

Regulatory Docket File

TWX
710-390-0739
WYR 76-116

YANKEE ATOMIC ELECTRIC COMPANY



20 Turnpike Road Westborough, Massachusetts 01581

November 17, 1976

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

Attention: Office of Nuclear Reactor Regulation

Reference: (a) License No. DPR-3 (Docket No. 50-29)
(b) Proposed Change 131 submitted September 25, 1975.
(c) NRC letter dated August 25, 1976 (Docket No. 50-29).

Dear Sir:

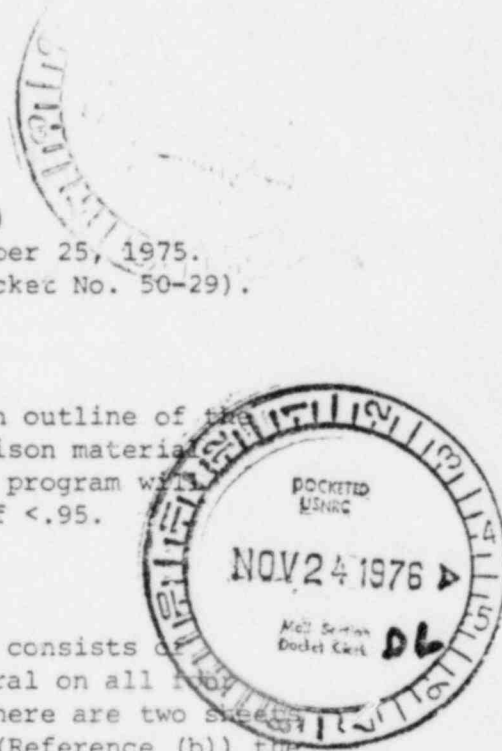
As requested by Reference (c) the following is an outline of the in-situ inspection program for the presence of the poison material (Boral) in the new spent fuel racks. This inspection program will verify the presence of sufficient Boral to ensure Keff < .95.

I. BACKGROUND

The rack design for Yankee Nuclear Power Station consists of individual square storage cavities each containing Boral on all four sides; therefore, between any two adjacent cavities there are two sheets of Boral. In the original proposed change submittal (Reference (b)) the Keff was stated as 0.796 including calculational uncertainties. This value would change to 0.927 if one of the two Boral sheets is missing between each cavity. Taking this design conservatism into account, only 50 percent of the Boral would have to be accounted for; one sheet between adjacent cavities. This approach totally ignores the fact that an extensive QA program verifying the presence of Boral was implemented by the rack manufacturer. This quality assurance program has been discussed with you in two letters and one meeting.

II. TEST PROGRAM

The physical hardware for the test consists of a neutron source (Pu-Be) surrounded by polyethylene, neutron detectors (fission chambers) and electronic recording equipment. Basically, the source will be inserted in one cavity and a detector in an adjacent cavity. The source and detector will be mounted on a rigid frame which will fix their positions relative to each other. By knowing what the detector readings should be with and without Boral present a "go, no-go" inspection system can be established. Preliminary testing has been performed using cavity models which are full scale in cross-section. Two model cavities were



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deliberately made with aluminum rather than Boral in one side of each. With these models, detector readings in counts per minute (CPM) were measured under various configurations. Figure 1 shows schematically the combinations tested and the resulting CPM the detector registered. The test results show a count rate of 27 ± 5 CPM when one or two Boral sheets were present between the source and detector compared to 210 ± 15 CPM when no Boral is present. This high degree of separability between acceptable and non-acceptable results make this test more than adequate to demonstrate the presence of the required amount of Boral. All tests were performed in air using the same center to center spacing as the actual racks incorporated. Both ends of the model cavities are open and can be visually inspected as to the contents. Boral is visually distinct from aluminum in cross-section.

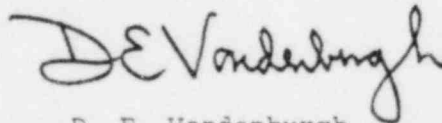
III. ON-SITE INSPECTION

All the new spent fuel racks will be inspected using this technique before installation in the spent fuel pool. An outline of the QA program that will be instituted for the in-situ inspection program is shown in Table 1. All standard health physics precautions and procedures will be implemented during the testing.

The inspection program Yankee has outlined herein will verify the presence of 50 percent of the poison material in the necessary configuration to ensure $K_{eff} < .95$. We trust this will satisfy your requirements, however, if any questions arise feel free to call us.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

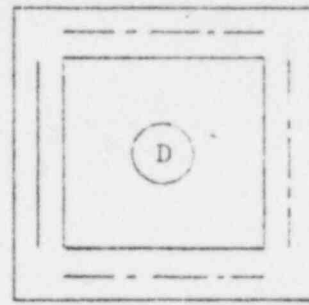
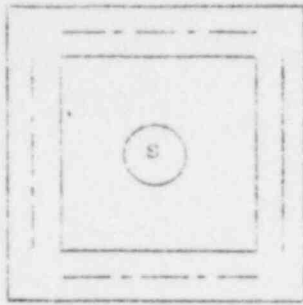


D. E. Vandenburg
Vice President

TMC/kg

FIGURE 1
PRELIMINARY IN-SITU TESTING

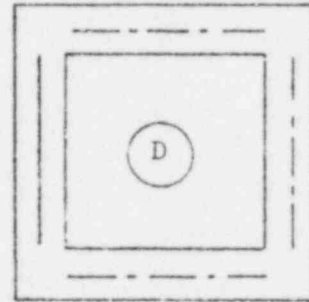
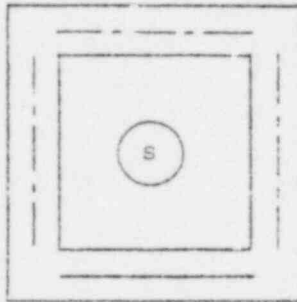
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a Aluminum vs. Aluminum

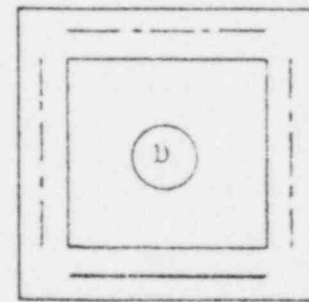
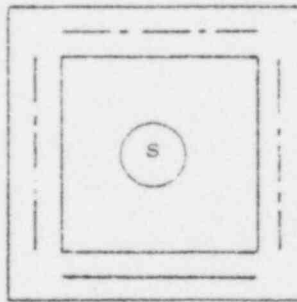
CPM: 210_±15

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b Aluminum vs. Boral

CPM: 27_±5



c Boral vs. Boral

CPM: 27_±5

Not to Scale

POOR ORIGINAL

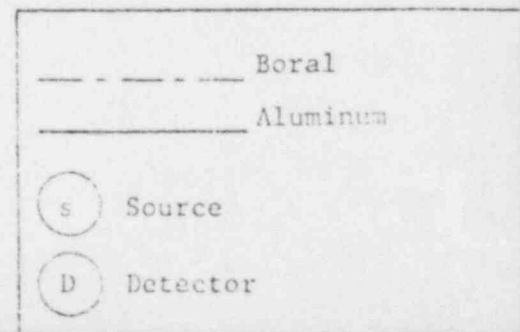


TABLE I

OUTLINE OF QA PROGRAM FOR IN-SITU INSPECTION

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Check # 11965
Date 11-17-72

- EVERY CAVITY WILL BE INSPECTED TO ENSURE THE PRESENCE OF BORAL IN EACH DIRECTION.
- ALL DETECTOR READINGS AND CORRESPONDING CAVITY SERIAL NUMBERS WILL BE RECORDED.
- INDIVIDUAL SIDES OF EACH CAVITY WILL BE ACCEPTED OR REJECTED BASED ON ITS DETECTOR READING COMPARED TO STANDARD READING ESTABLISHED BY MODELS.
- AT PREDETERMINED INTERVALS THE ACCEPTABLE STANDARD DETECTOR READING WILL BE REVERIFIED BY USING MODELS.
- IF SIGNIFICANT DEVIATION FROM STANDARD READING IS FOUND DURING CALIBRATION CHECK, ALL PREVIOUS CAVITIES WILL BE RE-INSPECTED UP TO LAST CHECK USING CORRECTED EQUIPMENT.
- ALL TESTING WILL BE DONE IN ACCORDANCE WITH WRITTEN APPROVED PROCEDURES.

POOR ORIGINAL

50-29

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

FILE NUMBER

TO: NRC

FROM: YAEC

Westborough, Mass. 01581
D.E. Vandenburg

DATE OF DOCUMENT

11-17-76

DATE RECEIVED

11-24-76

LETTER

NOTORIZED

PROP

INPUT FORM

NUMBER OF COPIES RECEIVED

3 signed 37 CC

DESCRIPTION Ltr re our 8-25-76 ltr...furn info on in-situ inspection program for the presence of the poison material (Boral) in the new spent fuel racks....w/attach TABLE 1 + Fig. 1

ENCLOSURE

PLANT NAME: Yankee Rowe

Do Not Remove
ACKNOWLEDGED

SAFETY

FOR ACTION/INFORMATION

ENVIRO DHL 11-26-76

ASSIGNED AD:
BRANCH CHIEF: (6) Schwencer
PROJECT MANAGER: Burger
LIC. ASST.: Sheppard

ASSIGNED AD:
BRANCH CHIEF:
PROJECT MANAGER:
LIC. ASST.:

INTERNAL DISTRIBUTION

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TIC:	REG. VIE	ULRIKSON (ORNL)
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ASLB:	CONSULTANTS	
ACRS / 6 CYS	CAT "B"	

CONTROL NUMBER

11965

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