

TENNESSEE VALLEY AUTHORITY

PROPRIETARY

CHATTANOOGA, TENNESSEE 37401

5N 157B Lookout Place

MAY 22 1989

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

Gentlemen:

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

WATTS BAR NUCLEAR PLANT (WBN) - RESISTANCE TEMPERATURE DETECTOR (RTD) BYPASS LOOP ELIMINATION AND EAGLE 21 ELECTRONICS UPGRADE - ADDITIONAL INFORMATION REQUIRED BY NRC DURING THE SECOND AUDIT OF EAGLE 21 EQUIPMENT SOFTWARE PROGRAM

NRC conducted their second audit on this subject on April 24 through 26, 1989. The purpose of this letter is to formally provide information requested by NRC during the audit. Advance copies of this information were provided to J. Mauck, NRC, on April 26, 1989.

TVA acknowledges the need to limit the potential effects of radio frequency interference (RFI) on the Eagle 21 equipment. WBN's existing plant procedures currently restrict the use of hand-held radios in areas sensitive to RFI, including the Eagle 21 equipment. TVA will evaluate the need to take additional precautions to limit the potential for RFI effects on the Eagle 21 equipment by in-situ testing prior to fuel load. The in-situ testing will ensure any effects on the Eagle 21 equipment are within acceptable limits. The results of this testing will be made available to NRC. Since this issue cannot be fully addressed until the Eagle 21 equipment is installed, TVA suggests it be revisited during NRC's post-installation inspection of the Eagle 21 system at WBN.

Enclosed are:

- Westinghouse Electric Corporation (W) letter dated April 28, 1989, providing an Eagle 21 "Reliability Study Summary" (enclosure 1).
- W "Watts Bar Eagle 21 NRC Audit Clarification," dated April 28, 1989, regarding possible shorting of Eagle 21 contact output board fuse(s) during testing (enclosure 2.)
- W "Watts Bar Eagle 21 Audit Issue," dated May 2, 1989, concerning verification/validation of software for non-complex (simple) code.
- "Watts Bar Eagle 21 Process Protective System Replacement Hardware Verification and Validation Report," WCAP-12271, proprietary (enclosure 4), WCAP-12272, nonproprietary (enclosure 5).
- Enclosure 6 is a W application for withholding proprietary information from public disclosure CAW-89-071, with accompanying affidavit and proprietary information notice.
- Enclosure 7 contains the commitments contained in this letter.

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NRC POR*

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PDR ADECK 05000390
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PROPRIETARY INFORMATION ATTACHED,
WHEN SEPARATED, THIS PAGE IS
DECONTROLLED

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U.S. Nuclear Regulatory Commission

MAY 22 1989

Because this letter contains information proprietary to W, it is supported by an affidavit signed by W, the owner of the information (enclosure 6). The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses, with specificity, the considerations listed in paragraph (b)(4) of 10 CFR, section 2.790, of the Commission's regulations.

Accordingly, it is respectfully requested that the information, which is proprietary to W, be withheld from public disclosure in accordance with 10 CFR, section 2.790, of the Commission's regulations. Correspondence, with the respect to the proprietary aspects of the application for withholding or the supporting W affidavit, should reference CAW-89-071 and should be addressed to R. A. Wiesemann, Manager, Regulatory and Legislative Affairs, Westinghouse Electric Corporation, P. O. Box 355, Pittsburgh, Pennsylvania, 15230-0355.

If there are any questions, please telephone T. W. Horning at (615) 365-3381.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


Manager, Nuclear Licensing
and Regulatory Affairs

Enclosures

cc (Enclosures):

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

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

U.S. Nuclear Regulatory Commission (with proprietary information)
Watts Bar Resident Inspector
P.O. Box 700
Spring City, Tennessee 37381

ENCLOSURE 1

0590g

DOCKET NO. 50-390/391 WATTS BAR, 1/2 TVA

RESISTANCE TEMPERATURE DETECTOR (RTD)
BYPASS LOOP ELIMINATION AND EAGLE 21
ELECTRONICS UPGRADE

Rec'd. w/ltr. 5/22/89.....8905310094

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-NOTICE-



WAT-D-7928

Westinghouse
Electric Corporation

Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

Mr. P. R. Mandava
Project Engineer
Tennessee Valley Authority
NE Onsite, WBN 10B
Watts Bar Nuclear Power Plant
Spring City, TN 37381

April 28, 1989
TVA Contract No. 71C62-54114-1
S.O. No: 322

Tennessee Valley Authority
Watts Bar Nuclear Plant
Unit Numbers 1 and 2
EAGLE-21, NRC Audit
Reliability Study Summary

Dear Mr. Mandava:

The following is a summary statement of the EAGLE-21 Reliability Study requested by the NRC.

"The results of the availability assessment of the EAGLE-21 and equivalent analog process protection systems indicates that the EAGLE-21 digital system is at least as reliable as present analog technologies. It is felt that more detailed analysis would most likely show the EAGLE-21 digital system to have an even higher system availability. A more detailed analysis would incorporate fail-safe design principals, redundancy, functional diversification and test features of the EAGLE-21 digital system which were not included in the conservative analysis that was performed."

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION

Edward A. Novotnak

Edward A. Novotnak, Manager
TVA Watts Bar Project
Customer Projects Department

cc: P. R. Mandava, 5L
D. W. Wilson, 1L
I. R. Williamson, 1L
R. W. Meadows, 1L
R. L. Gridley, 1L

ENCLOSURE 2

0590g



WAT-D-7927

Westinghouse
Electric Corporation

Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

Mr. P. R. Mandava
Project Engineer
Tennessee Valley Authority
Onsite, WBN 10B
Watts Bar Nuclear Power Plant
Spring City, TN 37381

April 28, 1989
TVA Contract No. 71C62-54114-1
S.O. No: 322

Tennessee Valley Authority
Watts Bar Nuclear Plant
Unit Numbers 1 and 2
EAGLE-21, NRC Audit Clarification

Dear Mr. Mandava:

The following clarification of an NRC concern during the Watts Bar EAGLE-21 audit is provided to TVA for formal transmittal to the NRC.

In response to a concern regarding the possible shorting of the EAGLE-21 contact output board (ECO) fuse; Westinghouse performed engineering fault tests across a closed relay contact at 250 VDC and 580 VDC with the fuse shorted. In both instances the fault was cleared by the opening of a PC trace on the board. EAGLE 21 protective actions were maintained. The fault did not propagate across the class 1E/non-1E isolation barrier or from channel to channel. In addition, fuse shorted tests were successfully performed as part of the QDPS fault test report, WCAP-11340. The QDPS and EAGLE-21 contact output boards use the same relay for class 1E/non-1E isolation.

The EAGLE-21 system does not use fuses as a class 1E/non-1E isolation barrier. Fuses are used to limit fault current on the output (non-1E) side of the isolation device. It is good engineering practice to use fuses as a device for clearing fault currents. Fault current must be limited to prevent solder splatter. The EAGLE-21 fault tests performed with fuses installed (WCAPS 11733 and 11896) are valid. These tests demonstrate that the EAGLE 21 system isolation devices are in compliance with IEEE-279-1971, IEEE-384-1981, IEEE-603-1980 and Nuclear Regulatory Guide 1.75 Rev. 2 concerning the physical independence of class 1E circuits and class 1E/non-1E interaction.

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION

Edward A. Novotnak

Edward A. Novotnak, Manager
TVA Watts Bar Project
Customer Projects Department

cc: P. R. Mandava, 5L
D. W. Wilson, 1L
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R. L. Gridley, 1L

ENCLOSURE 3

0590g



WAT-D-7930

Westinghouse
Electric Corporation

Energy Systems

Box 355
Pittsburgh Pennsylvania 15230-0355

Mr. P. R. Mandava
Project Engineer
Tennessee Valley Authority
NE Onsite, WBN 10B
Watts Bar Nuclear Power Plant
Spring City, TN 37381

May 2, 1989
TVA Contract No. 71C62-54114-1
S.O. No: 322

Tennessee Valley Authority
Watts Bar Nuclear Plant
Unit Numbers 1 and 2
Watts Bar EAGLE-21 Audit Issue

Dear Mr. Mandava:

The following is a summary of information presented at the Watts Bar EAGLE-21 Audit at the Westinghouse ITTC site on April 26, 1989. This addresses the NRC concern that software procedures which were not emulated in the formal V&V process need to have been executed as a part of the formal validation.

All software procedures used to provide protection functions in the EAGLE-21 system were executed as a result of the formal V&V test process except for a single software procedure in the Digital Filter Processor (DFP). This software procedure consisted of three assembly language source code statements which functionally halt the DFP processor in the case of a fatal hardware error.

This software procedure was not emulation-tested due to the "simple" nature of the software procedure per the definitions in the Design, Verification and Validation Plan. Validation testing did not execute the procedure due to the need for a hardware failure to initiate the execution of the procedure.

Westinghouse believes that the static inspection of this software procedure which was independently performed was adequate to insure the proper operation of the EAGLE-21 system. This belief is based upon two considerations:

- 1) The extreme simplicity and obvious function of the particular unit.
- 2) All procedures referencing this software procedure were emulated to confirm that all calling interfaces were correct.

Very truly yours,

WESTINGHOUSE ELECTRIC CORPORATION

E. A. Novotnak / dm lsb

Edward A. Novotnak, Manager
TVA Watts Bar Project
Customer Projects Department

cc: P. R. Mandava, 5L
D. W. Wilson, 1L
I. R. Williamson, 1L
R. W. Meadows, 1L
R. L. Gridley, 1L

ENCLOSURE 5

Watts Bar Eagle 21 Process Protective System,
Replacement Hardware Verification and Validation Report,
WCAP-12272, Nonproprietary Version