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DENTON,H.R.	Office of Nuclear Reactor Regulation, Director
STOLZ,J.F.	Operating Reactors Branch 4

SUBJECT: Forwards info justifying lower values of integrated dose used in qualification of electrical equipment contained inside reactor bldg,per NRC 820209 request.Includes bases & assumptions used in analysis & sample calculation.

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TITLE: Response to NUREG -0737/NUREG-0660 TMI Action Plan Rqmts (OL's)

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March 16, 1982

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

Attention: Mr. J. F. Stolz, Chief
Operating Reactors Branch No. 4

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

By letter dated February 9, 1982, the NRC Staff requested that information be provided that justifies lower values of integrated dose used in the qualification of electrical equipment contained inside the Reactor Building.

In response to this request, bases and assumptions used in the analysis as well as a sample calculation are provided. The methodology is the same for all equipment with specified radiation doses less than the screening value.

Very truly yours,

William O. Parker, Jr.

RLG/php
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. W. T. Orders
NRC Resident Inspector
Oconee Nuclear Station

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OCONEE NUCLEAR STATION

Response to NRC Request for Additional Information Concerning Radiation dose Determination for Equipment Located Inside the Reactor Building.

The Total Integrated Dose (TID) information provided for equipment located inside the Reactor Building meets the requirements of the DOR Guidelines and is acceptable as noted in our response to SER paragraph 3.8.

The accident scenerio selected to yield the greatest release of radioactivity from the Reactor Coolant System (RCS) is the Loss of Coolant Accident (LOCA) with subsequent fuel damage. Radiation levels calculated for the Reactor Building were determined using the TID 14844 source term (100% noble gases, 50% iodines and 1% fission products).

Equipment with radiation doses less than the screening value ($4X10^7$) fall into four Categories:

1. Required for a short term function only following a design basis LOCA.

2. Required to function for a steamline break only.

3. Required to function for a small LOCA prior to any significant radiation releases.

4. Located outside the primary shield wall thus reducing the postulated radiation dose.

As dictated from the above categories, three main parameters must be considered when determining the proper TID:

1. Required operating time

2. Event (i.e., LOCA, HELB, etc.) for which the equipment is required to perform its safety function

3. The exact location of the equipment

The dose rate inside the Reactor Building is determined by the decay rates of the sources of activity. The dose rate decay curve was developed by two computer programs, N237BURP and KAP VI. Calculated by these programs, the Oconee post-LOCA 1-year TID is $6.1X10^7$ Rads.

Attachment I, "Normalized Integrated Dose vs. Time", was developed from the rate decay curve by dividing the integrated dose rate for a time period less than 1-year by the post-LOCA 1-year TID. By utilizing this curve the fraction of the post-LOCA 1-year TID received by a piece of equipment up to one year can be determined. It should also be noted that the 40-year normal TID is a function of Reactor operation and equipment location.

The following example presents the methodology used to determine the post-LOCA TID received by a typical piece of equipment located inside the Reactor Building.

EXAMPLE

EQUIPMENT: Reactor Coolant Pressure Transmitter
Item No. - 1PTRM0001
Plant ID No. - 1PT21P
System - ES

SPECIFIED REQUIRED OPERATING TIME: 15 minutes

WORST CASE EVENT: LOCA

LOCATION: Elevation 831; outside steam Generator Cavity walls
Radiation Zone 2 (Dwg. No.: 0-422-AA-3)

This transmitter has been qualified to operate in a radiation environment of 2.2×10^6 Rads TID (B & W TR-58-0093-00). Therefore, it must be determined if the 40-year normal integrated dose plus the 1 hour post-LOCA TID is greater than 2.2×10^6 Rads.

40-YEAR NORMAL TID = 3.0×10^4 Rads

FRACTION OF 1-YEAR POST-LOCA TID FROM ATTACHMENT 1 = .0298

1-HOUR POST-LOCA TID = .0298 X 1-YEAR POST LOCA TID

= .0298 X 6.1×10^7 Rads

= 1.82×10^6 Rads

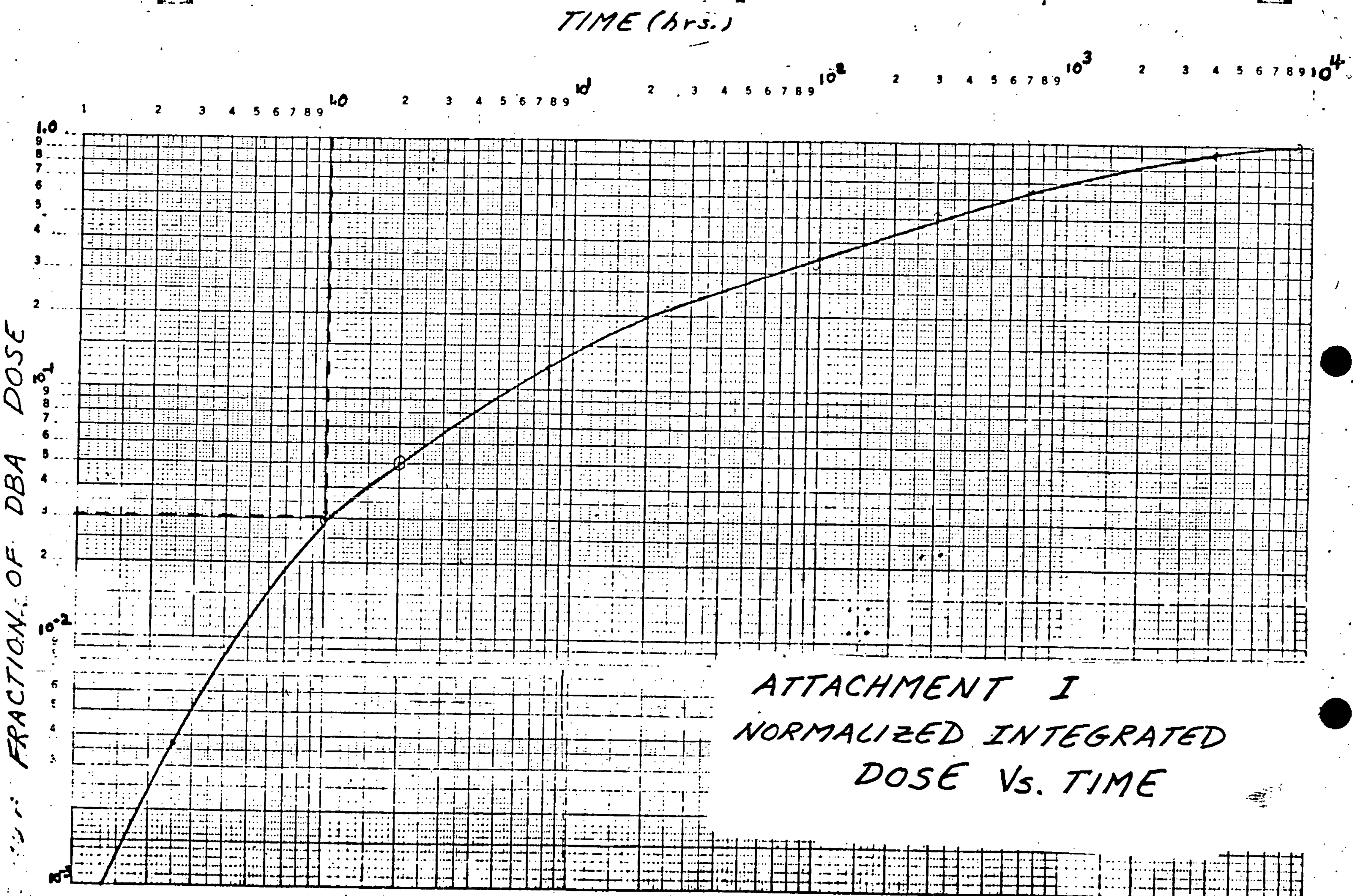
TOTAL = 40-YEAR NORMAL TID + 1-HOUR POST-LOCA TID

= 3.0×10^4 Rads + 1.82×10^6 Rads

= 1.85×10^6 Rads

The analysis confirms that the qualified radiation values for this transmitter exceeds the combined 40-year normal and accident dose calculated for the location of this device.

The methodology is the same for all equipment with specified radiation doses less than the screening value.



ATTACHMENT I

NORMALIZED INTEGRATED DOSE Vs. TIME