August 4, 2004

10 CFR 50.4

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

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

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2 - NUCLEAR REGULATORY COMMISION (NRC) GENERIC LETTER (GL) 2003-01: CONTROL ROOM HABITABILITY – FINAL RESPONSE (TAC NOS. MB 9856 AND MB 9857)

The purpose of this letter is to provide SQN's final response to GL 2003-01. The GL requested that addressees provide specific information to NRC to demonstrate that main control rooms (MCRs) complied with the current licensing and design bases and applicable regulatory requirements, and that suitable design, maintenance and testing control measures were in place for maintaining this compliance. The GL requested this information within 180 days or if necessitated, licensee could submit a 60-day letter with alternative actions including the basis for acceptability and completion schedule. Resource obligations for the Unit 2 Cycle 12 refueling outage primarily necessitated delay in the SQN final response. As a result, TVA responded within 60 days by letter dated August 11, 2003, with justification to provide the final letter within 90 days after completion of MCR unfiltered inleakage testing at both SQN and Watts Bar Nuclear Plant (WBN).

The SQN design and licensing bases are in compliance with the applicable regulatory requirements. The plant is constructed and maintained in accordance with its design, and the testing and evaluation performed in accordance with subject GL demonstrate this compliance and material condition.

Enclosure 1 provides TVA's final response for SQN Units 1 and 2.

This letter completes TVA's commitment to provide SQN's final response to the subject GL within 90 days from completion of MCR unfiltered inleakage testing at both SQN and WBN.

SQN's current surveillance requirements utilize pressure differential techniques for determining MCR integrity. While this testing technique does not measure control room inleakage, the results of the inleakage testing indicates that it has been able to provide a reasonable verification of control room boundary integrity. This pressure test is reasonable because of the SQN design that has limited pressurized ducts within the control room boundary. However, since this testing technique does not actually measure inleakage, TVA will submit a proposed revision to the current technical specification surveillance requirement for verifying MCR enclosure inleakage within nine months of NRC's approval of Technical Specification Task Force (TSTF)-448, "Control Room Habitability." TSTF-448 recommends an acceptable method for testing MCR enclosure inleakage and will be the basis for the proposed surveillance revision. This commitment is included in Enclosure 2.

Please direct questions concerning this issue to me at 423-843-7170 or J. D. Smith at (423) 843-6672.

Sincerely,

Original signed by

Pedro Salas
Licensing and Industry Affairs Manager

Enclosures:
1. TVA's Final Response to Generic Letter 2003-01
2. List of Regulatory Commitments

cc (Enclosures):
Mr. Robert J. Pascarelli, Senior Project Manager
U.S. Nuclear Regulatory Commission
MS 0-7A15
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852-2739

ENCLOSURE 1
TENNESSEE VALLEY AUTHORITY (TVA)
SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2
FINAL RESPONSE TO GENERIC LETTER (GL) 2003-01

EXECUTIVE SUMMARY

On June 12, 2003, NRC issued GL 2003-01 on the subject of control room habitability (CRH). The fourfold purpose of the GL (as quoted below from the GL text) was to:

1) *alert addressees to findings at U.S. power reactor facilities suggesting that the control room licensing and design bases, and applicable regulatory requirements (see section below) may not be met, and that existing technical specification surveillance requirements (SRs) may not be adequate;*
2) *emphasize the importance of reliable, comprehensive surveillance testing to verify control room habitability;*
3) *request addressees to submit information that demonstrates that the control room at each of their respective facilities complies with the current licensing and design bases and applicable regulatory requirements, and that suitable design, maintenance and testing control measures are in place for maintaining this compliance; and*
4) *collect the requested information to determine if additional regulatory action is required.*

SQN compliance with the General Design Criteria (GDC) is documented in the Final Safety Analysis Report (FSAR), primarily in Section 3.1, with references in other sections as appropriate throughout the FSAR. Applicable details of the design, with respect to CRH, are discussed below in the specific responses to the information requested.

This enclosure provides the information as requested for SQN Units 1 and 2. The SQN design basis and licensing basis are in compliance with the applicable regulatory requirements. The Main Control Room Habitability Zone (MCRHZ) is constructed and maintained in accordance with its design; however, the testing specified by the SQN technical specifications (TS) could better demonstrate this compliance and material condition. SQN will address the TS

issues in conjunction with Technical Specification Task Force Traveler (TSTF)-448 referenced in Regulatory Guide (RG)-1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors."

BACKGROUND

SQN is designed, built, and operated by TVA and employs a four-loop pressurized water reactor nuclear steam supply system furnished by Westinghouse Electric Corporation. The containment for the reactor consists of a free-standing steel vessel with an ice condenser and separate reinforced concrete shield building.

INFORMATION REQUESTED BY GL 2003-01

On pages 5 and 6 of GL 2003-01, information falling into three broad categories was requested to be provided to NRC. The specific wording from the GL is repeated below followed by TVA's response.

1. ***Provide confirmation that your facility's control room meets the applicable habitability regulatory requirements (e.g., GDC 1, 3, 4, 5, and 19) and that the CRHSs*** [control room habitability systems] ***are designed, constructed, configured, operated, and maintained in accordance with the facility's design and licensing bases.***

   The SQN MCRHZ is the floor elevation 732 of the control building. The zone includes the following areas:

   - Common Unit 1 and Unit 2 main control rooms (MCRs)
   - Plant common switchyard relay equipment room
   - Technical support center room
   - Control Room emergency ventilation system (CREVS) equipment room
   - Miscellaneous office spaces and toilet facilities

   SQN FSAR Sections 6.4 and 9.4.1 provide a description of these spaces and their normal and emergency ventilation. SQN performed plant walkdowns and document reviews to confirm that the facility meets

the requirements as described in the FSAR. The walkdowns and reviews were performed using the guidance provided in NRC RG 1.196, and Nuclear Energy Institute document NEI 99-03, Revision 1, "Control Room Habitability Guidance."

The control building heating, ventilating, air-conditioning, and air cleanup environmental control system (ECS) is a safety-related system designed to maintain the temperature and humidity in the building for protection, operation, maintenance, and testing of plant controls; and for the safe, uninterrupted occupancy of the MCR during an accident and the subsequent recovery period. The control building heating, ventilation, and air conditioning (HVAC) system is required to mitigate the consequences of design basis events. The control building ECS has two modes of operation: normal and emergency. The normal operation mode is the mode utilized during normal plant operation. The emergency operation mode is initiated automatically upon the receipt of a control room isolation signal from a safety injection signal for either reactor unit, upon the detection of high temperature, high levels of radioactivity in the control building air intake duct, or manually. This signal isolates the MCRHZ automatically, and the system maintains the MCRHZ at a minimum positive pressure of 0.125-inch water gauge relative to the pressures of the outdoors and slightly positive to all adjacent areas by supplying a small amount of outside air for pressurization. It also filters the supply air and re-circulates the MCRHZ air through high-efficiency particulate air filters and charcoal adsorbers.

Review of operating and test instructions verified that the MCRHZ was aligned, operated, and tested in accordance with those documents. Emergency procedures were reviewed and it was confirmed that the response guidance was also in accordance with approved engineering documents and FSAR descriptions.

Walkdowns and/or document reviews identified no issues that adversely impacted CRHSs such that operability of CRHS design or regulatory requirements was compromised. The walkdowns and reviews confirmed that SQN met the applicable CRHS regulatory

requirements and that the CRHSs are designed, constructed, configured, operated, and maintained in accordance with the facility's design bases and licensing bases. Only minor discrepancies were identified for disposition in four problem evaluation reports through the corrective action program.

Emphasis should be placed on confirming:

(a) That the most limiting unfiltered inleakage into your CRE (and the filtered inleakage if applicable) is no more than the value assumed in your design basis radiological analyses for control room habitability. Describe how and when you performed the analyses, tests, and measurements for this confirmation.

The SQN design and licensing bases assumes an unfiltered MCRHZ in-leakage rate of 51 cubic feet per minute (CFM). In accordance with TS requirements and their bases, SQN has been periodically performing tests since plant startup to demonstrate that the control room can be maintained at a positive 0.125-inch water gauge differential pressure to outside atmosphere and slightly positive pressure to adjacent areas. The pressurizing airflow is verified to be below the maximum allowed of 1000 CFM. In connection with TVA's review of the subject GL, testing was conducted using American Society for Testing and Materials (ASTM) E741 methods (i.e., tracer gas testing) to provide better quantification of the in-leakage value.

TVA performed testing of the SQN MCRHZ during the week of May 3, 2004. The testing was performed utilizing the ASTM E741, *Standard Test Method for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution,* for guidance. ASTM E741, as discussed in GL 2003-01, is the standard that determines the total MCRHZ inleakage from all sources and is well suited for assessing the integrity of positive pressure MCRHZs. ASTM E741 is also discussed in NRC RG 1.197, *Demonstrating Control Room Envelope Integrity at Nuclear Power Reactors*.

The most limiting unfiltered inleakage value assumed in the SQN design basis accident analyses for MCR dose, for all accidents described in Chapter 15 of the FSAR, is 51 CFM. The measured value from the tracer gas test showed the total unfiltered inleakage to be 8 CFM. The unfiltered in-leakage value determined by the tracer gas testing confirmed that the inleakage is less than that assumed in the accident analysis.

(b) That the most limiting unfiltered inleakage into your CRE is incorporated into your hazardous chemical assessments. This inleakage may differ from the value assumed in your design basis radiological analyses. Also, confirm that the reactor control capability is maintained from either the control room or the alternate shutdown panel in the event of smoke.

SQN reviewed both the on-site and off-site threats to the MCRHZ habitability posed by hazardous chemicals in accordance with the guidance of RG 1.78. FSAR Sections 2.2.3.4 and 2.2.3.5 address toxic gas protection for the control room. Section 2.2.3.4 states: "concludes that the MCR habitability is not jeopardized by accidental release of chemicals stored on site." Section 2.2.3.5 indicates that there are no off-site facilities within a five-mile radius where large quantities of toxic materials are stored. This conclusion remains valid.

Based on the above, hazardous chemical releases from on-site, off-site, or transportation sources do not adversely affect the SQN MCRHZ.

Also following the issuance of GL 2003-01, an evaluation in accordance with RG 1.196, using NEI 99-03 Revision 1 methodology was performed to confirm that reactor control capability is maintained from either the MCR or the alternate shutdown panel in the event of smoke. This evaluation determined that, in all fire scenarios which could generate significant smoke quantities, the capability to control the reactor and to place it in a safe shutdown condition would be retained.

The electrical board rooms housing the alternate shutdown panels and the MCR are separated by three-hour fire barriers. These areas are also served by independent HVAC systems (both ventilation and cooling). Therefore, it is concluded that reactor control can be maintained for a smoke event from the MCR or alternate shutdown locations.

Additionally, although self-contained breathing apparatus (SCBA) is not credited in the successful mitigation of a smoke event, all MCR assigned operators are required to be trained in the use of SCBA. The operators are provided training in the use of SCBA on an annual basis as part of the general employee training curriculum.

SCBAs are located within the MCR area and are readily accessible to the operators. The operators are aware of the SCBA location.

(c) That your technical specifications verify the integrity of the CRE, and the assumed inleakage rates of potentially contaminated air. If you currently have a ΔP surveillance requirement to demonstrate CRE integrity, provide the basis for your conclusion that it remains adequate to demonstrate CRE integrity in light of the ASTM E741 testing results. If you conclude that your ΔP surveillance requirement is no longer adequate, provide a schedule for: 1) revising the surveillance requirement in your technical specification to reference an acceptable surveillance methodology (e.g., ASTM E741), and 2) making any necessary modifications to your CRE so that compliance with your new surveillance requirement can be demonstrated.

If your facility does not currently have a technical specification surveillance requirement for your CRE integrity, explain how and at what frequency you confirm your CRE integrity and why this is adequate to demonstrate CRE integrity.

SQN TS SR 3.7.7 (on each of the SQN units) calls for periodic testing of each CREVS subsystem to

verify that a MCR pressure $\geq$ 0.125-inch water gauge with respect to outside atmosphere can be maintained. The Bases require that the boundary be maintained but do not specifically address unfiltered inleakage. However, the GL states that the positive pressure test alone does not guarantee unfiltered inleakage.

SQN will address the TS issues upon resolution of TSTF Traveler 448 as referenced in RG 1.196. The staff is currently reviewing TSTF-448, "Control Room Habitability." When approved, TSTF-448 will provide an acceptable requirement for MCR inleakage testing. TSTF-448 will revise the standard TSs, and SQN will modify its TSs accordingly once TSTF-448 is approved.

2. ***If you currently use compensatory measures to demonstrate control room habitability, describe the compensatory measures at your facility and the corrective actions needed to retire these compensatory measures.***

   SQN does not use compensatory measures in demonstrating MCRHZ compliance with regulatory requirements.

3. ***If you believe that your facility is not required to meet either the GDC, the draft GDC, or the "Principal Design Criteria" regarding control room habitability, in addition to responding to 1 and 2 above, provide documentation (e.g., Preliminary Safety Analysis Report, Final Safety Analysis Report sections, or correspondence) of the basis for this conclusion and identify your actual requirements.***

   SQN complies with GDC as discussed in item 1 above.

CONCLUSION

The results of the recently completed testing using ASTM E741 methods demonstrate that the 8 CFM unfiltered MCRHZ in-leakage does not approach the safety analysis value of 51 CFM. An assessment of hazardous chemical releases from on-site, off-site, or transportation sources concluded that such releases do not adversely affect the MCRHZ. There are no credible scenarios in which smoke can simultaneously prevent the shutdown of the reactors from both the control room and the alternate shutdown panels. In all scenarios involving smoke, either the control room or the alternate shutdown panels (or both) will not be significantly affected.

SQN will address TS issues once TSTF-448 is approved by NRC. No additional actions beyond compliance with the current TS and maintenance of the plant in accordance with its design basis are required at SQN to ensure control room habitability under all analyzed conditions.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

List of Regulatory Commitments

TVA will submit a proposed revision to the current technical specification surveillance requirement for verifying control room enclosure inleakage within nine months of NRC's approval of technical specification task force (TSTF)-448, "Control Room Habitability." TSTF-448 recommends an acceptable method for testing control room enclosure inleakage and will be the basis for the proposed revision.