



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

WBN-TS-04-17

November 8, 2005

10 CFR 50.90

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 - REQUEST FOR ADDITIONAL INFORMATION REGARDING THE TEMPORARY USE OF PENETRATIONS IN THE SHIELD BUILDING DOME DURING MODES 1-4 (TAC NO. MC6269)**

- References:
1. Watts Bar Nuclear Plant (WBN) Unit 1 - Proposed Temporary License Amendment Request Change No. WBN-TS-04-17 - Revise Sections 3.6.4 and 3.6.15 to Allow Use of Penetrations in Shield Building Dome During MODES 1-4 for Preparation of Steam Generator Replacement Project (SGRP) dated April 4, 2005.
  2. Watts Bar Nuclear Plant, Unit 1 - Request for Additional Information Regarding the Temporary Use of Penetrations in the Shield Building dome During MODES 1-4 (TAC No. MC6569) dated September 30, 2005.

The purpose of this letter is to provide TVA's response to NRC's request for additional information concerning TVA's application for a temporary license amendment, WBN-TS-04-17, submitted by Reference 1 and subsequent response to a request for additional information submitted by Reference 2.

The enclosure provides TVA's response to the NRC's request for additional information dated October 13, 2005.

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There are no regulatory commitments associated with this submittal. If you have any questions concerning this matter, please call me at (423) 365-1824.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 8<sup>th</sup> day of November, 2005.

Sincerely,



P. L. Pace  
Manager, Site Licensing  
and Industry Affairs

Enclosure

cc (Enclosure):

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ENCLOSURE

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1  
LICENSE AMENDMENT REQUEST WBN-TS-04-17  
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

The following provides TVA's responses to NRC's request for additional information received by electronic mail on September 27, 2005.

NRC REQUEST 1

What are the control room atmospheric dispersion factors ( $\chi/Q$  values) used in the dose assessment for postulated releases from the openings in the shield building dome to 1) the control room air intakes and 2) as a result of unfiltered inleakage? If these  $\chi/Q$  values are bounded by values which were previously approved, please provide a reference citation and sufficient information to demonstrate that releases from these openings are bounded by the previously approved  $\chi/Q$  values. Note that a comparison with previously approved values should be for point source releases. If inleakage of unfiltered air into the control room has been modeled using control room intake  $\chi/Q$  values, please confirm (preferably based on the results of tracer gas testing) that there are no potential unfiltered inleakage pathways during emergency mode that could result in  $\chi/Q$  values that are higher than the control room intake  $\chi/Q$  values.

If the  $\chi/Q$  values are new, please provide a copy of the meteorological data inputs and program outputs for any atmospheric dispersion computer codes (e.g., ARCON96) used to generate the  $\chi/Q$  values. A discussion of assumptions and inputs that are not a direct follow-on from guidance associated with use of the models, the Watts Bar Updated Final Safety Analysis Report (UFSAR), or other docketed supplemental information (e.g., drawings) should also be provided. Please provide a site plan highlighting the locations of all potential accident release pathways and control room intake and unfiltered inleakage pathways. If possible, drawings should be approximately to scale and show true north.

TVA RESPONSE

1) The control room atmospheric dispersion factors ( $\chi/Q$  values) used in the dose assessment for postulated releases from the penetrations in the Shield Building dome to the control room air intakes are as follows:

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0-2 hours	-	1.12E-3 sec/m <sup>3</sup>
2-8 hours	-	9.78E-4 sec/m <sup>3</sup>
8-24 hours	-	1.21E-4 sec/m <sup>3</sup>
1-4 days	-	9.36E-5 sec/m <sup>3</sup>
4-30 days	-	7.77E-5 sec/m <sup>3</sup>

These values are shown in the Updated Final Safety Analysis Report (UFSAR), Table 15.5-14. The analysis assumptions were submitted in a letter to NRC dated May 21, 2002, concerning "Tritium Production - Interface Issue Number 5 - Control Room Habitability System," (TAC No. MB1884). NRC approved the tritium production at WBN in License Amendment 40.

The control room dose analyses with the open penetration in containment used the same  $\chi/Q$  values as the design basis (no opening in containment) case. The reasoning for using the design basis  $\chi/Q$  values is as follows:

At the beginning of an accident, the emergency gas treatment system (EGTS) will begin to operate within 30 seconds. Therefore, this exhaust (4000 cubic feet per minute (cfm)  $\pm$  ten percent for one train, 8000 cfm  $\pm$  ten percent if two trains are running) will flow out of the Shield Building vent regardless if the penetration is open or closed. Realistically, with these flow rates and the relatively small size of the opening (18-inch diameter), it is expected that the direction of flow at the opening will be into the annulus, not out of the annulus. Even if there is some outflow, it will not be nearly the rate of EGTS. However, for conservatism, flow out of the vent is considered unfiltered for the assumed 15 minute time period to close the hatch, even though EGTS exhaust is through safety-related filters. By comparison, the containment leakage is 0.25 percent per day which is approximately 2.2 cfm. Therefore, the containment leakage is a very small percentage of the exhaust, meaning that differential pressure created by the EGTS exhaust will be equalized by roughly the same flow rate through the penetration opening from the outside.

Preliminary ARCON96 runs indicated that the worst case  $\chi/Q$  values for releases from the open penetration will be greater than the vent  $\chi/Q$ , however these values are within a factor of 2 of the design basis vent  $\chi/Q$  values.

It was decided that using the open penetration as a release point would be inappropriate as realistic flow patterns would have the vast majority of any releases going out the vent and

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not the penetration. However, to simulate any releases that do get out, no filtration is assumed while the penetration is open. The higher  $\chi/Q$  values for the releases of the penetration opening (factor of 2) are more than offset by not crediting the EGTS filters for the vent releases.

2) Unfiltered inleakage into the Main Control Room is assumed to be 51 cfm in the accident analysis. This limit includes 10 cfm for doors. This number has been confirmed to be conservative by the tracer gas testing performed as recommended in Generic Letter 2003-01, *Control Room Habitability*, and submitted to NRC on August 04, 2004. The results of the tracer gas test confirmed the total unfiltered inleakage to be less than 6.0 cfm.

The unfiltered inleakage  $\chi/Q$  values are assumed to be the same as the control room intake  $\chi/Q$  values. The  $\chi/Q$  values established by ARCON96 are the worst case of a set of  $\chi/Q$  values. Each  $\chi/Q$  set is based on the intake location. The control room intake locations are on opposite sides of the buildings. As such, using the worst case  $\chi/Q$  value based on the intake is conservative relative to the potential locations for unfiltered inleakage into the building. This includes consideration of the door leading from the Main Control Room Habitability Zone to the Turbine Building (for egress/ingress) listed in UFSAR Table 6.4-2, *Air Leakage (Infiltration) Paths in the Watts Bar MCRHS Area Control Room*.

#### NRC REQUEST 2

*What are the  $\chi/Q$  values used in the dose assessment for postulated releases from the openings in the shield building dome to the exclusion area boundary and low population zone? If these values were previously approved (e.g., in another licensing action), please provide a reference citation.*

*If the  $\chi/Q$  values are new, please provide a copy of the meteorological data inputs and program outputs for any atmospheric dispersion computer codes (e.g., PAVAN) used to generate the  $\chi/Q$  values. A discussion of assumptions and inputs that are not a direct follow-on from guidance associated with use of the models, the Watts Bar UFSAR, or other docketed supplemental information (e.g., drawings) should also be provided.*

#### TVA RESPONSE

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The  $\chi/Q$  values used in the dose assessment for postulated releases from the openings in the Shield Building dome to the exclusion area boundary and low population zone are as follows:

Time Period Hours	Exclusion Area Boundary	Low Population Zone
0-2 hours	6.07E-4	1.41E-4
2-8 hours		6.68E-5
8-24 hours		4.59E-5
1-4 days		2.04E-5
4-30 days		6.35E-6

These values are shown in WBN UFSAR, Table 15A-2. These values were also included in the analysis assumptions submitted in the letter to NRC dated May 21, 2002, concerning "Tritium Production - Interface Issue Number 5 - Control Room Habitability System," (TAC No. MB1884) which NRC approved the in License Amendment 40.

Because the penetration and the Shield Building vent are in close proximity of each other and on the same building, the offsite  $\chi/Q$  values are the same for the open penetration and the design basis case.