WBN2Public Resource

From: Poole, Justin
Sent: Friday, March 04, 2011 11:07 AM
To: Crouch, William D
Cc: WBN2HearingFile Resource
Subject: Draft Request for Additional Information re: FSAR Section 10.2.3
Attachments: RAI for WBN-2 Turbine Rotor Integrity.docx

Bill,

Attached, for your review, are preliminary Request for Additional Information (RAI) questions regarding Watts Bar Nuclear Plant (WBN), Unit 2. Please review to ensure that the RAI 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 Tennessee Valley Authority (TVA) needs to respond to the RAI questions.

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REQUEST FOR ADDITIONAL INFORMATION
SECTION 10.2.3, "TURBINE ROTOR AND DISK INTEGRITY"
WATTS BAR NUCLEAR PLANT UNIT 2 FINAL SAFETY ANALYSIS REPORT
AMENDMENT NO. 99

RAI-1

The applicant addressed the turbine rotor integrity for the WBN-2 in Amendment 102 of FSAR, Section 10.2.3, "Turbine Rotor and Disk Integrity." The staff evaluated this section against the acceptance criteria specified in SRP 10.2.3, "Turbine Disk Integrity," dated 1981 for low-pressure turbine disks. The acceptance criteria cover five areas: materials selection, fracture toughness, preservice inspection, turbine disk design, and inservice inspection.

Regarding the second criterion (fracture toughness), SRP 10.2.3 requires the ratio of the fracture toughness (K_{IC}) of the rotor material to the maximum tangential stress at speeds from normal to design overspeed be at least 2 $\sqrt{in}$. Further, this criterion requires the K_{IC} be obtained through one of the four methods specified in the SRP. However, Section 10.2.3.1 of Amendment 102 does not indicate how fracture toughness values for the rotor shaft and disks were obtained. Please confirm whether fracture toughness is obtained indirectly through a test data based K_{IC} versus (T-FATT) curve, where T is the operating temperature and FATT is the 50 % fracture appearance transition temperature. If the answer is yes, provide the K_{IC} versus (T-FATT) curve applicable to the WBN 2 turbine; if the answer is no, provide information regarding fracture toughness values for the rotor shaft and disks and how they are obtained.

RAI-2

Regarding the fourth criterion (turbine rotor design), SRP 10.2.3 requires (1) the combined stresses of the low-pressure turbine rotor at design overspeed should not exceed 0.75 of the minimum specified yield strength of the material, and (2) the natural frequencies (critical speeds) of the turbine shaft assemblies should be controlled so as to cause no distress to the unit during operation. The CT-27467 report, which supports Section 3.5.1.3 of Amendment 102, contains the stress distribution of the rotor assembly at a speed exceeding the design overspeed. Section 10.2.3.1 of Amendment 102 contains yield strength ranges for the rotor and the disks. Therefore, Item 1 of this criterion is addressed. However, Amendment 102 does not address Item 2 of this requirement, please provides this information.

RAI-3

Regarding the last criterion (inservice inspection), SRP 10.2.3 requires disassembly of the turbine at approximately 10-year intervals and complete inspection of all normally inaccessible parts, such as couplings, coupling bolts, turbine shafts, low-pressure turbine blades, low-pressure disks, and high-pressure rotors. Amendment 102 does not address this requirement, please provides this information.