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JUN 1 8 2005

10 CFR 50.4

U.S. Nuclear Regulatory Commission  
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Washington, D. C. 20555

Gentlemen:

In the Matter of )  
Tennessee Valley Authority )

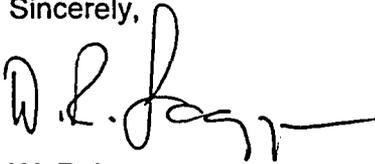
Docket No. 50-390

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - LOOSE PART DETECTION SYSTEM  
(LPDS) SPECIAL REPORT - TECHNICAL REQUIREMENT (TR) 3.3.6

Provided in Enclosure 1 is a special report for the LPDS. A report of this type is required by TR 3.3.6 and details the cause of the problems associated with the LPDS. Also included is a description of the actions TVA has planned for restoration of the system and a commitment to implement the actions. Enclosure 2 lists this commitment.

If you have any questions concerning this matter, please contact P. L. Pace at (423) 365-1824.

Sincerely,



W. R. Lagergren

Enclosures

1. Watts Bar Nuclear Plant (WBN) Special Report Loose Part Detection System (LPDS)
2. Commitment List

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Enclosures

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**Enclosure 1**  
**Watts Bar Nuclear Plant (WBN)**  
**Special Report**  
**Loose Part Detection System (LPDS)**

Description of the WBN LPDS:

The WBN LPDS provides the capability to detect acoustic disturbances indicative of loose parts within the Reactor Coolant System (RCS) pressure boundary. The six channels (designated as Channels 1 through 6) of this system have two sensors located at each of the six natural collection regions; the top and bottom plenums of the reactor vessel and the primary coolant inlet plenum to each steam generator. One sensor at each of the six locations is an active sensor and the other is an installed spare sensor. The six redundant instrumentation channels are physically separated, starting at the sensor location and extending out to the containment electrical penetrations.

The principal components for the LPDS are located in an electrical panel designated as 0-R-139. This panel is located in the Control Building at Elevation 708.0 in the Unit 1 Auxiliary Instrument Room. The six channels of the system include alarm units which, when their set threshold is exceeded, provide an alarm in the Main Control Room. This alarm is indicated on an annunciator window which is common to the six channels. Separate alarm indication for each of the channels is also provided on 0-R-139. The alarm function also automatically starts a digital recorder to record the disturbance. All six channels for loose part monitoring are individually recorded. An audio monitor provides the capability to "listen" audibly to the output signal of a selected channel.

Problem Encountered with the LPDS:

Condition A of TR 3.3.6 was entered on March 28, 2005, due to abnormally high background noise levels on both sensors of Channel 1. The background noise is most likely due to grounding issues inside containment. A functional evaluation, provided by Site Engineering, determined that Channel 1 could still detect a loose part as defined by Regulatory Guide 1.133, "Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors," despite the electronic noise on the Channel 1 sensors. Based on this, Condition A of TR 3.3.6 was exited on April 26, 2005.

The signal for LPDS Channel 5 deteriorated and Condition A of TR 3.3.6 was entered on May 2, 2005. Troubleshooting of Channel 5 revealed abnormally high background noise levels on both sensors of Channels 4 and 5.

Immediate Action Taken:

For each of the described problems, the alarm function of the LPDS to the Main Control Room was inhibited. TR 3.3.6 was entered as a result of this action. In Mode 1, access to the reactor vessel upper head where the Channel 1 sensors are located or access to Steam Generators 2 and 3 where the Channel 4 and 5 sensors are located is limited due to heat stress, high radiation, and physical access considerations. Therefore, the actions taken in response to the channels with electronic background noise were limited to the components and wiring which are outside containment. In an effort to determine the cause of the electronic noise, measures were taken to establish if any components in the system were malfunctioning. The potentially grounded sensors were identified through troubleshooting and confirmed by spectral analysis of the suspect sensors. Troubleshooting efforts also indicated that the grounds were external to the electronics contained in 0-R-139.

**Enclosure 1**  
**Watts Bar Nuclear Plant (WBN)**  
**Special Report**  
**Loose Part Detection System (LPDS)**

Engineering provided a revised functional evaluation of the ability of Channels 1, 4 and 5 to detect a loose part as specified in Regulatory Guide 1.133. The revised evaluation determined that the system was not functional due to the number of spurious alarms that would occur due to required adjustments to Channel 4 in conjunction with adjustments already made on Channel 1 to compensate for the abnormally high background noise level. Two channels with the required adjustments, in addition to the noise interference, will generate an intolerable number of alarms.

TVA contracted with CHAR, an industry recognized noise expert, to assist in determining the cause of the abnormally high background noise levels and potential solutions to the problem that could be implemented outside containment. CHAR gathered data from the sensors, and analyzed the data, and determined that a feasible solution to maintain functionality of the LPDS from modifications to the electronics in O-R-139 did not exist. Intermittency of the grounds contributed to the difficulty in finding a solution.

In addition to the above actions, the requirements of Technical Instruction (TI) 34.03, "Audio Monitoring of the Loose Parts Monitoring System," continue to be implemented. This TI has been in effect since initial fuel load and the instruction is currently performed weekly by operations personnel to monitor each of the audio channels of the system for loose parts. Although the ability of the LPDS to alarm on an impact signal is currently inhibited, operations personnel continue to monitor all channels on a weekly basis for a loose part.

Basis for LPDS Special Report:

TVA was unable to engineer a temporary alteration to the wiring in O-R-139 to compensate for the inadvertent grounds. Therefore, the LPDS alarm function will be disabled for longer than 30 days due to the high background noise. In accordance with Condition A of TR 3.3.6, a report must be submitted to NRC whenever one or more channels of the LPDS are inoperable for greater than 30 days.

Planned Corrective Actions:

TVA will implement actions to clear the inadvertent grounds when the unit is placed in Mode 5 or 6 for a time period sufficient to implement the work safely. Otherwise, the repairs will be implemented during the Cycle 7 outage. In the interim, TVA and CHAR continue to study the problem with the LPDS to determine the most likely cause of the high background noise, and actions to prevent the grounds from recurring.

**Enclosure 2  
Watts Bar Nuclear Plant (WBN)  
Special Report  
Loose Part Detection System (LPDS)**

**Commitment List**

1. TVA will implement actions to clear the inadvertent grounds when the unit is placed in Mode 5 or 6 for a time period sufficient to implement the work safely. Otherwise, the repairs will be implemented during the Cycle 7 outage.