

DUKE POWER COMPANY

POWER BUILDING

422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

May 4, 1982

TELEPHONE: AREA 704
373-4083

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Ms. E. G. Adensam, Chief
Licensing Branch No. 4

Re: McGuire Nuclear Station
Docket Nos. 50-369, 50-370

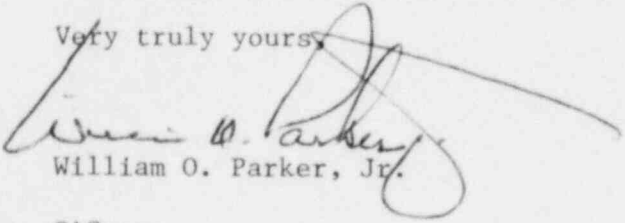


Dear Mr. Denton:

Attached herewith are 20 copies of Revision 4 to Duke Power Company's report "An Analysis of Hydrogen Control Measures at McGuire Nuclear Station." The purpose of this revision is to provide an interim project report for the Combustion Phenomena Testing program at Whiteshell Laboratories.

Please advise if you have any questions regarding this information.

Very truly yours,


William O. Parker, Jr.

GAC:scs

Attachment

cc: Mr. James P. O'Reilly, Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Mr. P. R. Bemis
Sr. Resident Inspector
McGuire Nuclear Station

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AN ANALYSIS OF HYDROGEN CONTROL MEASURES AT
MCGUIRE NUCLEAR STATION

Insertion Sheet
Revision 4

Remove These Pages:

2.8-2

Volume 1 - Chapter 2

Volume 2 - Appendix 2J

Insert These Pages:

2.8-2

Add Interim Project Report
in back of Appendix 2J

with fans and grating. Tests are to be conducted with both items individually and jointly. Fan flow is varied from zero to a combined maximum of approximately 3000 cfm. The grating consists of a 1/4 inch plate perforated with 1 inch diameter holes, resulting in a blockage of 50%. Plates are located one third and two thirds the vessel height. Hydrogen concentrations are varied from 6 to 20 v/o. In Phase 4, a pipe approximately one foot in diameter and 20 feet long is attached to the sphere. Tests are to be conducted with uniform and non-uniform hydrogen concentrations varying from 6 to 20%. Ignition will be in the pipe and in the sphere. These tests provide data on the effects of flame propagation from one geometry into another, as well as the effects of propagation from one concentration to another.

Test results obtained appear to confirm that steam and turbulence have competing effects on hydrogen combustion. Steam tends to reduce the rate and degree of combustion, while turbulence promotes rapid and more complete combustion. However, as the hydrogen concentration approaches stoichiometric, the effect of turbulence becomes marginal. The effect of gratings is dependent on the hydrogen concentration. Gratings appear to enhance the combustion rate of lean mixtures due to splitting of the fire ball. However, the heat sink effect of the gratings appear to dominate for relatively rich concentrations; thus reducing the peak pressure. All testing, with the exception of Phase 4, has been completed. Phase 4 testing is scheduled for completion by early May. Two interim reports, dated December, 1981 and April, 1982 are presented in Appendix 2J. These reports present the results obtained in the first three phases of the project.

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