WBN2Public Resource

From: Poole, Justin
Sent: Monday, November 29, 2010 10:49 AM
To: 'Crouch, William D'
Cc: Milano, Patrick; Lamb, John; Raghavan, Rags; WBN2HearingFile Resource; Campbell, Stephen
Subject: Watts Bar Unit 2 Draft RAI for Section 15.5

Bill,

Below, for your review, is a draft RAI regarding Section 15.5 Environmental Consequences of Accidents. Please review to ensure that the questions are understandable, the regulatory basis is clear, there is no proprietary information contained in the RAI, and to determine if the information was previously docketed. Please also let me know how much time TVA needs to respond to the RAI.

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The following questions are related to information provided in Enclosure 1 and Attachment 12 of the July 31, 2010, Tennessee Valley Authority (TVA) response (Agencywide Documents Access and Management System (ADAMS) Accession Number ML102290258) to a July 12, 2010, Nuclear Regulatory Commission request for additional information (ADAMS Accession Number ML101600278). These questions concern the atmospheric dispersion factors (χ/Q values) used as input to the design basis accident (DBA) dose assessments for Watts Bar, Unit 2.

1. Hourly onsite meteorological measurements for the 18 year period from 1976 through 1993 were used to generate χ/Q values applied to the control room (CR) DBA dose assessment. Joint wind speed, wind direction and atmospheric stability (JFD) summaries for the 20 year period from 1974 through 1993 were used to generate χ/Q values for the exclusion area boundary (EAB) and low population zone (LPZ) dose assessments.

   NRC staff notes that 1974 through 1993 data summaries were previously reviewed and discussed in NUREG-0847, Supplement No. 15, “Safety Evaluation Report related to the operation of Watts Bar Nuclear Plant, Units 1 and 2 (SSER 15), June 30, 1995 (ADAMS Accession Number ML072060488). While current in 1995, these measurements characterized meteorological conditions approximately 15 to 35 years ago. NUREG-0800, Standard Review Plan 2.3.3, “Onsite Meteorological Measurements Programs,” (July 1981) states that at least two consecutive annual cycles, including the most recent one-year period should be provided for the operating license review to judge the acceptability of meteorological data summaries for atmospheric dispersion estimates. Therefore, please provide information consistent with this guidance to show that the 1974 through 1993 data remain representative of recent atmospheric dispersion conditions at the Watts Bar site applicable to the CR, EAB and LPZ DBA dose assessment.

   If the provided information includes confirmatory χ/Q calculations using samples of more recent data, NRC staff recommends that TVA use the revised surface roughness length and averaging sector width constant inputs to the ARCON96 computer code presented in Regulatory Guide (RG) 1.194, “Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants,” June 2003 (ADAMS Accession Number ML072640098). In addition, although NRC staff acknowledges that TVA did not use the PAVAN computer code to calculate the EAB and LPZ χ/Q values, NRC staff notes that the Watts Bar site appears to experience a relatively high frequency of light wind speeds. Therefore, NRC staff
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recommends that TVA use a finer breakdown of light wind speed categories when compiling data in a JFD summary format when using the RG 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants," methodology. NRC Regulatory Issue Summary 2006-04, "Experience with Implementation of Alternative Source Terms," March 7, 2006 (ADAMS Accession Number ML053460347), provides an example wind speed categorization.

2. In Response ADB 15.5 – ADB-2 of Enclosure 1, TVA states that the same χ/Q values used in the dose analysis are applied the unfiltered inleakage and that use of these χ/Q values is appropriate for the following reasons:

    a. The intake air vent is a direct path into the MCR (main control room) and other specific unfiltered leakage paths into the MCR have not been identified.

    b. The maximum χ/Q values used in the dose analysis represent leakage path locations relatively close to the release point, where unfiltered inleakage could originate over the total habitability envelope surface area, the majority of which is further from the release point than the air intake vents used in the dose analysis.

    c. The more remote inleakage locations would produce smaller χ/Q values as compared to locations near the release point. Thus, use of the maximum calculated χ/Q values are conservative relative to unfiltered inleakage.

    d. A total of 51 cubic feet per minute (CFM) unfiltered inleakage into the MCR is assumed in the dose analysis. Tracer gas testing of the MCR indicated the actual unfiltered inleakage is less than 6 cfm. Consequently, the dose analysis is very conservative relative to unfiltered inleakage.

    Watts Bar Final Safety Analysis Report (FSAR) Figure 1.2-1 submitted in Attachment 12 provides notations showing the location and other summary information about the source/receptor pairs assumed in the Watts Bar CR DBA dose assessment. The figure is marked with an arrow to show the general main control room (MCR) habitability area. However, the boundaries are not highlighted to clearly define its perimeter with respect to the source locations and CR intakes. To assist the NRC staff in reviewing each of the reasons associated with TVA's conclusion that use of the limiting CR intake χ/Q values is appropriate, please provide additional information concerning the following.

    a. Regulatory Guide 1.194, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," June 2003, notes that radioactive materials released during an accident can enter the control room envelope via unintentional infiltration paths including doorways, envelope penetrations, and leakage in ventilation system components. Were other actions, in addition to tracer gas testing, performed to attempt to identify any such unfiltered inleakage paths? Why would the most direct path from a source to an intake be the limiting case for unfiltered inleakage?

    b. Please outline the area of the MCR habitability envelope on Figure 1.2-1 to show the relationship of the envelop boundary to the postulated sources and intakes.

    c. NRC staff acknowledges that the more remote inleakage locations would generally produce smaller χ/Q values as compared to locations near the release point. However, Response 15.5 – ADB-3.a states that the selection of χ/Q values did consider that TVA operating procedures require that TVA personnel switch the MCR intake to the less contaminated (smaller χ/Q) air supply location 8 hours post-accident. Thus, the intake to which the unfiltered inleakge is being compared changes to the intake having the smaller χ/Q values for the 8 hour to 30 day time periods. Please discuss how use of the lower χ/Q values is acceptable when assessing unfiltered inleakage.

    d. Were the tracer gas tests performed over the entire MCR habitability envelope volume

3. Table 15.5-14 of the Watts Bar, Unit 2, FSAR lists three sets of χ/Q values used in the CR DBA dose assessment. Please provide further justification, including a comparison among the χ/Q values associated with all release scenarios, for why these values are conservative.

   Response 15.5 – ADB-3.a states that the selection of χ/Q values did consider that TVA operating procedures require that TVA personnel switch the MCR intake to the less contaminated (smaller χ/Q) air supply location 8 hours post-accident. Please confirm that use of the limiting χ/Q values for the 0 to 8 hour time period and smaller χ/Q values for the 8 hour to 30 day time period associated with an assumed release from Unit 1 results in the limiting dose to the CR when compared with use of lower 0 to 8 hour χ/Q values and the limiting 8 hour to 30 day χ/Q values for assumed releases from Unit 2.

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