TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

July 18, 1980

Director of Nuclear Reactor Regulation
Attention: Mr. A. Schwencer, Chief
Light Water Reactors Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Schwencer:

In the Matter of the Application of) Docket Nos. 50-327
Tennessee Valley Authority) 50-328

References:
1. Letter from A. Schwencer to H. G. Parris dated June 19, 198[illegible]
2. Letter from L. M. Mills to A. Schwencer dated June 16, 1980
3. Letter from L. M. Mills to A. Schwencer dated June 17, 1980

In your letter dated June 19, 1980, you requested additional information regarding four subjects: shielding design review, high range containment radiation monitor, access control of areas adjacent to spent fuel transfer tubes, and containment sump debris. The first three items are discussed individually below. The last item, containment sump debris, will be addressed in a separate letter by July 25, 1980.

The questions regarding the shielding design review for Sequoyah Nuclear Plant have been addressed in TVA's report, "Design Review of Plant Shielding and Environmental Qualification of Equipment for Post-Accident Operation," (see Enclosure 1). The design report was transmitted by letter dated June 16, 1980 (reference 2).

TVA has revised its commitment to provide high range containment radiation monitors. High range radiation monitors will be installed in both the upper and lower compartments. TVA's document, "Response to NUREG-0578 Short Term Lessons Learned Requirement," will be revised by amendment to document this change. Responses to the specific questions on the high range radiation monitors are provided in Enclosure 2.

TVA has previously responded to the question on access control of areas adjacent to the spent fuel transfer tube. A revised response was transmitted to you by letter dated June 17, 1980 (reference 3). As noted in that letter, the Sequoyah Final Safety Analysis Report will be revised to include the new response.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosures (41)

SHIELDING REVIEW

331.03

(12.2.1)
(12.3.2)

Provide a summary of the shielding design review required by our letter dated November 9, 1979, implementing the lessons learned item 2.1.6.b of NUREG-0578, and provide a description of the results of this review. Include in your description:

a. source terms used in the evaluation (NUREG-0578 specified that source terms in Regulatory Guide 1.3, 1.4 and 1.7 be used).

b. systems assumed to contain high levels of radioactivity in a post-accident situation including, but not limited to, containment, residual heat removal, safety injection, CVCS, demineralizers, charging systems, reactor coolant filters, seal water filters sample lines, liquid radwaste systems, gaseous radwaste systems, and standby gas treatment systems. If any of these systems or others that could contain high radioactivity were excluded, explain why such systems were excluded from review.

c. specify areas where access is considered necessary for vital system operation after an accident. Your evaluation of areas to determine the necessary vital areas should include but not be limited to, consideration of the control room, Technical Support Center, Operational Support Center, recombiner hookup and control stations, hydrogen purge control stations, containment isolation reset control area, sampling and sample analysis areas, manual ECCS alignment

area, motor control centers, instrument panels, emergency power supplies, security center and radwaste control panels. If any of these areas were not considered areas where access was necessary after an accident, explain why they are excluded.

d. Designation of the codes used for analysis, such as ORIGEN, ISOSHIELD, QUAD or others.

e. The projected doses to individuals for necessary occupancy times in vital areas.

f. A brief description of the proposed plant modifications resulting from the design review and confirmation that these modifications will be complete by January 1, 1981, or full power, whichever is later.

Response

TVA's report entitled "Design Review of Plant Shielding and Environmental Qualification of Equipment for Postaccident Operation" was provided to the NRC by letter from L. M. Mills to A. Schwencer dated June 16, 1980. This report includes all the requested information.

331.04
(12.3.4)
(NTOL)

Revise and broaden your response of 1/24/80 to provide a description of the two high range containment monitors required by our letter of November 9, 1979, implementing the Lessons Learned item 2.1.8.b of NUREG-0578, and specify the location of these monitors (inside containment). The description of the monitors should include:

a. type of radiation measured;

b. the range or ranges of the monitors. If two or more monitors are required to span the range in Table 2.8.1.b.3 of our November 9, 1979, letter (10^8 rad/hr total radiation or 10^7 R/hr photons only), the ranges of the subsystem monitors must overlap (i.e., upper value/lower value of overlap) by at least a factor of 10;

c. location of and type of readout (continuous and recording);

d. energy response (sensitive to 60 kev);

e. calibration frequency and methods (refueling frequency);

f. verification that the monitors are powered by separate vital instrument buses;

g. verification that the monitors will be operational by full power;

h. verification that the monitors meet the seismic qualifications of Regulatory Guide 1.100 (Seismic Category I) and are environmentally qualified to survive an in-containment LOCA in accordance with Regulatory Guide 1.89.

Response

By January 1, 1981, TVA will provide redundant monitoring of radiation levels inside the containment during accident conditions. In the current plant design, this monitoring is done indirectly with a single instrument located in the auxiliary building opposite the containment upper compartment personnel hatch. The shielding between the monitor detector and the containment atmosphere consists of approximately 3/4-inch steel (i.e., the thickness of the containment personnel hatch doors).

Although indirect containment monitoring will provide adequate radiation monitoring following relatively severe loss-of-coolant accidents, our analyses have indicated that location of high-range monitors inside the containment atmosphere would make possible the monitoring of containment radiation over a greater spectrum of loss-of-coolant accidents and for a longer time period subsequent to the beginning of accident conditions. Instruments suitable for this purpose have been designed and should be qualified for the intended service in the near future. TVA is, therefore, augmenting its design for monitoring containment atmosphere during accident conditions by locating high-range monitors inside the containment.

The containment of each reactor unit will be monitored with four high-range area radiation monitors. Two of the monitors will provide redundant monitoring of the containment upper compartment and the other two will provide redundant monitoring of the lower compartment.

The monitor detectors will be located in normally accessible locations that are not protected by massive shielding. Additionally, in the case of the lower compartment, locations of high-exposure rates during normal operations, will be avoided. Specifically, the monitor detectors for the upper compartment will be located at normally accessible locations at or above elevation 796.63 and the monitor detectors for the lower compartment will be located between the primary shield and the crane wall at 5.0 feet to 6.0 feet above the floor at elevation 679.78.

The monitors are being purchased from General Atomic Company. Only gamma radiation is detected since the stainless steel detector enclosure effectively prevents beta radiation from reaching the detector. The monitor range is 10^8 R/h to 10^7 R/h. Monitor response in R/h is continuously indicated and recorded in the main control room. The monitors will measure exposure rates from all fission product radiation, including the low energy Xe-133 gamma radiation. The monitors will be calibrated at each refueling period with methods to be supplied by General Atomic Company. The monitors are supplied with trained 120V ac vital instrument power. Before installation, the monitors

will be seismically and environmentally qualified in accordance with Regulatory Guides 1.100 and 1.89, respectively.

If these monitors cannot be installed and operational by January 1, 1981, TVA will temporarily add a second high-range monitor outside one of the containment personnel hatches to provide redundant (indirect) monitoring of radiation levels inside the containment during accident conditions.