Tennessee Valley Authority, Post Office Box 2000, Spring City, Tennessee 37381-2000

Richard T. Purcell
Site Vice President, Watts Bar Nuclear Plant

TVA-WBN-TS-99-007 10CFR 50.90

SEP 2 8 1999

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

Gentlemen:

In the Matter of) Docket No. 50-390
Tennessee Valley Authority)

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - TECHNICAL SPECIFICATION (TS) CHANGE NO. 99-007 - "RESPONSE TIME TEST (RTT) ELIMINATION"

In accordance with the provisions of 10 CFR 50.90, TVA is submitting a request for an amendment to WBN's license NPF-90 to change the Technical Specifications for Unit 1.

WBN's current TSs require periodic measurement of response times of reactor trip and engineering safety features instrumentation channels. The proposed change would provide an alternative to the requirement of actually measuring the response times. Instead, the response times would be verified by summing allocated times for sensors, the process protection system, the nuclear instrumentation system, and logic system. These allocated values will be added to the times measured for the actuated devices to initiate their safety function and compared to the overall analysis limits. The proposed change requires revising the TS definition for "Engineered Safety Features (ESF) Response Time" and "Reactor Trip System (RTS) Response Time" to provide for verification of response time for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC in accordance with Westinghouse Owners Group Topical Reports WCAP-13632-P-A, Revision 2, and WCAP-14036-P-A, Revision 1.

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TVA has determined that there are no significant hazards considerations associated with the proposed change and that the change is exempt from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). The WBN Plant Operations Review Committee and the WBN Nuclear Safety Review Board have reviewed this proposed change and have determined that operation of WBN Unit 1 in accordance with the proposed change will not endanger the health and safety of the public. Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosures to the Tennessee State Department of Public Health.

Enclosure 1 to this letter provides the description and evaluation of the proposed change, including TVA's determination that the proposed change does not involve a significant hazards consideration, and is exempt from environmental review. Enclosure 2 contains copies of the appropriate Unit 1 TS pages marked-up to show the proposed change. Enclosure 3 forwards the revised TS pages which incorporate the proposed change. Enclosure 4 lists the commitments made in this submittal.

TVA requests that approval be provided approximately 30 days prior to beginning the Unit 1 Cycle 3 refueling outage scheduled for September 2000, and that the revised TS be made effective within 30 days of NRC approval. If you have any questions about this change, please contact Paul Pace at (423) 365-1824.

Sincerely,

R. T. Purcell

Enclosures
cc: See page 3

Subscribed and sworn to before me
on this 28th day of September, 1999.

E. Jeannette Long
Notary Public
My Commission Expires June 27, 2001

SEP 2 8 1999

PLP:CWT:LDR
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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1
DOCKET NO. 390

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE TS-99-007
DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

I. DESCRIPTION OF THE PROPOSED CHANGE

TVA proposes to modify the Watts Bar Nuclear Plant (WBN) Unit 1 Technical Specifications (TS) by revising the TS definition for "Reactor Trip System (RTS) Response Time" and "Engineered Safety Features (ESF) Response Time" to provide for verification of response times for selected components provided that the components and methodology for verification have been previously reviewed and approved by the NRC. The TS Bases for Surveillance Requirements 3.3.1.15 and 3.3.2.10 are also being revised to describe the basis and methodology for the use of allocated response times for verification. The proposed changes have been prepared in accordance with Westinghouse Owners Group Topical Reports WCAP-13632-P-A, Revision 2, and WCAP-14036-P-A, Revision 1, which have been approved by the NRC. The proposed changes are illustrated by a markup of the current WBN Unit 1 TS in Enclosure 2.

II. REASON FOR THE PROPOSED CHANGE

The current WBN Technical Specifications require periodic measurement of response times of reactor trip and ESF instrument channels. The proposed change would provide an alternative to the requirement to actually measure the response times. Instead, the response times would be verified by summing allocated times for pressure and differential pressure sensors, the process protection system (Eagle 21), the nuclear instrumentation system (NIS), and the logic system (Solid State Protection System, SSPS). These allocated values will be added to the times measured for the actuated devices to initiate their safety function and compared to the overall analysis limits. Elimination of periodic response time testing (RTT) will result in reduced maintenance testing hours, reduced radiation exposure, and will reduce the number of activities to be performed during refueling outages.

WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," provides the basis and

methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. Allocations for sensor responses times may be derived from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests); (2) in place, onsite, or offsite (e.g., vendor) test measurements; or (3) utilizing vendor engineering specifications. Response time verifications for other sensor types must be demonstrated by test.

WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," provides the basis and methodology for using allocated signal processing and actuation logic response times in the overall verification of the protection system channel response time.

III. SAFETY ANALYSIS

Background

Instrument channel response time is generally the time span from when a monitored variable exceeds a predetermined setpoint at the channel sensor, until the actuated device begins its safety function. RTT has been an integral part of the TS instrument surveillance program to assure the proper functioning of the sensors and instrumentation for the RTS and ESF. It verifies that the individual channel/train actuation response times are less than or equal to the maximum values assumed in the accident analyses.

The Westinghouse Owners Group (WOG) performed two analyses to assess the impact of elimination of RTT for protection system instrumentation. These analyses also discussed alternate test methodologies that would show that the instrumentation was functioning correctly. The first of these analyses was WOG Topical Report WCAP-13632-P-A Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," dated August 1995 (original issue), which was approved by an NRC Safety Evaluation (SE) dated September 5, 1995, and reissued as the approved version in January 1996. The second analysis, WCAP-14036-P-A, Revision 1, "Elimination of Periodic Protection Channel Response Time Tests," dated October 1998, was approved by an NRC SE dated October 6, 1998, as supplemented by NRC's letter dated November 3, 1998. These analyses implement the concept of a generic bounding response time which is allocated for sensors and protection channels addressed in the reports. Degradation or failures of this equipment would result in equipment response times no greater than the bounding response time or would be detected during the performance of other periodic surveillance testing such as calibration.

The NRC SEs approving these WCAPs stipulated certain conditions that individual plant licensees must meet when implementing the guidelines in the WCAPs on a plant specific basis. These WCAPs and the analyses supporting the plant specific requirements form the basis for these proposed changes.

TVA has verified that selected protection systems components installed at Watts Bar are the same manufacturer and model numbers as those components evaluated in WCAPs 13632-P-A and 14036-P-A. Tables 1 and 2 identify the reactor trip and engineered safety features actuation systems equipment affected by this request.

This request is similar to recent requests made by Sequoyah Nuclear Plant and Vogtle Electric Generating Plant, the lead plant for the WOG RTT elimination effort. The Vogtle request was granted by NRC on February 8, 1999. It is also similar to the generic industry request being processed as TSTF-111, Revision-6.

Basis for Proposed Change for Sensors

WCAP-13632-P-A contains the technical basis and methodology for eliminating RTT requirements on sensors identified in the WCAP. The NRC SE for WCAP-13632-P-A requires confirmation by the licensee that the generic analysis in the WCAP is applicable to their plant and that licensees take the four actions listed below. TVA has reviewed the plant data for WBN Unit 1. The sensors bounded by the generic analysis contained in WCAP-13632-P-A which are installed at WBN and which are subject to TS-required RTT are identified in Tables 1 and 2. To comply with the required actions of WCAP-13632-P-A, TVA will take the following actions to address these four issues:

1. Perform a hydraulic RTT prior to installation of a new transmitter/switch or following refurbishment of the transmitter/switch (e.g., sensor cell or variable damping components) to determine an initial sensor-specific response time value.

Response to Item 1:

Consistent with the proposed TS and Bases changes and Electric Power Research Institute Report NP-7243, Revision 1, the applicable plant procedures will stipulate that pressure sensor response times must be verified by performance of an appropriate response time test prior to placing a sensor into operational service and reverified following maintenance that may adversely affect sensor response time.

2. For transmitters and switches that use capillary tubes, perform an RTT after initial installation, and after any maintenance or modification activity that could damage the capillary tubes.

Response to Item 2:

Plant procedure revisions (and/or other appropriate administrative controls) will stipulate that pressure sensors (transmitters) utilizing capillary tubes, that can be tested must be subjected to RTT after initial installation and following any maintenance or modification activity which could damage the transmitter capillary tubes.

3. If variable damping is used, implement a method to assure that the potentiometer is at the required setting and cannot be inadvertently changed or perform a hydraulic RTT of the sensor following each calibration.

Response to Item 3:

WBN has no pressure transmitters with variable damping installed in RTS or ESFAS application for which RTT is required; therefore, no WBN procedure changes or enhanced administrative controls are required.

4. Perform periodic drift monitoring of all Model 1151, 1152, 1153, and 1154 Rosemount pressure and differential pressure transmitters, for which RTT elimination is proposed, in accordance with the guidance contained in Rosemount Technical Bulletin No. 4 and continue to remain in full compliance with any prior commitments to Bulletin 90-01, Supplement 1, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount."

Response to Item 4:

WBN does not have any Rosemount transmitters installed in any RTS or ESFAS application for which RTT is required as shown in Tables 1 and 2. WBN provided responses to NRC Bulletin 90-01 by letters dated January 31, 1992, and December 22, 1992; and to Bulletin 90-01, Supplement 1, by letters dated January 19, 1994, and October 20, 1994. As noted in these responses, WBN replaced applicable transmitters with new or refurbished transmitters, eliminating the need for increased monitoring. These letters address the actions that WBN has taken with respect to Item 4.

Basis for Proposed Changes for Protection Channels

WCAP-14036-P-A contains the technical basis and methodology for eliminating RTT requirements on protection channels identified in the WCAP. The NRC safety evaluation for WCAP-14036-P-A requires confirmation by the licensee that the generic analysis in the WCAP is applicable to their plant.

TVA has reviewed the plant data for WBN Unit 1. Tables 1 and 2 identify the RTS and ESFAS equipment which is installed at WBN and subject to response time testing required by TS. TVA has reviewed the FMEAs in WCAP 14036-P-A Rev. 1 to ensure that they are applicable to this equipment, and that the analysis is valid for the versions of the boards utilized at WBN.

IV. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The proposed license amendment would revise the Watts Bar Nuclear Plant (WBN) Unit 1 Technical Specifications (TS), Section 1.1, Definitions, for "Engineered Safety Feature (ESF) response Time" and "Reactor Trip System (RTS) Response Time" to provide for verification of response time for selected components provided that the components and the methodology for verification have been previously reviewed and approved by the NRC. TVA has concluded that operation of WBN Unit 1, in accordance with the proposed change to the Technical Specifications, does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92(c).

In addition, the Bases for Surveillance Requirements 3.3.1.15 and 3.3.2.10 are being revised to clarify that response time may be verified by actual response time tests in any series of sequential, overlapping or total channel measurements, or by the summation of allocated sensor, signal processing and actuation logic response times with actual response time tests on the remainder of the channel. Allocations for sensor response times may be derived from: (1) historical records based on acceptable response time tests (hydraulic, noise, or power interrupt tests), (2) in place, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A, Revision 2, "Elimination of Pressure Sensor Response Time Testing Requirements," provides the basis and methodology for using allocated sensor response times in the overall verification of the channel response time for specific sensors identified in the WCAP. Response time verifications for other sensor types must be demonstrated by test.

WCAP-10436-P-A, Revision 1 "Elimination of Periodic Protection Channel Response Time Tests," provides the basis and methodology for using allocated signal processing and actuation logic response times in the overall verification of the protection system channel response time. The analyses performed in WCAP-13632-P-A and WCAP-14036-P-A determined that degradation or failures of equipment addressed by the reports would result in equipment response times no greater than the allocated response times or would be detected during the performance of other periodic surveillance testing such as calibration. The allocations for sensor, signal conditioning and actuation logic response times must be verified prior to placing the component into operational service and reverified following maintenance that may adversely affect the response time. TVA has verified that the selected components installed at Watts Bar are the same manufacturer and model numbers as those components evaluated in WCAPs 13632-P-A and 14036-P-A.

A. **The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.**

This change to the TS does not result in a condition where the design, material, and construction standards that were applicable prior to the change are altered. The same RTS and ESFAS instrumentation is being used, the time response allocations/modeling assumptions in the Chapter 15 analyses are unchanged; only the method of verifying time response is changed. The proposed change will not modify any system interface and could not increase the likelihood of an accident since these events are independent of this change. The proposed activity will not change, degrade or prevent actions, or alter any assumptions previously made in evaluating the radiological consequences of an accident described in the UFSAR. Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

B. **The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.**

This change does not alter the performance of pressure and differential pressure transmitters, process protection racks (Eagle 21), nuclear instrumentation (NIS), and logic system (SSPS) used in the plant protection systems. These components/systems will still have response time verified by test prior to placing the equipment in operational service and after any maintenance that could affect the response time of that equipment. Changing the method of periodically verifying instrument response time for

applicable instrumentation from RTT to calibration and channel checks or functional test will not create any new accident initiators or scenarios. Therefore, the proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

C. **The proposed amendment does not involve a significant reduction in a margin of safety.**

This change does not affect the total system response time assumed in the safety analysis. The periodic system response time verification method for selected pressure and pressure differential sensors, Eagle 21, NIS, and SSPS is modified to allow use of actual test data or engineering data. The method of verification still provides assurance that the total system response time is within that assumed in the safety analysis, since calibration checks and functional tests will detect any degradation which might significantly affect equipment response time. Therefore, the proposed license amendment request does not result in a significant reduction in margin of safety.

V. ENVIRONMENTAL IMPACT CONSIDERATION

The proposed change does not involve a significant hazards consideration, a significant change in the types of or significant increase in the amounts of any effluents that may be released offsite, or a significant increase in individual or cumulative occupational radiation exposure. Therefore, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), an environmental assessment of the proposed change is not required.

TABLE 1
REACTOR TRIP FUNCTIONS ALLOCATION TIMES

FUNCTION	SENSOR (NOTE 1)	TIME (SEC)	EAGLE 21 / NIS	TIME (SEC)	SSPS RELAYS (NOTE 6)	TIME (SEC)
POWER RANGE NEUTRON FLUX (HIGH / LOW SETPOINT) (NIS)	NOTE 2	NA	NOTE 4	0.065	INPUT	0.020
OTDT (PRESSURE)	BARTON 763	0.200	NOTE 3	0.409	INPUT	0.020
OTDT (NEUTRON FLUX)	NOTE 2	NA	NOTES 3,4,5	0.410	INPUT	0.020
OTDT (TEMPERATURE)	NOTE 2	NA	NOTE 3	0.409	INPUT	0.020
OPDT (TEMPERATURE)	NOTE 2	NA	NOTE 3	0.409	INPUT	0.020
PRESSURIZER PRESSURE HIGH / LOW	BARTON 763 / 763A	0.200	NOTE 3	0.409	INPUT	0.020
LOSS OF FLOW - SINGLE LOOP / TWO LOOPS	FOXBORO E13DH / NE13DH	0.400	NOTE 3	0.409	INPUT	0.020
RCP UNDERVOLTAGE	NOTE 2	NA	NA	NA	INPUT	0.020
RCP UNDERFREQUENCY	NOTE 2	NA	NA	NA	INPUT	0.020
SG WATER LEVEL LO-LO	BARTON 764	0.400	NOTE 3	0.409	INPUT	0.020
CONTAINMENT PRESSURE HIGH - SI	BARTON 764	0.400	NOTE 3	0.409	INPUT	0.020
PRESSURIZER PRESSURE LOW - SI	BARTON 763 / 763A	0.200	NOTE 3	0.409	INPUT	0.020
STEAMLINE PRESSURE LOW - SI	BARTON 763	0.200	NOTE 3	0.409	INPUT	0.020
	FOXBORO E11GM / NE11GM	0.200	NOTE 3	0.409	INPUT	0.020

TABLE 2
ESFAS FUNCTIONS ALLOCATION TIMES

FUNCTION (NOTE 8)	**SENSOR** (NOTE 1)	**TIME** (SEC)	**EAGLE 21/ NIS**	**TIME** (SEC)	**SSPS RELAYS** (NOTE 6,7)	**TIME** (SEC)
CONTAINMENT PRESSURE HIGH - SI	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
PRESSURIZER PRESSURE LOW - SI	BARTON 763 / 763A	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
STEAMLINE PRESSURE LOW - SI	BARTON 763	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
	FOXBORO E11GM / NE11GM	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
CONTAINMENT PRESSURE HIGH-HIGH - CS	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
CONTAINMENT PRESSURE HIGH SI - CIA	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
PRESSURIZER PRESSURE LOW SI - CIA	BARTON 763 / 763A	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
STEAMLINE PRESSURE LOW SI - CIA	BARTON 763	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
	FOXBORO E11GM / NE11GM	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
CONTAINMENT PRESSURE HIGH-HIGH - CIB	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
CONTAINMENT PRESSURE HIGH-HIGH - SLI	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
STEAMLINE PRESSURE LOW - SLI	BARTON 763	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
	FOXBORO E11GM / NE11GM	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
STEAMLINE PRESSURE NEGATIVE RATE HIGH - SLI	BARTON 763	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
	FOXBORO E11GM / NE11GM	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
SG WATER LEVEL HIGH-HIGH - TT	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + 2 SLAVES	0.124
SG WATER LEVEL HIGH-HIGH - FWI	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
CONTAINMENT PRESSURE HIGH SI -FWI	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
PRESSURIZER PRESSURE LOW SI - FWI	BARTON 763 / 763A	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
STEAMLINE PRESSURE LOW SI - FWI	BARTON 763	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
	FOXBORO	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088

TABLE 2
ESFAS FUNCTIONS ALLOCATION TIMES

FUNCTION (NOTE 8)	**SENSOR** (NOTE 1)	**TIME** (SEC)	**EAGLE 21/ NIS**	**TIME** (SEC)	**SSPS RELAYS** (NOTE 6,7)	**TIME** (SEC)
	E11GM / NE11GM					
SG WATER LEVEL LO-LO - AFW	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
CONTAINMENT PRESSURE HIGH SI - AFW	BARTON 764	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
PRESSURIZER PRESSURE LOW SI - AFW	BARTON 763 / 763A	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
STEAMLINE PRESSURE LOW SI - AFW	BARTON 763	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
	FOXBORO E11GM / NE11GM	0.200	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
RWST LEVEL LOW COINCIDENT WITH SI - AUTO SWITCHOVER TO CONTAINMENT SUMP	BARTON 752	0.400	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088
CONTAINMENT SUMP LEVEL HIGH - AUTO SWITCHOVER TO CONTAINMENT SUMP	NOTE 2	NOTE 2	NOTE 3	0.409	INPUT + MASTER + SLAVE	0.088

TABLES 1 & 2 NOTES
RTS/ESFAS FUNCTIONS ALLOCATION TIMES

1. Except as noted, the sensors installed at WBN were evaluated in WCAP-13632-P-A R2 (Table 9-1). Allocated sensor response times are determined in accordance with Section 9 of WCAP-13632-P-A R2. Response times for Barton transmitters are derived from Table 9-1 of the WCAP. Response times for Foxboro transmitters are supported by actual tests of the transmitters installed at WBN.

2. Sensors for these functions were not evaluated in WCAP-13632-P-A R2. Therefore, allocated sensor response times are not used and sensors will continue to be tested as required. NIS detectors are exempt from RTT per Technical Specifications.

3. The Eagle 21 cards installed at WBN were evaluated in Section 4.7 of WCAP-14036-P-A R1 (card types ERI, EAI, DFP, LCP, DDC and EPT). The allocated response time for Eagle 21 (0.409 seconds) is in accordance with Section 4.7 of the WCAP.

4. The Power Range NIS cards installed at WBN were evaluated in Section 4.6 of WCAP-14036-P-A R1 (Detector Current Monitor, Summing and Level Amplifier, Level Trip Bistable, and Isolation Amplifier). The allocated response time for NIS is in accordance with Section 4.6 of the WCAP (65 msec for level trips, 1 msec for isolation amplifier).

5. Includes allowance for both NIS and Eagle 21.

6. Relays evaluated in Section 4.8 of WCAP-14036-P-A R1 and used in the WBN SSPS are:

   - Input and Master Relays: G. P. Clare GP1 Series, Midtex/AEMCO 156, or Potter & Brumfield KH series.
   - Slave Relays: Westinghouse Type AR.

   The following allocated response times for the SSPS relays are in accordance with Section 4.8 of WCAP-14036-P-A R1; logic circuit response time was determined to be insignificant.

   - Reactor Trip Functions: 20 msec (input relay).
   - ESFAS Functions:
     26 msec + 26 msec + 36 msec = 88 msec (input + master + slave); or

     26 msec + 26 msec + 36 msec + 36 msec = 124 msec (input + master + 2 slaves in series).

TABLES 1 & 2 NOTES
RTS/ESFAS FUNCTIONS ALLOCATION TIMES

7. The bounding response time allocation for ESF functions is the combination of the longest pick-up or drop-out time for each relay in the total circuit signal path for ESF component actuation. Therefore, an additional 36 msec must be allocated for each Potter and Brumfield Type MDR or Westinghouse Type AR (alternating current coil) auxiliary relay (if installed) between the slave relay and end device.

8. ESFAS Functions Acronyms

SI - Safety Injection
CS - Containment Spray
TT - Turbine Trip
SLI - Steamline Isolation
FWI - Feedwater Isolation
AFW - Auxiliary Feedwater
CIA - Containment Isolation Phase A
CIB - Containment Isolation Phase B
CVI - Containment Vent Isolation