concrete portion of the HCU floor to the suppression pool surface is involved in the local detonation. This volume also roughly corresponds to the region from the bottom of the main steam tunnel to the suppression pool surface. Reference letter 1 contained MP&L's evaluation of the Grand Gulf Nuclear Station's (GGNS) capability to withstand this local detonation. The analysis submitted in reference 1 showed that the GGNS containment structure is capable of withstanding the pressure time history which results from this local detonation.

Reference letter 2 included evaluations of the capability to withstand the local detonations of the drywell head and the lower containment air lock. Both of these components were demonstrated to be capable of withstanding the local detonation.

REFERENCES:

1. Letter AECM-82/266 from L. F. Dale to H. R. Denton dated June 11, 1982.

2. Letter AECM-82/336 from L. F. Dale to H. R. Denton dated July 1, 1982.

ATTACHMENT 2

1) CLASIX-3 Grand Gulf Drywell Break Sensitivity Summary, Report No. OPS-38A54 Rev. C, May 11, 1983 [PROPRIETARY VERSION]

2) CLASIX-3 Grand Gulf Drywell Break Sensitivity Summary, Report No. OPS-39A82 Rev. A, May 11, 1983 [NON-PROPRIETARY VERSION]