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

Enclosed are TVA's responses to M. Mendonca's informal questions dated June 27, 1980, on the Sequoyah Nuclear Plant Reactor Vessel Head Venting System.

If you have any questions, please get in touch with D. L. Lambert at FTS 857-2581.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills

L. M. Mills, Manager
Nuclear Regulation and Safety

Enclosures (41)

ENCLOSURE

1. Provide the description, analyses, procedures, and requirements for the pressurizer vent system as outlined in our November 9, 1979, letter.

Response:

Guidelines for the use of the pressurizer vent system have been provided in the emergency operating instructions (EOI's) provided by Westinghouse through the TMI Owners Group.

Analyses recently completed by Westinghouse with regard to Inadequate Core Cooling (WCAP-975), (Inadequate Core Cooling Studies of Scenarios with Feedwat[illegible]ble Using the NOTRUMP Computer Code) and Loss of Feedwater Induced LOCA's (WCAP-9744, Loss of Feedwater Induced Loss of Coolant Accident Report) have identified the need for additional guidelines regarding the use of the pressurizer vent system.

These additional guidelines regarding the use of the pressurizer vent system will be utilized in the preparation of an "Inadequate Core Cooling Procedure."

2. The proposed design could leave 160 FT^3 of reactor vessel head volume unvented that could adversely impact pressurizer control, heat transfer, and pump performance in recirculation mode. Also, the configuration and possible injection of UHI may interfere or be interferred with by the vent system. Therefore, provide either an analysis of the impact of this relatively large potential unvented volume and UHI configuration or, preferably, revise the design to essentially vent all of the reactor coolant system. Also, show that the vent system will vent RCS hot legs.

Response:

Procedures for use of the vent system will address this question (see item No. 9).

The hot leg on the Westinghouse PWR is not a high point; therefore, no venting is required.

3. Provide a schematic of the proposed Phase I vent system. Per the criteria in our letter dated November 9, 1979, assure: (1) that a single failure would not prevent venting; (2) that the probability of an inadvertent venting (by a single failure) be minimized and the adequacy of the leak detection system to measure an inadvertent venting; (3) that the system is designed to RPS safety grade standards (including seismic design); and (4) that requirements for vent path lineup are in place (block valves open with power or hand wheel removed).

Response:

The Reactor Vessel Head Vent System (RVHVS) consists of two parallel flow paths with redundant isolation valves in each flow path. The valves in each flow path are powered by opposite vital buses. If one single failure prevents a venting operation through one flow path, the second flow path provides a redundant backup. The two isolation valves in each flow path provide a single failure method of isolating the venting system.

Each isolation valve is a fail closed normally deenergized valve. With two valves in series, the failure of any one valve or power supply will not inadvertently open a vent path.

The RVHVS is seismically designed and supported. The isolation valves are qualified to IEEE-323, 344, 382, and meet Regulatory Guide 1.48 (active valves).

The RVHVS has two normally de-energized valves in series in each flow path. As such, power lockout to any valve is not considered necessary.

4. Demonstrate that the vent exit is to an area of the containment with adequate ventilation and cooling. Also, show that the vent exhaust does not impinge on other equipment or evaluate impact.

Response:

The reactor vessel head vent is routed to two different areas in the containment. One vent path is to the pressurizer relief tank. The other vent path is discharged in the vicinity of the ice condenser lower inlet doors. Gases are discharged primarily via the path to the ice condenser lower inlet doors. No localized buildup of gas from this vent is expected because of the airflow paths created by operation of the containment air return fans during an accident. Also, the vent paths are being designed to prevent direct impingement on other equipment in the vicinity of the vent discharge.

5. Provide justification that the vent system is qualified to pass all possible mediums, e.g., noncondensible gases, steam, water, and combinations thereof.

Response:

The head vent system valves are seismically and electrically qualified to the degree discussed in the response to question number 3. The valves supplied for the head vent system are designed (as required by the valve E-Specification) to pass all possible flow mediums.

6. Provide additional, independent vent system operational indication instrumentation, preferably valve position indication. (The downstream temperature indication by itself is not considered sufficiently reliable).

Response:

Isolation valves have stem position switches. Control valves have an independent reading of setpoint and valve position (feedback signal).

7. If the vents are larger than the LOCA definition (10 CFR 50 App. A), provide analyses to demonstrate that the LOCA consequences are acceptable. If the vents are not larger than the LOCA definition, discuss.

Response:

The vent is smaller than the LOCA definition. The system is orificed to 3/8 inch. A break in the piping downstream of the orifice will result in a blowdown of less than the capacity of one centrifugal charging pump.

8. Discuss the discharge capacity of the vents. How does it compare with the guidelines of venting a gas volume 1/2 the RCS volume in one hour?

Response:

The RVHVS will vent 1/2 of the RCS volume of hydrogen (at typical system temperatures) within one hour.

9. Provide criteria and operator action for venting and its termination. The procedure must also assure adequate decay heat removal via the U-tube steam generators, given possible noncondensibles that would obstruct natural circulation heat removal. The procedures must consider vent capabilities and the spectrum of potential venting condition. Include criteria for venting and its termination which assure pressurizer control, natural circulation, heat removal, reactor pressure and level control (prevent steam flashing and core uncovery), and containment combustibility requirements. The procedures must be based on the following criteria:

   a. The plant can meet the requirements of 10 CFR 50.46 and 50.44 (and combustible gas criteria of Regulatory Guide 1.7 (Rev. 1 and Standard Review Plan Section 6.2.5), and

   b. there is a substantial increase in the plants ability to maintain core cooling and containment integrity for events beyond the design basis.

   Response:

   Westinghouse is in the process of developing inadequate core cooling procedures for recommended use of the vent system by the utilities. These procedures for use of the RVHVS will include consideration of the Regulatory Guide 1.7 considerations.

   These procedures are to be derived from analyses of inadequate core cooling, WCAP-9745 and WCAP-9744, which have been submitted to the NRC for review by the Westinghouse Owners Group. The current schedule for procedures to be implemented at Sequoyah Nuclear Plant assumes the NRC approval of analyses and Owners Group Guidelines without schedular impact. The current schedule for procedures to be implemented is mid-October, 1980.

10. Provide analyses demonstrating that the direct venting on noncondensable gases with perhaps high hydrogen concentrations does not result in violation of combustible gas concentration limits in containment as described in 10 CFR 50.44, Regulatory Guide 1.7 (Rev. 1), and Standard Review Plan, Section 6.2.5.

Response:

Refer to the response to question 9. We will provide a schedule for analysis of direct venting.