February 29, 2000 Template HNRR-058

Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS REGARDING ELIMINATION OF INSTRUMENTATION RESPONSE TIME TESTING FROM TECHNICAL SPECIFICATIONS (TAC NOS. MA6498 AND MA6499) (TS 99-08)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment No. 251 to Facility Operating License No. DPR-77 and Amendment No. 242 to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant (SQN), Units 1 and 2, respectively. These amendments are in response to your application dated August 30, 1999, as supplemented on January 13, 2000, which requested approval to revise the Technical Specification (TS) definitions and their associated Bases for Engineered Safety Features and Reactor Trip System response time testing definitions in TS Sections 1.13 and 1.27 for SQN Units 1 and 2. This amendment also includes changes to the terminology for TS Surveillance Requirements 4.3.1.1.3 and 4.3.2.1.3.

A copy of our Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

/RA/

Ronald W. Hernan, Sr. Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosures: 1. Amendment No. 251 to License No. DPR-77
2. Amendment No. 242 to License No. DPR-79
3. Safety Evaluation

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 29, 2000

Mr. J. A. Scalice
Chief Nuclear Officer and
Executive Vice President
Tennessee Valley Authority
6A Lookout Place
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SUBJECT: SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2 - ISSUANCE OF AMENDMENTS REGARDING ELIMINATION OF INSTRUMENTATION RESPONSE TIME TESTING FROM TECHNICAL SPECIFICATIONS (TAC NOS. MA6498 AND MA6499) (TS 99-08)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment No. **251** to Facility Operating License No. DPR-77 and Amendment No. **242** to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant (SQN), Units 1 and 2, respectively. These amendments are in response to your application dated August 30, 1999, as supplemented on January 13, 2000, which requested approval to revise the Technical Specification (TS) definitions and their associated Bases for Engineered Safety Features and Reactor Trip System response time testing definitions in TS Sections 1.13 and 1.27 for SQN Units 1 and 2. This amendment also includes changes to the terminology for TS Surveillance Requirements 4.3.1.1.3 and 4.3.2.1.3.

A copy of our Safety Evaluation is also enclosed. Notice of Issuance will be included in the Commission's next biweekly Federal Register notice.

Sincerely,

Ronald W. Hernan

Ronald W. Hernan, Sr. Project Manager, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-327 and 50-328

Enclosures: 1. Amendment No. 251 to License No. DPR-77
2. Amendment No. 242 to License No. DPR-79
3. Safety Evaluation

cc w/enclosures: See next page

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No.251
License No. DPR-77

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated August 30, 1999, as supplemented on January 13, 2000, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-77 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 251, are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented no later than 45 days after issuance, including issuance of the applicable Technical Requirements Manual section for use by licensee personnel.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert Martin
for Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: February 29, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 251

FACILITY OPERATING LICENSE NO. DPR-77

DOCKET NO. 50-327

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

| REMOVE | INSERT |
|---|---|
| 1-3 | 1-3 |
| 1-5 | 1-5 |
| 3/4 3-1 | 3/4 3-1 |
| 3/4 3-14 | 3/4 3-14 |
| B 3/4 3-2 | B 3/4 3-2 |
| -- | B 3/4 3-2a |

DOSE EQUIVALENT I-131

1.11 DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microcurie/gram) which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed in Table III of TID-14844, "Calculation of Distance Factors for Power and Test Reactor Sites." |R159

$\bar{E}$ - AVERAGE DISINTEGRATION ENERGY

1.12 $\bar{E}$ shall be the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration (in MeV) for isotopes, other than iodines, with half lives greater than 15 minutes, making up at least 95% of the total non-iodine activity in the coolant. |R159

ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME

1.13 The ENGINEERED SAFETY FEATURE RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and the methodology for verification have been previously reviewed and approved by NRC. |R159

FREQUENCY NOTATION

1.14 The FREQUENCY NOTATION specified for the performance of Surveillance Requirements shall correspond to the intervals defined in Table 1.2. |R159

GASEOUS RADWASTE TREATMENT SYSTEM

1.15 A GASEOUS RADWASTE TREATMENT SYSTEM is any system designed and installed to reduce radioactive gaseous effluents by collecting primary coolant system offgases from the primary system and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment. |R159

IDENTIFIED LEAKAGE

1.16 IDENTIFIED LEAKAGE shall be: |R159

a. Leakage (except CONTROLLED LEAKAGE) into closed systems, such as pump seal or valve packing leaks that are captured and conducted to a sump or collecting tank, or

PRESSURE BOUNDARY LEAKAGE

1.22 PRESSURE BOUNDARY LEAKAGE shall be leakage (except steam generator tube leakage) through a non-isolable fault in a Reactor Coolant System component body, pipe wall or vessel wall.

PROCESS CONTROL PROGRAM (PCP)

1.23 DELETED R237

PURGE - PURGING

1.24 PURGE or PURGING is the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating condition, in such a manner that replacement air or gas is required to purify the confinement.

QUADRANT POWER TILT RATIO

1.25 QUADRANT POWER TILT RATIO shall be the ratio of the maximum upper excore detector calibrated output to the average of the upper excore detector calibrated outputs, or the ratio of the maximum lower excore detector calibrated output to the average of the lower excore detector calibrated outputs, whichever is greater. R205

RATED THERMAL POWER (RTP) R145

1.26 RATED THERMAL POWER (RTP) shall be a total reactor core heat transfer rate to the reactor coolant of 3411 MWt.

REACTOR TRIP SYSTEM (RTS) RESPONSE TIME

1.27 The REACTOR TRIP SYSTEM RESPONSE TIME shall be the time interval from when the monitored parameter exceeds its (RTS) trip setpoint at the channel sensor until loss of stationary gripper coil voltage. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and the methodology for verification have been previously reviewed and approved by the NRC.

REPORTABLE EVENT

1.28 A REPORTABLE EVENT shall be any of those conditions specified in Section 50.73 to 10 CFR Part 50.

## 3/4.3 INSTRUMENTATION

### 3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1.1 As a minimum, the reactor trip system instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE. R194

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1.1 Each reactor trip system instrumentation channel and interlock shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-1. R16

4.3.1.1.2 The logic for the interlocks shall be demonstrated OPERABLE prior to each reactor startup unless performed during the preceeding 92 days. The total interlock function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by interlock operation.

4.3.1.1.3 The REACTOR TRIP SYSTEM RESPONSE TIME of each reactor trip function shall be verified to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3.1.

## 3/4.3.2 ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

### LIMITING CONDITION FOR OPERATION

3.3.2.1 The Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4. |R194

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

a. With an ESFAS instrumentation channel or interlock trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3-4, declare the channel inoperable and apply the applicable ACTION requirement of Table 3.3-3 until the channel is restored to OPERABLE status with the trip setpoint adjusted consistent with the Trip Setpoint value.

b. With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-3.

### SURVEILLANCE REQUIREMENTS

4.3.2.1.1 Each ESFAS instrumentation channel shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-2.

4.3.2.1.2 The logic for the interlocks shall be demonstrated OPERABLE during the automatic actuation logic test. The total interlock function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by interlock operation.

4.3.2.1.3 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each ESFAS function shall be verified to be within the limit at least once per 18 months. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once per N times 18 months where N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No. of Channels" Column of Table 3.3-3.

The verification of response time at the specified frequencies provides assurance that the reactor trip and ESF actuation function associated with each channel is completed within the time limit assumed in the safety analyses. No credit was taken in the analyses for those channels with response times indicated as not applicable in the updated final safety analysis report.

R194

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) inplace, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A Revision 2 (January 1996), "Elimination of Pressure Sensing 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 verification for other sensor types must be demonstrated by test. TVA has verified that the selected components at Sequoyah are the same Manufacturer and Model No. as evaluated in WCAPs 13632-P-A and 14036-P-A. WCAP-14036-P-A Revision 1 (October 1998), "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 allocations for sensors, signal conditioning, and actuation logic response times must be verified prior to placing the component in operational service and reverified following maintenance that may adversely affect response time. In general, electrical work does not impact response time provided the parts used for the repair are of the same type and value. Specific components identified in the WCAP may be replaced without verification testing. One example of where response time could be affected is replacing the sensing assembly of a transmitter.

Action 15 of Table 3.3-1, Reactor Trip System Instrumentation, allows the breaker to be bypassed for up to 4 hours for the purpose of performing maintenance. The 4 hours is based on a Westinghouse analysis performed in WCAP-10271, Supplement 1, which determines bypass breaker availability. R58

The placing of a channel in the trip condition provides the safety function of the channel. If the channel is tripped for testing and no other condition would have indicated inoperability, the channel should not be declared inoperable. BR-9

The Auxiliary Feedwater (AFW) Suction Pressure-Low function must be OPERABLE in MODES 1, 2, and 3 to ensure a safety grade supply of water for the AFW System to maintain the steam generators as the heat sink for the reactor. This function does not have to be OPERABLE in MODES 5 and 6 because heat being generated in the reactor is removed via the Residual Heat Removal (RHR) System and does not require the steam generators as a heat sink. In MODE 4, AFW automatic suction transfer does not need to be OPERABLE because RHR will already be in operation, or sufficient time is available to place RHR in operation to remove decay heat. R242

## 3/4.3.3 MONITORING INSTRUMENTATION

### 3/4.3.3.1 RADIATION MONITORING INSTRUMENTATION

The OPERABILITY of the radiation monitoring channels ensures that 1) the radiation levels are continually measured in the areas served by the individual channels and 2) the alarm or automatic action is initiated when the radiation level trip setpoint is exceeded.

### 3/4.3.3.2 MOVABLE INCORE DETECTORS

The OPERABILITY of the movable incore detectors with the specified minimum complement of equipment ensures that the measurements obtained from use of this system accurately represent the spatial neutron flux distribution of the reactor core. The OPERABILITY of this system is demonstrated by irradiating each detector used and determining the acceptability of its voltage curve.

For the purpose of measuring $F_Q(X,Y,Z)$ or $F_{\Delta H}(X,Y)$ a full incore flux map is used. Quarter-core flux maps, as defined in WCAP-8648, June 1976, may be used in recalibration of the excore neutron flux detection system, and full incore flux maps or symmetric incore thimbles may be used for monitoring the QUADRANT POWER TILT RATIO when one Power Range Channel is inoperable. |R227

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 242
License No. DPR-79

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Tennessee Valley Authority (the licensee) dated August 30, 1999, as supplemented on January 13, 2000, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-79 is hereby amended to read as follows:

   (2) Technical Specifications

   The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 242 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance, to be implemented no later than 45 days after issuance, including issuance of the applicable Technical Requirements Manual section for use by licensee personnel.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert Martin
for Richard P. Correia, Chief, Section 2
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical Specifications

Date of Issuance: February 29, 2000

ATTACHMENT TO LICENSE AMENDMENT NO. 242

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

| REMOVE | INSERT |
|---|---|
| 1-3 | 1-3 |
| 1-6 | 1-6 |
| 3/4 3-1 | 3/4 3-1 |
| 3/4 3-14 | 3/4 3-14 |
| B 3/4 3-2 | B 3/4 3-2 |
| -- | B 3/4 3-2a |

DOSE EQUIVALENT I-131

1.11 DOSE EQUIVALENT I-131 shall be that concentration of I-131 (microcurie/gram) which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed in Table III of TID-14844, "Calculation of Distance Factors for Power and Test Reactor Sites." |R146

$\bar{E}$ - AVERAGE DISINTEGRATION ENERGY

1.12 $\bar{E}$ shall be the average (weighted in proportion to the concentration of each radionuclide in the reactor coolant at the time of sampling) of the sum of the average beta and gamma energies per disintegration (in MeV) for isotopes, other than iodines, with half lives greater than 15 minutes, making up at least 95% of the total non-iodine activity in the coolant. |R146

ENGINEERED SAFETY FEATURE (ESF) RESPONSE TIME

1.13 The ENGINEERED SAFETY FEATURE RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays where applicable. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and the methodology for verification have been previously reviewed and approved by the NRC. |R146

FREQUENCY NOTATION

1.14 The FREQUENCY NOTATION specified for the performance of Surveillance Requirements shall correspond to the intervals defined in Table 1.2. |R146

GASEOUS RADWASTE TREATMENT SYSTEM

1.15 A GASEOUS RADWASTE TREATMENT SYSTEM is any system designed and installed to reduce radioactive gaseous effluents by collecting primary coolant system offgases from the primary system and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment. |R146

RATED THERMAL POWER (RTP) |R132

1.26 RATED THERMAL POWER (RTP) shall be a total reactor core heat transfer rate to the reactor coolant of 3411 MWt. |R146

REACTOR TRIP SYSTEM (RTS) RESPONSE TIME |

1.27 The REACTOR TRIP SYSTEM RESPONSE TIME shall be the time interval from when the monitored parameter exceeds its (RTS) trip setpoint at the channel sensor until loss of stationary gripper coil voltage. The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and the methodology for verification have been previously reviewed and approved by NRC. |R146

REPORTABLE EVENT

1.28 A REPORTABLE EVENT shall be any of those conditions specified in Section 50.73 to 10 CFR Part 50. |R146

SHIELD BUILDING INTEGRITY

1.29 SHIELD BUILDING INTEGRITY shall exist when: |R146

a. The door in each access opening is closed except when the access opening is being used for normal transit entry and exit.

b. The emergency gas treatment system is OPERABLE.

c. The sealing mechanism associated with each penetration (e.g., welds, bellows or O-rings) is OPERABLE.

SHUTDOWN MARGIN

1.30 SHUTDOWN MARGIN shall be the instantaneous amount of reactivity by which the reactor is subcritical or would be subcritical from its present condition assuming all full length rod cluster assemblies (shutdown and control) are fully inserted except for the single rod cluster assembly of highest reactivity worth which is assumed to be fully withdrawn. |R146

SITE BOUNDARY

1.31 The SITE BOUNDARY shall be that line beyond which the land is not owned, leased, or otherwise controlled by the licensee (see figure 5.1-1). |R146

## 3/4.3 INSTRUMENTATION

### 3/4.3.1 REACTOR TRIP SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.1 As a minimum, the reactor trip system instrumentation channels and interlocks of Table 3.3-1 shall be OPERABLE. |R182

APPLICABILITY: As shown in Table 3.3-1.

ACTION:

As shown in Table 3.3-1.

SURVEILLANCE REQUIREMENTS

4.3.1.1.1 Each reactor trip system instrumentation channel and interlock shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-1.

4.3.1.1.2 The logic for the interlocks shall be demonstrated OPERABLE prior to each reactor startup unless performed during the preceeding 92 days. The total interlock function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by interlock operation.

4.3.1.1.3 The REACTOR TRIP SYSTEM RESPONSE TIME of each reactor trip function shall be verified to be within its limit at least once per 18 months. Neutron detectors are exempt from response time testing. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once every N times 18 months where N is the total number of redundant channels in a specific reactor trip function as shown in the "Total No. of Channels" column of Table 3.3.1.

## 3/4.3.2 ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

### LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-3 shall be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4. |R182

APPLICABILITY: As shown in Table 3.3-3.

ACTION:

a. With an ESFAS instrumentation channel or interlock trip setpoint less conservative than the value shown in the Allowable Values column of Table 3.3-4, declare the channel inoperable and apply the applicable ACTION requirement of Table 3.3-3 until the channel is restored to OPERABLE status with the trip setpoint adjusted consistent with the Trip Setpoint value.

b. With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-3.

### SURVEILLANCE REQUIREMENTS

4.3.2.1.1 Each ESFAS instrumentation channel and interlock shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations for the MODES and at the frequencies shown in Table 4.3-2.

4.3.2.1.2 The logic for the interlocks shall be demonstrated OPERABLE during the automatic actuation logic test. The total interlock function shall be demonstrated OPERABLE at least once per 18 months during CHANNEL CALIBRATION testing of each channel affected by interlock operation.

4.3.2.1.3 The ENGINEERED SAFETY FEATURES RESPONSE TIME of each ESFAS function shall be verified to be within the limit at least once per 18 months. Each verification shall include at least one train such that both trains are verified at least once per 36 months and one channel per function such that all channels are verified at least once per N times 18 months where N is the total number of redundant channels in a specific ESFAS function as shown in the "Total No. of Channels" Column of Table 3.3-3.

REACTOR TRIP SYSTEM AND ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

The verification of response time at the specified frequencies provides assurance that the reactor trip and the ESF actuation function associated with each channel is completed within the time limit assumed in the safety analyses. No credit was taken in the analyses for those channels with response times indicated as not applicable in the updated final safety analysis report. R182

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) inplace, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. WCAP-13632-P-A Revision 2 (January 1996), "Elimination of Pressure Sensing 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 verification for other sensor types must be demonstrated by test. TVA has verified that the selected components at Sequoyah are the same Manufacturer and Model No. as evaluated in WCAPs 13632-P-A and 14036-P-A. WCAP-14036-P-A Revision 1 (October 1998), "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 allocations for sensors, signal conditioning, and actuation logic response times must be verified prior to placing the component in operational service and reverified following maintenance that may adversely affect response time. In general, electrical work does not impact response time provided the parts used for the repair are of the same type and value. Specific components identified in the WCAP may be replaced without verification testing. One example of where response time could be affected is replacing the sensing assembly of a transmitter.

Action 15 of Table 3.3-1, Reactor Trip System Instrumentation, allows the breaker to be bypassed for up to 4 hours for the purpose of performing maintenance. The 4 hours is based on a Westinghouse analysis performed in WCAP-10271, Supplement 1, which determines bypass breaker availability. R46

The placing of a channel in the trip condition provides the safety function of the channel. If the channel is tripped for testing and no other condition would have indicated inoperability, the channel should not be declared inoperable. BR-10

The Auxiliary Feedwater (AFW) Suction Pressure-Low function must be OPERABLE in MODES 1, 2, and 3 to ensure a safety grade supply of water for the AFW System to maintain the steam generators as the heat sink for the reactor. This function does not have to be OPERABLE in MODES 5 and 6 because heat being generated in the reactor is removed via the Residual Heat Removal (RHR) System and does not require the steam generators as a heat sink. In MODE 4, AFW automatic suction transfer does not need to be OPERABLE because RHR will already be in operation, or sufficient time is available to place RHR in operation to remove decay heat. R228

## 3/4.3.3 MONITORING INSTRUMENTATION

### 3/4.3.3.1 RADIATION MONITORING INSTRUMENTATION

The OPERABILITY of the radiation monitoring channels ensures that 1) the radiation levels are continually measured in the areas served by the individual channels and 2) the alarm or automatic action is initiated when the radiation level trip setpoint is exceeded.

### 3/4.3.3.2 MOVABLE INCORE DETECTORS

The OPERABILITY of the movable incore detectors with the specified minimum complement of equipment ensures that the measurements obtained from use of this system accurately represent the spatial neutron flux distribution of the reactor core. The OPERABILITY of this system is demonstrated by irradiating each detector used and determining the acceptability of its voltage curve.

For the purpose of measuring $F_Q(X,Y,Z)$ or $F_{\Delta H}(X,Y)$ a full incore flux map is used. Quarter-core flux maps, as defined in WCAP-8648, June 1976, may be used in recalibration of the excore neutron flux detection system, and full incore flux maps or symmetric incore thimbles may be used for monitoring the QUADRANT POWER TILT RATIO when one Power Range Channel is inoperable. |R214

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 251 TO FACILITY OPERATING LICENSE NO. DPR-77

AND AMENDMENT NO. 242 TO FACILITY OPERATING LICENSE NO. DPR-79

TENNESSEE VALLEY AUTHORITY

SEQUOYAH NUCLEAR PLANT, UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

## 1.0 INTRODUCTION

By application dated August 30, 1999, as supplemented on January 13, 2000, the Tennessee Valley Authority (TVA, the licensee) proposed amendments to the Technical Specifications (TS) for Sequoyah Nuclear Plant (SQN), Units 1 and 2 (TS Change 99-08). The requested changes would revise the TS definitions and their associated Bases for Engineered Safety Features (ESF) and Reactor Trip System (RTS) response time testing (RTT) definitions in TS Sections 1.13 and 1.27 for SQN Units 1 and 2. This amendment request also includes changes to the terminology for TS Surveillance Requirements (SRs) 4.3.1.1.3 and 3.3.2.1.3. In a letter dated January 13, 2000, TVA provided clarifying information regarding this review that responds to questions that arose during a conference call between the U.S. Nuclear Regulatory Commission (NRC) and TVA on January 5, 2000. This supplemental letter did not expand the scope of the initial Amendment request or change the NRC staff's initial proposed no significant hazards consideration determination.

## 2.0 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 loops for the ESF and the RTS.

The Westinghouse Owners Group (WOG) performed two analyses to assess the impact of elimination of RTT for instruments and instrument loops. These analyses also discussed alternate test methodologies that would show that the instrumentation was functioning correctly. The first analysis was the WOG Licensing Topical Report, WCAP-13632-P, Revision (Rev.) 2, "Elimination of Pressure Sensor Response Time Testing Requirements," dated August 1995, which was approved by the staff's safety evaluation (SE) dated September 5, 1995

Enclosure 3

(Reference 1). The second analysis, WCAP-14036-P, Rev. 1, "Elimination of Periodic Protection Channel Response Time Tests," dated December 1995, was approved by the staff's SE dated October 6, 1998 (Reference 2). The NRC staff's SEs, approving WCAP-13632-P, Rev. 2, and WCAP-14036-P, Rev. 1, stipulated certain conditions that individual plant licensees must meet when implementing the guidelines in WCAP-13632-PA, Rev. 2, and WCAP-14036–PA, Rev. 1, on a plant-specific basis. These WCAPs and the analyses supporting the plant-specific requirements form the basis for changes proposed by TVA for SQN.

## 3.0 PROPOSED CHANGES AND EVALUATION

### Proposed Changes

There are two types of changes contained within the licensee's request. The first is to eliminate periodic pressure sensor RTT in accordance with WCAP-13632-P, Rev. 2, and the second is to eliminate protective channel RTT for the RTS and ESF actuation system in accordance with WCAP-14036-P, Rev. 1.

For the first change, the licensee proposes to no longer perform RTT on the following sensors as listed in Table 1 of its application:

Barton 752
Barton 763
Barton 764
Foxboro E13DH/NE13DH
Foxboro E11GM/NE11GM
Foxboro NE13DM

These sensors are listed in the staff's SE dated September 5, 1995, approving WCAP-13632-P, Rev. 2. Since the staff has already reviewed the generic analysis, the licensee needs only to meet the conditions for plant-specific amendments discussed in Section 4 of this SE.

For the second change, the licensee proposed elimination of RTT for the RTS and ESF system, and instead will depend upon calibration and other periodic testing, as described in WCAP-14036-P, Rev. 1, in order to determine the proper operation and functioning of the RTS and ESF instrumentation. In those cases where the TS requires the licensee to verify that a protective system can meet its protective function in a prescribed time, a bounding response time will be added to those portions of the protective system actual response time tested in order to determine the total system response time. The requirement to actually measure the response times would be eliminated, and instead, the response times will be verified by summing allocated times for sensors, the process protection system, the nuclear instrumentation system, and the logic system. These allocated values will be added to the measured times for the actuated devices and compared to the overall analysis limits.

The TS changes, as proposed by the licensee, would revise the TS 1.13 and 1.27 definitions for "Engineered Safety Features (ESF) Response Time" and "Reactor Trip System (RTS) Response Time," respectively, 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. The TS requirements for response time verification will continue to be implemented by SR 4.3.1.1.3 for the RTS and SR 4.3.2.1.3 for Engineered Safety Features Actuation System (ESFAS).

The definition for ESF response time would be changed by adding two sentences, the second of which would allow response times for selected components to be verified. The definition, as augmented by the underlined portion, reads:

> The ESF RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its ESF actuation setpoint at the channel sensor until the ESF equipment is capable of performing its safety function (i.e., the valves travel to their required positions, pump discharge pressures reach their required values, etc.). Times shall include diesel generator starting and sequence loading delays, where applicable. <u>The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and the methodology for verification have been previously reviewed and approved by the NRC.</u>

Likewise, the definition for RTS response time would be changed by adding two sentences, the second of which would allow response times for selected components to be verified. The definition, as augmented by the underlined portion, reads:

> The RTS RESPONSE TIME shall be that time interval from when the monitored parameter exceeds its RTS trip setpoint at the channel sensor until loss of stationary gripper coil voltage. <u>The response time may be measured by means of any series of sequential, overlapping, or total steps so that the entire response time is measured. In lieu of measurement, response time may be verified for selected components provided that the components and the methodology for verification have been previously reviewed and approved by the NRC.</u>

<u>Evaluation</u>

The addition of these sentences will allow the licensee to verify the component response times rather than performing an actual RTT. These changes are in accordance with the report WCAP-14036-P, Rev. 1, and the staff's SE approving that report, and are, therefore, acceptable to the staff.

<u>Proposed Change</u>

The licensee has proposed a change to SR 4.3.1.1.3, "REACTOR TRIP SYSTEM RESPONSE TIME," and SR 4.3.2.1.3, "THE ENGINEERED SAFETY FEATURES RESPONSE TIME," to change the words "demonstrated," "test," and "tested" to the words "verified" and "verification" to be consistent with the proposed alternatives to actually testing individual response times of sensors each time the SR is performed.

Evaluation

These changes are consistent with allowing the licensee to verify the component response times rather than performing an actual RTT in each case. These changes are in accordance with the report WCAP-14036-P, Rev. 1, and the staff's SE approving that report, and are, therefore, acceptable to the staff.

Proposed Change

The licensee has proposed a change to Bases Sections B 3/4.3.1 and B 3/4.3.2, to delete one paragraph and replace it with two paragraphs from WCAP-14036-P-A, Rev. 1, that reference the methodology and bases for NRC approval of deletion of RTT.

Evaluation

These changes describe the rationale that allows the licensee to verify the component response times by using approved methodology instead of performing an actual RTT. These changes are in accordance with WCAP-14036-P, Rev. 1, as approved by the staff's SE and are, therefore, acceptable to the staff.

Other Review Issues

During the conference call with TVA on January 5, 2000, the staff raised two minor issues regarding details of TVA's amendment request. One issue was use of the words "logic," "train," and "logic train" in a manner not consistent with WCAP-13632. The second issue was discussion of the words used in the proposed SQN Bases changes with respect to impact of electrical repair work on transmitters. TVA submitted changes to their initial submittal as an attachment to its January 13, 2000, letter that resolved these minor issues.

4.0 VERIFICATION OF PLANT-SPECIFIC CONDITIONS

4.1 The NRC staff stipulated several conditions in the generic SE approving Topical Report WCAP-13632-P, Rev. 2, that must be met by the individual licensee referencing the topical report before the guidance could be implemented in plant-specific TS change proposals. From the licensee's submittals, the NRC staff verified that the licensee has met or will meet the applicable conditions. The conditions stipulated by the Topical Report, the TVA responses to those conditions, the NRC staff concerns discussed during a telephone conference call on January 5, 2000, the TVA supplemental written responses, dated January 13, 2000, and the NRC staff's evaluations are as follows:

4.1.1 Condition 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: Consistent with the proposed TS and Bases changes and Electric Power Research Institute Report (EPRI) NP-7243, Rev. 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 re-verified following maintenance that may adversely affect sensor response time. TVA has also included this in its list of licensee commitments in Enclosure 4 of its September 28, 1999 application.

Staff Concern: TVA should add a commitment to the SQN Commitment Tracking System.

Supplemental Response: [1] A commitment will be added to the SQN Commitment Tracking System before implementation of the approved TS change that states:

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 re-verified following maintenance that may adversely affect sensor response time.

Evaluation: This response fulfills the condition in the staff's generic SE, approving WCAP-13632-P, Rev. 2, and is, therefore, acceptable to the NRC staff.

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

Staff Concern: TVA's response does not address switches. TVA is requested to address its plans for RTT for switches in response to the condition in the SE. TVA should add a commitment to the SQN Commitment Tracking System. Also, TVA should clarify the meaning of the term "that can be tested" with respect to whether its interpretation would exclude any transmitters or switches that use capillary tubes from the testing addressed by the SE condition.

Supplemental Response: [1] Switches were intentionally omitted from the original TS change request because there are no switches with capillary tubes in the SQN RTT Program. Additionally, SQN does not employ any transmitters or switches with capillary sensing lines in applications that require response time testing.

---

[1]Supplemental responses are documented in a January 13, 2000, voluntary TVA response to questions asked during a conference call with the NRC on January 5, 2000.

The term " . . . that can be tested . . . " was added to provide flexibility in the event that a future design condition may need the exclusion. However, since future changes to response time test exclusions require NRC approval, the term is not needed and should be removed. Additionally, since these applications do not exist at SQN, implementation of this condition is not applicable.

A commitment will be added to the SQN Commitment Tracking System before implementation of the approved TS change that states:

The applicable plant procedures will stipulate that pressure sensors (transmitters and switches) utilizing capillary tubes must be subjected to response time testing after initial installation and following any maintenance or modification activity that could damage the transmitter capillary tubes.

Evaluation: This response fulfills the condition in the staff's generic SE, approving WCAP-13632-P, Rev. 2, and is, therefore, acceptable to the NRC staff.

4.1.3 Condition 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 hydraulic RTT of the sensor following each calibration.

Response: SQN has no pressure transmitters with variable damping installed in any RTS or ESFAS application for which RTT is required. No SQN procedure changes or enhanced administrative controls are required.

Staff Concern: TVA should add a commitment to the SQN Commitment Tracking System.

Supplemental Response: [1] A commitment will be added to the SQN Commitment Tracking System before implementation of the approved TS change that states:

The applicable plant procedures (or appropriate administrative controls) will stipulate that pressure transmitters equipped with variable damping capability in reactor trip system or engineered safety features response time applications, which require periodic response time test, must be subjected to response time testing after initial installation or following any maintenance or modification activity. Administrative controls may include use of pressure transmitters that are factory set and hermetically sealed to prohibit tampering or in situ application of a tamper seal (or sealant) on the potentiometer to secure and give visual indication of the potentiometer position.

Evaluation: This response fulfills the condition in the staff's generic SE, approving WCAP-13632-P, Rev. 2, and is, therefore, acceptable to the NRC staff.

4.1.4 Condition 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 NRC Bulletin 90-01, Supplement 1, "Loss of Fill-Oil in Transmitters Manufactured by Rosemount," dated December 22, 1992. As an alternative to performing periodic drift monitoring of Rosemount transmitters, licensees may complete the following actions: (1) ensure that operators and technicians are aware of the Rosemount transmitter loss of fill-oil issue and make provisions to ensure that technicians monitor for sensor response time degradation during the performance of calibrations and functional tests of these transmitters, and (2) review and revise surveillance testing procedures, if necessary, to ensure that calibrations are being performed using equipment designed to provide a step function or fast ramp in the process variable and that calibrations and functional tests are being performed in a manner that allows simultaneous monitoring of both the input and output response of the transmitter under test, thus allowing, with reasonable assurance, the recognition of significant response time degradation.

Response: SQN does not have any Rosemount transmitters installed in RTS or ESFAS applications for which RTT is required as shown in Tables 1 and 2. SQN provided responses to NRC Bulletins 90-01 and 90-01, Supplement 1, by letters dated July 13, 1990 and March 4, 1993, respectively. These responses define actions SQN would take in the future, should any of the existing transmitters in RTS or ESFAS applications requiring RTT be replaced with Rosemount transmitters.

Evaluation: TVA's response indicates that there are no Rosemount transmitters in the list of sensors in TVA's application for which RTT elimination is proposed. Therefore, this item is not applicable to SQN. On this basis, TVA's response is consistent with the condition in the staff's generic SE that approved WCAP-14036-P, Rev. 1, and is, therefore, acceptable to the NRC staff.

4.2 The staff's SE approving WCAP-14036-P, Rev. 1, also had a requirement that must be met by the individual licensee referencing the topical report before the guidance could be implemented in plant-specific TS change proposals. The requirement is as follows:

Condition: Since the performance of RTT is a TS requirement, licensees referencing WCAP-14036 must submit a TS amendment to eliminate that requirement for the identified equipment. In that amendment request, the licensee must verify that the failure modes and effects analysis (FMEA) performed by the WOG is applicable to the equipment actually installed in the licensees facility, and that the analysis is valid for the versions of the boards used in the protection system.

Response: TVA provided the following information in their license amendment application dated August 30, 1999:

WCAP-14036-P-A, Rev. 1, contains the technical basis and methodology for elimination of RTT requirements on protection channels identified in the WCAP. The NRC safety evaluation for WCAP-14036-P requires confirmation by the licensee that generic analysis in the WCAP is applicable to their plant.

Two tables have been prepared to identify the equipment affected by this request. Table 1 identifies the equipment that is part of the RTS and Table 2 identifies the equipment that is part of the ESFAS. The equipment listed in Tables 1 and 2 is the equipment actually installed at SQN. TVA has reviewed the FMEAs in WCAP 14036-P-A, Rev. 1, to ensure that they are applicable to this equipment, and the analysis is valid for the versions of the boards utilized. These tables also identify the assumed response time being used and how the number was derived.

Evaluation: This response fulfills the condition in the staff's generic SE, approving WCAP-14036-P, Rev. 1, and is, therefore, acceptable to the NRC staff.

4.3 Bounding (or allocated) sensor response times

Information submitted by TVA

In addition to the preceding conditions, when a plant accident analysis determines that a mitigation system is required to actuate in a certain response time, the testing for that response time is generally required by the TS. The TVA amendment request will eliminate some of the testing previously required. The two topical reports mentioned above provide adequate justification that calibrations and other surveillance testing will prove that the instruments are functioning properly. When the testing is not done to a portion of the instrument loop, but the TS requires the verification of assumptions made in the accident analysis, some assumed or bounding value for the untested portion of the loop must be added to the tested portion, to arrive at a total system response time. WCAP-14036-P, Rev. 1, included those maximum or bounding response times for the equipment, which was analyzed in that Topical Report. WCAP-13632-P, Rev. 2, did not have similar bounding response times approved for all of the sensors which were addressed in that topical report. TVA identified the source for the Barton and Foxboro response times in Note 1 for Tables 1 and 2 in its August 30, 1999, application.

The staff's SE for WCAP-13632 notes that Westinghouse has proposed using allocated sensor response times in accordance with the methodology described in Section 9 of WCAP-13632-P, Rev. 2. Allocations for sensor response times would be obtained from (1) historical records based on acceptable RTT (hydraulic, noise, or power interrupt tests), (2) inplace, onsite, or offsite (e.g., vendor) test measurements, or (3) utilizing vendor engineering specifications. In this regard, Tables 1 and 2 of SQN's application identifies RTS and ESFAS equipment and provides the bounding response time values to be used for SQN equipment. Note 3 indicates that the sensor values are from a SQN Surveillance Instruction procedure but does not indicate

which of the above three methods was utilized. During the course of the NRC staff's review, this issue was raised during the conference call with TVA on January 5, 2000.

In its letter of January 13, 2000, TVA provided clarifications on this matter. TVA stated that the sensor times documented in Tables 1 and 2 of TS Change 99-08 are based upon method (1), historical records based on acceptable RTT, utilizing historical records of acceptable RTT as obtained from the SQN response time testing program. Most of the sensor response time testing at SQN for the past 10 years has been performed by a vendor utilizing *in situ* (noise and power interrupt) testing techniques and were determined to be very conservative. These allocated times were accounted for separately in the procedure from the rest of the protection channel to ensure that the total response time is less than the value for the given function. The *in situ* response time testing results (though conservative when compared to hydraulic ramp generator bench testing) will normally be less than the allocated times. The sensor response time testing at SQN has used vendor *in situ* techniques for many years. The one exception to this methodology was identified in Table 1 of TS Change 99-08. Specifically, Note 6 of Table 1 identifies that the response times were based on actual onsite hydraulic ramp generator measurements. In the case of the loss of flow function, there was not enough margin in the total loop response time to allow the overly conservative allocated sensor times. Therefore, a review of historical ramp generator response times was used to determine response time.

TVA, in its supplemental letter of January 13, 2000, stated that a comparison of the response times in Table 9-1 of WCAP-13632, to the allocated times SQN has chosen, demonstrates that the SQN response times are conservative. To ensure consistency with the WCAP and previous NRC evaluations, Tables 1 and 2 of proposed TS Change 99-08 were revised and were included with TVA's supplemental submittal. The revision applies WCAP allocated times for the sensors, with the exception of the Foxboro sensors. For the Foxboro sensors, historical data was obtained, and evaluations were performed to ensure suitability of the allocation times. Historical data for the Foxboro sensors were provided in the supplemental TVA letter for reactor coolant (RCS) flow, steam pressure, and containment pressure.

The sensor bounding response time values provided by TVA are as follows:

| Sensor Type | Bounding Response Value |
|---|---|
| Barton 752 | 400 mSec |
| Barton 763 | 200 mSec |
| Barton 764 | 400 mSec |
| Foxboro NE11GM/E11GM | 867 mSec |
| Foxboro E13DH/NE13DH | 350 mSec |
| Foxboro NE13DM | 500 mSec |

Use of these values, and the values found in WCAP-14036-P, Rev. 1, is consistent with the staff generic approval of RTT elimination, and is therefore, acceptable.

NRC Staff Evaluation

As discussed above assumed administrative (or allocated) values for sensor response time are required for those RTS and ESFAS channels whose sensor response time tests have been eliminated, but for which system relay response time testing is still required. The same is true for systems in which the entire instrumentation channel is exempted from RTT, but where there

is still a requirement to show that a protective function will occur within a stated time. When there is a need to determine a channel response time for instrument channels whose transmitters/sensors have been eliminated, the assumed administrative value (instead of measured values) for the transmitter/sensor will be added to measured values of the remainder of the channel. In these cases, use of the design response times provided by the manufacturer or response times listed in either the Westinghouse topical reports or in EPRI NP-7243 for the instruments in question is appropriate and should be used.

TVA stated that these response time data are not available for Foxboro instruments. Therefore, TVA has proposed using response time values based upon actual values measured during past response time tests. TVA provided the historical data and calculations in a clarification of TS Change Request No. 99-08 dated January 13, 2000. The three applications of Foxboro sensors have somewhat different allocated response times assigned by the licensee, dependent on the usage of the sensor. The Foxboro model E13DH and NE13DH transmitters, used for RCS flow measurements, have an assumed response value of 350 milliseconds. The Foxboro model NE11GM transmitters, used for steamline pressure, have an assumed value of 867 milliseconds. The Foxboro model NE13DM transmitters, used for containment pressure, have an assumed value of 500 milliseconds.

In order to determine an assumed administrative value for instrument response time, TVA reviewed the operational history (i.e., the measured response times) for SQN. This data was evaluated to determine statistical mean and standard deviation of the previously measured response time values. An assumed administrative value was chosen which would be compatible with a one-sided statistical tolerance limit so that 95% of the reading would fall within the limits, with a 95% confidence level. The staff has determined that since this is an NRC-approved method for calculating set point values, and this methodology is statistically valid for determining an upper bounding value, this methodology is an appropriate method for calculating response time based upon historical operating data.

These calculations can be done by the methodology shown in Table T-11b, "One sided tolerance limit factor for a normal distribution" in NRC Publication NUREG-1475, "Applying Statistics." Time values shown below are in seconds unless otherwise noted.

| | |
|---|---|
| Sensor | Foxboro E13DH / NE13DH |
| Usage | RCS Flow |
| Mean | .1354 |
| Std Dev | .0306 |
| Sample Size | 70 |
| One sided tolerance limit factor (95/95 Multiplier IAW NUREG 1475) | 1.990 |
| One sided tolerance limit ($T_{upper}$) | .196 sec |
| TVA SQN Assumed Value | .350 sec |

| | |
|---|---|
| Sensor | Foxboro NE11GM |
| Usage | Steam Pressure |
| Mean | .1921 |
| Std Dev | .0678 |
| Sample Size | 57 |
| One sided tolerance limit factor (95/95 Multiplier IAW NUREG 1475) | 2.045 |
| One sided tolerance limit ($T_{upper}$) | .331 sec |
| TVA SQN Assumed Value | .867 sec |

| | |
|---|---|
| Sensor | Foxboro NE13DM |
| Usage | Containment Pressure |
| Mean | .233 |
| Std Dev | .0375 |
| Sample Size | 12 |
| One sided tolerance limit factor (95/95 Multiplier IAW NUREG 1475) | 3.175 |
| One sided tolerance limit ($T_{upper}$) | .352 sec |
| TVA SQN Assumed Value | .500 sec |

The methodology used by TVA for the determination of these values is similar to that generally in use in setpoint methodology for the determination of anticipated instrument drift. Since in each case the value which the licensee has assigned as an assumed value is larger than the calculated one sided tolerance limit, the assumed values are conservative values and therefore acceptable. The staff also concurs that the methodology used by the licensee has statical validity, and is an acceptable methodology for determining an administrative value to be used in those cases where the administrative response time value is determined by use of plant historical data.

Overall Summary

On the basis of its review, the NRC staff concludes that the licensee has implemented the provisions of the generic SE for RTT elimination and satisfied the applicable plant-specific conditions in accordance with the NRC-approved topical reports WCAP-13632-P, Rev. 2, and WCAP-14036-P, Rev. 1; therefore, the staff concludes that the proposed SQN TS modifications for selected instrument RTT elimination are acceptable.

## 5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Tennessee State official was notified of the proposed issuance of the amendment. The State official had no comments.

## 6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (64 FR 54381 dated October 6, 1999). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

## 7.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by

operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date: February 29, 2000

REFERENCES

1. Letter, B.A. Boger, NRC, to R.A. Newton, Westinghouse Owners Group Chairman, September 5, 1995, "Review of Westinghouse Electric Corporation Topical Report WCAP-13632, Rev. 2, 'Elimination of Pressure Sensor Response Time Testing Requirements,' dated August 1995 - Westinghouse Owners Group Program MUHP-3040, Rev. 1" (NRC Accession Number 9509070068).

2. Letter, T.H. Essig, NRC, to L. Liberatori, Chairman Westinghouse Owners Group Steering Committee, October 6, 1998, "Safety Evaluation Related to Topical Report WCAP-14036, Rev. 1, 'Elimination of Periodic Protection Channel Response Time Tests' (TAC Number MA0863)" (NRC Accession Number 9810090054).

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