TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

RECEIVED
MAR 01 1982
U.S. NUCLEAR REGULATORY COMMISSION
DOCUMENT MANAGEMENT BRANCH
TIDC

February 25, 1982

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Ms. Adensam:

In the Matter of the Applicaton of	)	Docket Nos. 50-390
Tennessee Valley Authority	)	50-391

Enclosed is TVA's response to informal NRC questions Q221.16 on Loose Parts Monitoring at the Watts Bar Nuclear Plant. This information should resolve open item 18 of the draft Safety Evaluation Report.

If you have any questions concerning this matter, please get in touch with D. P. Ormsby at FTS 858-2682.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Regulation and Safety

Sworn to and subscribed before me
this 25th day of Feb. 1982.

Bryant M. Lowery
Notary Public

My Commission Expires 4/4/82

Enclosure
cc: U.S. Nuclear Regulatory Commission
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

B001
S 1/1

8203020420 820225
PDR ADOCK 05000390
E PDR

ENCLOSURE
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
LOOSE PARTS MONITORING

Q221.16 NRC Question

Provide a commitment to supply a report on the Watts Bar Loose Parts Monitoring System (LPMS). The report should contain:

1. a description of the operator training program,

2. a description of system hardware operation and implemenation of the loose parts detection program after start-up testing,

3. an evaluation of the LPMS for conformance to Regulatory Guide 1.133.

Response

1. TVA instructors will train the Watts Bar reactor operators during their licensing training. The training will instruct the operators on the action necessary to analyze the probable events and instruct the operator on the operation of the equipment.

   The operators will respond to the control room alarm as shown below.

   Immediate Action: Upon arriving to the alarm module (O-R-139):

   A. Listen to the audio output of the first alert channel (as indicated by flashing digit (1-6) on first alert display).

   B. Auxiliary instrument room to determine element causing alarm.

   C. Record time in log (hr., min., sec.).

   Supplementary Action: Upon arriving at the alarm module (O-R-139):

   A. Listen to the audio output of the first alert channel (as indicated by flashing digit (1-6) on first alert display).

   B. Listen to the audio output of any other alert channels (as indicated by a constant red light on their detectors).

   C. Log the identity of the first alert and any other involved channels.

   D. If impact noises are audible, allow tape to run.

   E. If no impact noises are discernible on any channels, reset the system, disable the alarm and autostart, and notify the Instrument Department to increase the gain by one step on all channels.

F. Check RCP vibration indicators for high vibration.

G. Notify SRO if indicator shows high vibration on RCP.

H. Enter investigation results in record book in lower part of panel.

2. The Loose Part Monitoring System (LPMS) provides the capability to detect acoustic disturbances indicative of loose parts within the reactor coolant system pressure boundry.

The loose part monitoring function of this system has two sensors located at each of the four 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 four locations is an active sensor and the other is an installed spare sensor. The low-plenum reactor vessel sensors are mounted to the incore instrumentation guide tubes. The upper-plenum reactor vessel sensors are mounted on the vessel head by means of clamped fixtures. The steam generator inlet sensors are installed on a mounting pad attached to the steam generators. The redundant instrumentation channels are physically separated, starting at the sensor location and extending out to the containment electrical penetrations. The system cabinet is located in the control building at elevation 708 in the unit 1 auxiliary instrument room. This one cabinet contains equipment which electronically monitors both nuclear steam supply systems in the plant. The loose part monitoring function consists of four active channels for each unit. These channels include alarms units which, when their set threshold is exceeded, provide an alarm in the main control room and automatically starts a frequency-modulated tape recorder to record the disturbance. All four channels for loose part monitoring are individually recorded for each nuclear unit. An audio monitor provides a capability to audibly "listen" to the output signal of a selected channel. Each of the active sensors has a calibration device installed on its mounting fixture. These solenoid operated devices are activated at the system cabinet to produce a simulated loose-part impact signal to accommodate required periodic channel functional testing. The system sensitivity of each channel is periodically calibrated to detect an impact with a kinetic energy of 0.5 ft-lb on the surface of the reactor coolant pressure boundry within three feet of the sensor.

The anticipated major sources of internal and external noises are operation of the reactor coolant pumps, reactor coolant hydraulic excitation, and stepping of the control rod drive control mechanisms. Normal background noises present during the various plant operating modes are accounted for in the signal processing circuitry. The system automatically adjusts its impact alert alarm level above the background noise, detecting only those signals which rise above the changing average. This feature permits the impact alert alarms level to be adjusted to a maximum sensitivity level consistent with the short term averaging of the normal

background noises over a preselected time period. The LPMS, although not a Class 1E system, has been designed and qualified to endure seismic events. The portion of the system inside the reactor building (sensors and cabling) will operate and remain functional through an Operating Basis Earthquake (OBE) as seismic category I equipment. The portion of the system outside the reactor building (cabling and instrument cabinet containing electronic indicating, alarming, recording, and analysis instrumentation) will remain structurally intact through a Safe Shutdown Earthquake (SSE) as seismic category I (L) equipment. The equipment, except the tape recorder, will operate and function after exposure to an SSE. The system will be qualified for the normal and abnormal operating radiation, vibration, temperature, and humidity environments.

3. The conformance to RG 1.133 to the LPMS is as follows:

   A. Regulatory Position C.1: The system description is provided in No. 2 above and confirms TVA meets the intent of the requirements of position C.1.

   B. Regulatory Positions C.2 and C.3: The conformance to these positions is indicated by the response in part 1 above.

   C. Regulatory Position C.4: Section 7.6.7 of the WBN-FSAR will be revised to include the additional information provided in No. 2.