

Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

William R. Lagergren, Jr.
Site Vice President, Watts Bar Nuclear Plant

AUG 04 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 No.50-390
Tennessee Valley Authority)

**WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - NUCLEAR REGULATORY
COMMISSION (NRC) GENERIC LETTER (GL) 2003-01: CONTROL ROOM
HABITABILITY - FINAL RESPONSE (TAC MB 9872)**

The purpose of this letter is to provide WBN'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 1, Cycle 5 refueling outage primarily necessitated delay in the WBN Unit 1 final response. As a result, TVA responded within 60 days by letter dated August 8, 2003, with justification to provide the final letter within 90 days after completion of MCR unfiltered inleakage testing at both Sequoyah Nuclear Plant (SQN) and WBN.

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The WBN design and licensing basis 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 WBN.

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

WBN's current surveillance requirements utilize pressure differential techniques for determining MCR inleakage. It has been determined that this technique does not adequately satisfy the intent to accurately measure the inleakage rate. 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.

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Please direct questions concerning this issue to P. L. Pace
at (423) 365-1824.

Sincerely,

A handwritten signature in black ink, appearing to read 'W. R. Lagergren', with a long horizontal flourish extending to the right.

W. R. Lagergren

Enclosures:

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

cc: See page 4

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cc (Enclosures):

NRC Resident Inspector
Watts Bar Nuclear Plant
1260 Nuclear Plant Road
Spring City, Tennessee 37381-2000

Mr. M. M. Comar, Project Manager
U.S. Nuclear Regulatory Commission
MS 08G9
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852-2739

Ms. M. H. Chernoff, Project Manager
U.S. Nuclear Regulatory Commission
MS 08G9
One White Flint North
11555 Rockville Pike
Rockville, Maryland 20852-2739

U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, Georgia 30303-8931

ENCLOSURE 1
TENNESSEE VALLEY AUTHORITY (TVA)
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
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.

This document provides the information as requested for WBN Unit 1. The WBN 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 WBN Technical Specifications (TS) could better demonstrate this compliance and material condition. WBN will address the TS issues in conjunction with Technical Specification Task Force (TSTF)-448 referenced in Regulatory Guide (RG)-1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors."

BACKGROUND

WBN Unit 1 is designed, built, and operated by TVA and employs a four-loop pressurized water reactor and the Nuclear Steam Supply System (NSSS) furnished by Westinghouse Electric Corporation. The Unit 1 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 by 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.***

WBN compliance with the General Design Criteria (GDC) Appendix A to 10 CFR Part 50 is documented in its Updated Final Safety Analysis Report (UFSAR), primarily in section 3.1, "Conformance with NRC General Design Critieria," of the UFSAR with references in other UFSAR sections, as appropriate. This compliance is reflected in the design requirements and UFSAR sections discussed in detail throughout the UFSAR. Applicable details of the design, with respect to control room habitability, are discussed below in the specific responses to the information requested.

The WBN MCRHZ is the floor elevation 755 feet of the Control Building. The zone contains the following areas:

- Common Unit 1 and Unit 2 Main Control Rooms (MCRs)
- The plant common switchyard relay equipment room
- Technical support center room

- MCR Emergency Ventilation (CREV) system equipment room
- Miscellaneous office spaces and toilet facilities

WBN Final Safety Analysis Report (FSAR), Sections 6.4, "Habitability Systems," and 9.4.1, "Control Room Area Ventilation System," provide a complete description of these spaces and their normal and emergency ventilation. TVA performed walkdowns and document reviews to confirm that WBN meets the design basis requirements described in the FSAR. The walkdowns and reviews were performed using the guidance provided in NRC RG 1.196 and Nuclear Energy Institute (NEI)-99-03, Revision 1, "Control Room Habitability Guidance."

The Control Building Heating, Ventilating, Air-Conditioning, and Air Cleanup (HVACAC) system is a safety-related system designed to maintain the temperature and humidity in the building for personnel comfort, protection and operation of plant controls, and to provide safe, uninterrupted occupancy of the MCRHZ during normal, accident, and post accident recovery conditions. During normal operation, outside air is supplied to the control building to replace exhausted air and to makeup for out-leakage from the building. To minimize air in-leakage, the MCRHZ is maintained at a positive pressure with respect to adjacent spaces and the outdoors except during a tornado warning when tornado dampers are closed and all pressurization flow is lost.

Upon receipt of a safety injection signal or upon indication of high radiation or smoke concentrations in the outside air supply to the Control Building, the MCRHZ is automatically isolated. The system maintains the MCRHZ at a minimum positive pressure of 0.125 inches water gauge relative to outside atmosphere and 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 (HEPA) filters and charcoal adsorbers. Penetrations into the MCRHZ are provided with low leakage seals and isolation dampers or valves, to restrict the

exfiltration of air from the MCR during a Control Room Isolation (CRI). The smoke detectors are Underwriters Laboratories (UL) listed or Factory Mutual (FM) approved for air duct smoke detection service.

The Control Building HVACAC system is required to mitigate the consequences of Design Basis Events (DBE). As discussed above, the HVACAC system has two modes of operation: normal and isolation. The following safety functions are provided:

- a) Maintain acceptable temperatures for protection and reliable operation of controls and equipment.
- b) Provide safe, uninterrupted occupancy of the MCRHZ during normal, accident, and post-accident recovery conditions.
- c) Introduce adequate quantities of outside air to maintain a positive pressure in the MCRHZ as described above for all operating modes except during a tornado warning.

Upon receipt of a CRI signal, isolation dampers and valves in the ductwork penetrations close to isolate the MCRHZ from the outside. During isolation conditions the system provides air purification to keep air quality levels in the MCRHZ within the specified limits.

- d) Provide continuous ventilation for battery rooms to control accumulation of hydrogen gas in accordance with IEEE standard 484-1975.

The control building HVACAC system also serves the following non-safety-related functions:

- a) Maintain the control building spaces (except spreading room) at the design relative humidity of approximately 50 percent.
- b) Provide continuous ventilation of the spreading room during normal operation.

- c) Exhaust foul air from the toilet and locker room during normal operation.

Upon receipt of a CRI signal, the control building emergency air cleanup subsystem re-circulates a portion of the MCRHZ return air through air cleanup trains composed of HEPA filters and charcoal adsorbers. A control room isolation signal to isolate the MCRHZ can be manually initiated. The subsystem provides cleanup capabilities sufficient to keep radioactive concentration levels in the MCRHZ within the limits specified.

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

Walkdowns and/or document reviews identified no issues that adversely impacted MCRHZ such that operability of control room habitability (CRH) design or regulatory requirements was compromised. The walkdowns and reviews confirmed that WBN met the applicable CRH regulatory requirements and that the CRHSs are designed, constructed, configured, operated, and maintained in accordance with the facility's design basis and licensing basis. Only some minor discrepancies were identified for disposition 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 WBN design and licensing bases for unfiltered MCRHZ in-leakage rate is limited to 51 cubic feet per minute (CFM). The WBN MCR TS surveillances

specify periodic testing to demonstrate positive MCRHZ pressure and that pressurizing airflow is limited to below 711 CFM. In connection with TVA's review of the subject GL, TVA tested for WBN MCRHZ inleakage during the week of April 5, 2004. TVA's test vendor followed the guidance in the American Society for Testing and Materials (ASTM)- E741, *Standard Test Method for Determining Air Change in a Single Zone by Means of a Tracer Gas Dilution*. ASTM E741, as discussed in GL 2003-01, is well suited for assessing the integrity of positive-pressure Control Room Envelopes (CREs).

The unfiltered inleakage limit assumed in the WBN accident analyses for MCR dose for accidents described in FSAR Chapter 15, "Accident Analyses," is 51 CFM. This limit includes 10 CFM for doors. The tracer gas test results confirmed total unfiltered inleakage to be less than 6.0 CFM. Thus, test results confirmed that the most limiting unfiltered inleakage into the CRE was well within the design basis radiological 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.***

WBN reviewed both the onsite and offsite threats to the MCRHZ habitability posed by hazardous chemicals in accordance with the guidance of RG 1.78, "Evaluating the Habitability of a Nuclear Power Plant Control Room During a Postulated Hazardous Chemical Release," and updated the evaluation to contain the latest available information. FSAR Section 6.4.4.2, "Toxic Gas Protection," regarding toxic gas protection for the MCR states: "It was therefore concluded that no hazard to CRH is posed by any of the chemicals stored onsite, offsite within a 5-mile radius, or transported

by the site by barge, rail, or road within a 5-mile radius." This assessment remains valid.

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

These areas are also served by independent Heating, Ventilating, and Air Conditioning (HVAC) systems (both ventilation and cooling). Therefore, a credible single smoke event (either external or internal to the control room habitability zone) does not simultaneously result in contamination of the control room and alternate shutdown locations.

The alternate shutdown panels can be accessed via two separate entry points.

Control room assigned operators are required to be trained in the use of Self Contained Breathing Apparatus (SCBA). SCBAs are available for use when smoke from the fire impedes the operator.

SCBAs are located within the MCR area and are readily accessible to the operators. The operators are aware of the SCBA location. The SCBAs are inspected on a monthly basis.

- (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.

WBN TS surveillance requirement (SR) 3.7.10.4 specifies for periodic testing of each Control Room Emergency Ventilation System (CREVS) subsystem to verify that a MCRHZ pressure is greater than or equal to 0.125 inches water gauge relative to outside atmosphere and adjacent areas can be maintained. The TS Bases associated with this SR state that the testing "... verifies the integrity of the control room enclosure, and the assumed inleakage rates of the potentially contaminated air." While this technique does not directly measure the inleakage rate, Technical Specification Task Force (TSTF)-448, "Control Room Habitability." recommends an acceptable method for testing MCR enclosure inleakage and will be the basis for improving the current TS. The GL states that the positive pressure test alone does not guarantee unfiltered inleakage. The TSTF approach addresses the GL concern that the positive pressure test alone does not guarantee unfiltered inleakage.

WBN will address the TS issues upon resolution of TSTF-448 as referenced in RG 1.196, "Control Room Habitability at Light-Water Nuclear Power Reactors." The staff is currently reviewing TSTF-448. When approved, TSTF-448 will provide an acceptable requirement for MCR inleakage

testing. TSTF-448 will revise the standard TSS, and WBN 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.***

WBN 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.***

WBN complies with the GDC as discussed in Item 1 above.

CONCLUSION

Results of the recently completed testing using ASTM E741 methods demonstrate that unfiltered MCRHZ inleakage does not approach assumed values. An assessment of hazardous chemical releases from onsite, offsite, 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 reactor from both the MCR and the alternate shutdown panel. In scenarios involving smoke either the MCR or the alternate shutdown panel (or both) will not be significantly affected.

WBN 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 WBN to ensure CRH under analyzed conditions.

ENCLOSURE 2
TENNESSEE VALLEY AUTHORITY (TVA)
WATTS BAR NUCLEAR PLANT (WBN) UNIT 1
FINAL RESPONSE TO GENERIC LETTER 2003-01

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 surveillance revision.