

YANKEE ATOMIC ELECTRIC COMPANY



20 Turnpike Road Westborough, Massachusetts 01581

December 12, 1977



United States Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Office of Nuclear Reactor Regulation
Division of Operating Reactors
Victor Stello, Jr., Director

Dear Sir:

Subject: Yankee Topical Power Spike Model

As discussed with your staff at a November 16, 1977 meeting, Yankee Atomic Electric Company's Nuclear Services Division requests that the NRC review the subject document which is enclosed. An additional 59 copies are being transmitted under separate cover.

The purpose of the power spike model is to evaluate the magnitude of local power peaking which arises because of the increasing neutron flux due to the decrease of neutron absorption, resulting from the formation of gaps due to fuel densification. Since the power peaking in a given rod at a given axial interval is a function of the size and number of gaps in the surrounding fuel rods, the power spike model employs a statistical approach to determine the gap distribution. Based on this gap distribution and a conservative set of percent contributions to the power peaking due to a single gap, the augmented power distribution is determined. The ratio of the worst augmented power to the worst nominal power is the power spike. The program recomputes the power spike of each axial interval a few thousand times to develop a good statistical sample. Finally, utilizing the power census, the power spike for each axial interval, is determined with 95% confidence that no more than one fuel rod will exceed the power spike.

We would appreciate the expeditious review and approval of this model. Upon approval we intend to immediately request that this model be amended to one of our operating plant dockets.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

L. H. Heider
Assistant Vice President

8011060 859

RHG/kg

P

77550054

DISTRIBUTION AFTER ISSUANCE OF OPERATING LICENSE

NRC FORM 195

U.S. NUCLEAR REGULATORY COMMISSION

DOCKET NUMBER

50-29271/309

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

FILE NUMBER

TO: Mr. Victor Stello, Jr.

FROM: Yankee Atomic Electric Company
Westborough, Mass.
L. H. Heider

DATE OF DOCUMENT
12/12/77

DATE RECEIVED
12/19/77

BESTER
 ORIGINAL
 COPY

NOTORIZED
 UNCLASSIFIED

PROP

INPUT FORM

NUMBER OF COPIES RECEIVED

3 SIGNED

DESCRIPTION

ENCLOSURE

Consists of report entitled "Yankee Power Spike Model"- by P. T. Antomopoulos, K. J. Heider and C. L. Watkins - Nuclear Engineering & Development Dept. - November 1977.....

(1-P)

(1/2")

566
RPT

PLANT NAME: Yankee Rowe/Vermont Yankee
Maine Yankee/
RJL 12/21/77

60 ENCL.

SAFETY FOR ACTION/INFORMATION

BRANCH CHIEF: R. REID
A. SCHWENCER
A. BURGER
L. OLSHAN
J. SIEGEL
R. INGRAM

INTERNAL DISTRIBUTION

REC FILE S. SHEPPARD

~~APP-DWG~~

T & F (2)

GELD

WANAUER

CHECK

EISENHUT

SHAO

BAER

BUTLER

FRIMES

J. COLLINS

J. MCGOUGH

EXTERNAL DISTRIBUTION

(3) LPDR: GREENFIELD MASS / BRATTLEBORO VT / WICAZETT ME

TIC

NSIC

ACRS 16 CYS SENT CATEGORY B

POOR ORIGINAL

CONTROL NUMBER

11/22/77
772550054