TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
5N 157B Lookout Place

MAY 04 1990

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - COMPLETION OF THE EAGLE 21 VERIFICATION AND VALIDATION (V&V) ACTIVITIES

This letter is to inform you of the completion of V&V activities associated with the SQN Eagle 21 process protection system upgrade. No significant disturbances were noted in the V&V activities from the time NRC completed its audit on April 20, 1990, and the completion of V&V. From the total of 658 software verification problem reports, 22 were written since completion of the audit. None of these 22 required a coding change for resolution. The validation activity resulted in 13 problem reports after the NRC audit. Of these 13, only one required a revision of software code. This change was in the test sequence processor analog input calibration routine. The final version of the affected software has also been installed and tested in the Eagle 21 racks at SQN.

This letter also provides as an enclosure information concerning operability of Eagle 21 equipment in Mode 5. This information supplements the information submitted by TVA's letter to NRC dated April 26, 1990.

The V&V final report will be transmitted by future correspondence. Please direct questions concerning this issue to Russell R. Thompson at (615) 843-7470.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

E. G. Wallace, Manager
Nuclear Licensing and
Regulatory Affairs

Enclosure
cc: See page 2

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U.S. Nuclear Regulatory Commission

MAY 04 1990

cc (Enclosure):
Ms. S. C. Black, Assistant Director
for Projects
TVA Projects Division
U.S. Nuclear Regulatory Commission
One White Flint, North
11555 Rockville Pike
Rockville, Maryland 20852

NRC Resident Inspector
Sequoyah Nuclear Plant
2600 Igou Ferry Road
Soddy Daisy, Tennessee 37379

Mr. B. A. Wilson, Assistant Director
for Inspection Programs
TVA Projects Division
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

ENCLOSURE

WESTINGHOUSE ELECTRIC CORPORATION
TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT UNIT 1
EAGLE 21 MODE 5 OPERATION

Westinghouse Electric Corporation Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

Mr. P. G. Trudel
Project Engineer
Tennessee Valley Authority
Sequoyah Nuclear Plant
P.O. Box 2000
Soddy Daisy, TN 37379

TVA-90-761
April 27, 1990

Tennessee Valley Authority
Sequoyah Nuclear Plant Unit 1
Eagle-21 Mode 5 Operation

Dear Mr. Trudel:

In response to TVA's request, Reactor Coolant System Wide Range Cold Leg Temperature has been added to the process protection channels required for Mode 5 operation at Sequoyah Nuclear Power Plant Unit 1. This channel along with those previously addressed have been evaluated to provide supplemental information to address questions raised by the NRC staff with respect to Eagle-21 process protection channels required for Mode 5 operation at Sequoyah Nuclear Power Plant Unit 1. The channels in question are Refueling Water Storage Tank Level, Reactor Coolant System Wide Range Hot Leg Temperature, Reactor Coolant System Wide Range Cold Leg Temperature and Reactor Coolant System Wide Range Pressure. Responses to the NRC staff questions are provided here below:

1. For the subject channels, all units of code required for continuous on-line processing have completed software verification testing and for the remaining problem reports, final resolution will not require any code changes.

   Also, for the subject channels, Validation testing has been successfully completed, the data has been evaluated and there were no test anomalies identified. Twelve (12) units of code remain to be re-verified for the Test Sequence Processor (TSP) subsystem and fourteen (14) units for the Man-Machine Interface (MMI).

   The TSP subsystem and MMI have a passive relationship with respect to the processing of these channels. The TSP subsystem and MMI are electrically separated from and are only used to perform automatic surveillance test and provide diagnostic/monitoring capabilities for the process protection system. It is important to note that electrical power may be removed from the TSP subsystem and MMI with absolutely no impact to operation of the Loop Calculation Processor (LCP) subsystem, which is required for continuous on-line processing of the protection channels.

2. For the overall Eagle-21 system for Sequoyah Nuclear Power Plant, the nature of the remaining verification problem reports to be formally closed may be categorized as follows:

   - Remaining problem reports consist of approximately:

     18% Generic
     11% Module Level
     28% Type J (Header/Comments)
     17% Type E (Logic Anomaly)
      7% Type G (Data Handling Anomaly)
      6% Type B (Design Requirements Implemented Incorrectly)
     13% Other

   - All problem reports to-date have been screened to assure that none will cause an impact to the software currently installed at Sequoyah. The current effort consists of completing the testing of the outstanding TSP and MMI code, and the formal close out of outstanding problem reports.

   - All problem reports associated with the loop calculation processor (LCP) and its inputs have been addressed and there are no open items which would have any impact on code in place at Sequoyah.

3. The software code for the process channels required to be operable for Mode 5 resides in LCP subsystem Programmable Read Only Memory (PROM) components along with software required to process all other channels in the affected racks. However, all LCP code has completed software verification testing. In addition, Validation prudency tests have been completed to demonstrate that no adverse interactions exist between the TSP subsystem, MMI and the LCP subsystems. These Validation prudency tests have also demonstrated that no interactions exist between the various channels which reside in the LCP subsystem.

In summary, it is concluded:

1) System Validation testing for the subject process channels has been successfully completed.

2) All software required for continuous on-line processing of the subject channels has completed verification testing and code changes are not required to close out remaining problem reports.

3) The 26 units of code to be re-verified have no effect on the continuous on-line processing of the channels required for Mode 5 operation and,

4) The process channels which are completing system Validation testing have no interactions with those channels required for Mode 5 operation.

If any further clarification to the above is needed, or any other information is required, we will be available to respond at your convenience.

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION

B. J. Garry

B. J. Garry, Manager
TVA Sequoyah Projects
Customer Projects Department

cc: D. M. Lafever
R. G. Davis
M. J. Burzynski