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January 15, 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 Sir:

SUBJECT: Hydrogen Control Owners Group
(HCOG) BWR-6 Mark III
Containment Sensitivity Study
for Hydrogen Generation Event
File No: 004, 008, 110
Correspondence No: HGN-001

The Mark III Containment Hydrogen Control Owners Group (HCOG) has prepared a set of studies of the temperature and pressure response of a Mark III containment to hydrogen burns resulting from the operation of an igniter system. The Grand Gulf Nuclear Station (GGNS) Mark III containment was used as a typical containment for this analysis. The analysis includes both base case analyses and an extensive set of sensitivity studies which make these results applicable to a broad range of Mark III containment designs. Based on the extensive nature of this analysis in determining the sensitive parameters for Mark III Containments, it is the position of the HCOG that the Mark III applicants which funded this work should not be required to perform any further sensitivity studies.

Enclosed is a copy of this report "CLASIX-3 Containment Response Sensitivity Analysis".

The CLASIX-3 analytical results for the reference containment are based on two assumptions that are inherent in the program and essential to the applicability of the results to other BWR Mark III plants. The first assumption is that each control volume in the analysis is perfectly mixed. The second assumption is that the ignition does not occur until the hydrogen concentrations achieve a specified value. For an adiabatic, isochoric deflagration of a given mixture of hydrogen, air and steam, the final temperature and pressure are independent of the volume of the container. The deviations from the adiabatic, isochoric conditions during a deflagration will determine the decrease in the peak temperature and pressure from the idealized conditions.

In the analyses, the highest pressures always occurred during a burn in the containment volume and an essentially concurrent burn in the wetwell. During this burn, there is a small increase in the volume due to depression of the suppression pool level in the wetwell and a small decrease in mass of the atmosphere due to flow through the vacuum breakers into the drywell. Both of these effects are small. Also during the burn, heat is removed from the atmosphere by transfer to the passive heat sinks and mass is added to the atmosphere through vaporization of the spray.

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By submittal of this report, two major accomplishments result:

(1) There is an elimination of the duplication of effort for each applicant in the HCOG to conduct a major series of studies on this generic licensing concern; the single study suffices.

(2) The task of the Nuclear Regulatory Commission (NRC) in reviewing applicant submittals is reduced in magnitude.

Yours truly,

J. D. Richardson, Chairman
Hydrogen Control Owners Group

SHH/JDR:dr
Attachment

cc: Carl R. Stahle
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