ENCLOSURE 1

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-95-07)

LIST OF AFFECTED PAGES

Unit 1

3/4 1-5
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Unit 2

3/4 1-5
6-22
6-22a

4.1.1.3 The MTC shall be determined to be within its limits during each fuel cycle as follows:

a. The MTC shall be measured and compared to the BOL limit specified in the COLR prior to initial operation above 5% of RATED THERMAL POWER, after each fuel loading. R15

b. The MTC shall be measured at any THERMAL POWER and compared to the 300 ppm surveillance limit specified in the COLR (all rods withdrawn, RATED THERMAL POWER condition) within 7 EFPD after reaching an equilibrium boron concentration of 300 ppm. In the event this comparison indicates that the MTC is more negative than the 300 ppm surveillance limit specified in the COLR, the MTC shall be remeasured and compared to the EOL MTC limit specified in the COLR at least once per 14 EFPD during the remainder of the fuel cycle. R159 R159

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OCT 23 1991

MONTHLY REACTOR OPERATING REPORT

6.9.1.10 Routine reports of operating statistics and shutdown experience, including documentation of all challenges to the PORVs or Safety Valves, shall be submitted on a monthly basis no later than the 15th of each month following the calendar month covered by the report. R76

CORE OPERATING LIMITS REPORT

6.9.1.14 Core operating limits shall be established and documented in the CORE OPERATING LIMITS REPORT before each reload cycle or any remaining part of a reload cycle for the following: R159

1. Moderator Temperature Coefficient BOL and EOL limits and 300 ppm surveillance limit for Specification 3/4.1.1.3,
2. Shutdown Bank Insertion Limit for Specification 3/4.1.3.5,
3. Control Bank Insertion Limits for Specification 3/4.1.3.6,
4. Axial Flux Difference Limits for Specification 3/4.2.1,
5. Heat Flux Hot Channel Factor, K(z), and W(z) for Specification 3/4.2.2, and
6. Nuclear Enthalpy Hot Channel Factor and Power Factor Multiplier for Specification 3/4.2.3.

6.9.1.14.a The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by NRC in:

1. WCAP-9272-P-A, "WESTINGHOUSE RELOAD SAFETY EVALUATION METHODOLOGY", July 1985 (W Proprietary).
   (Methodology for Specifications 3.1.1.3 - Moderator Temperature Coefficient, 3.1.3.5 - Shutdown Bank Insertion Limit, 3.1.3.6 -Control Bank Insertion Limits, 3.2.1 - Axial Flux Difference, 3.2.2 - Heat Flux Hot Channel Factor, and 3.2.3 - Nuclear Enthalpy Hot Channel Factor.)
2. WCAP-10216-P-A, "RELAXATION OF CONSTANT AXIAL OFFSET CONTROL F_Q SURVEILLANCE TECHNICAL SPECIFICATION", JUNE 1983 (W Proprietary).
   (Methodology for Specification 3.2.1 - Axial Flux Difference (Relaxed Axial Offset Control) and 3.2.2 - Heat Flux Hot Channel Factor (W(z) surveillance requirements for F_Q Methodology).)
3. WCAP-10266-P-A Rev. 2, "THE 1981 REVISION OF WESTINGHOUSE EVALUATION MODEL USING BASH CODE", March 1987, (W Proprietary).
   (Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor).
4. WCAP-13631-P-A, "SAFETY EVALUATION SUPPORTING A MORE NEGATIVE EOL MODERATOR TEMPERATURE COEFFICIENT TECHNICAL SPECIFICATION FOR THE SEQUOYAH NUCLEAR PLANTS," MARCH 1993 (W Proprietary). R17
   (Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient)

INSERT B

CORE OPERATING LIMITS REPORT (continued)

6.9.1.14.b The core operating limits shall be determined so that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits, nuclear limits such as shutdown margin, and transient and accident analysis limits) of the safety analysis are met. R1

6.9.1.14.c The CORE OPERATING LIMITS REPORT shall be provided within 30 days after cycle start-up (Mode 2) for each reload cycle or within 30 days of issuance of any midcycle revision to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector.

SPECIAL REPORTS INSERT C

6.9.2.1 Special reports shall be submitted within the time period specified for each report, in accordance with 10 CFR 50.4. R76

6.9.2.2 Diesel Generator Reliability Improvement Program

As a minimum the Reliability Improvement Program report for NRC audit, required by LCO 3.8.1.1, Table 4.8-1, shall include:

(a) a summary of all tests (valid and invalid) that occurred within the time period over which the last 20/100 valid tests were performed R56

(b) analysis of failures and determination of root causes of failures

(c) evaluation of each of the recommendations of NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability in Operating Reactors," with respect to their application to the Plant

(d) identification of all actions taken or to be taken to 1) correct the root causes of failures defined in b) above and 2) achieve a general improvement of diesel generator reliability

(e) the schedule for implementation of each action from d) above

(f) an assessment of the existing reliability of electric power to engineered-safety-feature equipment

Insert A

Measurement of the MTC in accordance with 4.1.1.3.b may be suspended provided the benchmark criteria and the Revised Prediction as documented in the COLR are satisfied. Data required for the calculation of the Revised Prediction is provided in the Most Negative Temperature Coefficient Limit Report per Specification 6.9.1.15.

Insert B

5. WCAP-13749-P-[A], "SAFETY EVALUATION SUPPORTING THE CONDITIONAL EXEMPTION OF THE MOST NEGATIVE EOL MODERATOR TEMPERATURE COEFFICIENT MEASUREMENT," May, 1993 (Proprietary) (Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient.)

Insert C

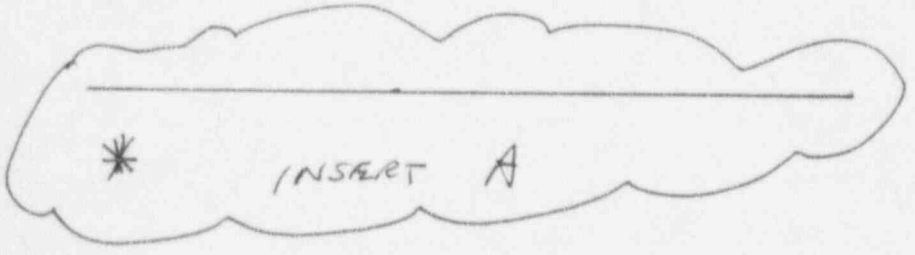
6.9.1.15 The Most Negative MTC Report shall be prepared at least 60 days prior to the date the limit would become effective and maintained on file. This report will include the data required for the determination of the Revised Prediction of the 300 ppm/ARO/RTP MTC per WCAP-13749-P-[A].

SURVEILLANCE REQUIREMENTS

4.1.1.3 The MTC shall be determined to be within its limits during each fuel cycle as follows:

a. The MTC shall be measured and compared to the BOL limit specified in the COLR prior to initial operation above 5% of RATED THERMAL POWER, after each fuel loading. R146

b. The MTC shall be measured at any THERMAL POWER and compared to the 300 PPM surveillance limit specified in the COLR (all rods withdrawn, RATED THERMAL POWER condition) within 7 EFPD after reaching an equilibrium boron concentration of 300 ppm. In the event this comparison indicates the MTC is more negative than the 300 PPM surveillance limit specified in the COLR, the MTC shall be remeasured and compared to the EOL MTC limit specified in the COLR at least once per 14 EFPD during the remainder of the fuel cycle. R146 R146



MONTHLY REACTOR OPERATING REPORT

6.9.1.10 Routine reports of operating statistics and shutdown experience, including documentation of all challenges to the PORVs or Safety Valves, shall be submitted on a monthly basis no later than the 15th of each month following the calendar month covered by the report. R64

CORE OPERATING LIMITS REPORT

6.9.1.14 Core operating limits shall be established and documented in the CORE OPERATING LIMITS REPORT before each reload cycle or any remaining part of a reload cycle for the following: R146

1. Moderator Temperature Coefficient BOL and EOL limits and 300 ppm surveillance limit for Specification 3/4.1.1.3,
2. Shutdown Bank Insertion Limit for Specification 3/4.1.3.5,
3. Control Bank Insertion Limits for Specification 3/4.1.3.6,
4. Axial Flux Difference Limits for Specification 3/4.2.1,
5. Heat Flux Hot Channel Factor, K(z), and W(z) for Specification 3/4.2.2, and
6. Nuclear Enthalpy Hot Channel Factor and Power Factor Multiplier for Specification 3/4.2.3.

6.9.1.14.a The analytical methods used to determine the core operating limits shall be those previously reviewed and approved by NRC in:

1. WCAP-9272-P-A, "WESTINGHOUSE RELOAD SAFETY EVALUATION METHODOLOGY", July 1985 (W Proprietary).
   (Methodology for Specifications 3.1.1.3 - Moderator Temperature Coefficient, 3.1.3.5 - Shutdown Bank Insertion Limit, 3.1.3.6 -Control Bank Insertion Limits, 3.2.1 - Axial Flux Difference, 3.2.2 - Heat Flux Hot Channel Factor, and 3.2.3 - Nuclear Enthalpy Hot Channel Factor.)
2. WCAP-10216-P-A, "RELAXATION OF CONSTANT AXIAL OFFSET CONTROL F_Q SURVEILLANCE TECHNICAL SPECIFICATION", JUNE 1983 (W Proprietary).
   (Methodology for Specification 3.2.1 - Axial Flux Difference (Relaxed Axial Offset Control) and 3.2.2 - Heat Flux Hot Channel Factor (W(z) surveillance requirements for F_Q Methodology).)
3. WCAP-10266-P-A Rev. 2, "THE 1981 REVISION OF WESTINGHOUSE EVALUATION MODEL USING BASH CODE", March 1987, (W Proprietary).
   (Methodology for Specification 3.2.2 - Heat Flux Hot Channel Factor).
4. WCAP-13631-P-A, "SAFETY EVALUATION SUPPORTING A MORE NEGATIVE EOL MODERATOR TEMPERATURE COEFFICIENT TECHNICAL SPECIFICATION FOR THE SEQUOYAH NUCLEAR PLANTS," MARCH 1993 (W Proprietary). R161
   (Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient)

INSERT B

6.9.1.14.b The core operating limits shall be determined so that all applicable limits (e.g., fuel thermal-mechanical limits, core thermal-hydraulic limits, ECCS limits, nuclear limits such as shutdown margin, and transient and accident analysis limits) of the safety analysis are met. R146

CORE OPERATING LIMITS REPORT (Continued)

6.9.1.14.c THE CORE OPERATING LIMITS REPORT shall be provided within 30 days after cycle start-up (Mode 2) for each reload cycle or within 30 days of issuance of any midcycle revision to the NRC Document Control Desk with copies to the Regional Administrator and Resident Inspector. R1

SPECIAL REPORTS INSERT C

6.9.2.1 Special reports shall be submitted within the time period specified for each report, in accordance with 10 CFR 50.4. R64

6.9.2.2 Diesel Generator Reliability Improvement Program

As a minimum the Reliability Improvement Program report for NRC audit, required by LCO 3.8.1.1, Table 4.8-1, shall include:

(a) a summary of all tests (valid and invalid) that occurred within the time period over which the last 20/100 valid tests were performed R44

(b) analysis of failures and determination of root causes of failures

(c) evaluation of each of the recommendations of NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability in Operating Reactors," with respect to their application to the Plant

(d) identification of all actions taken or to be taken to 1) correct the root causes of failures defined in b) above and 2) achieve a general improvement of diesel generator reliability

(e) the schedule for implementation of each action from d) above

(f) an assessment of the existing reliability of electric power to engineered-safety-feature equipment

Insert A

Measurement of the MTC in accordance with 4.1.1.3.b may be suspended provided the benchmark criteria and the Revised Prediction as documented in the COLR are satisfied. Data required for the calculation of the Revised Prediction is provided in the Most Negative Temperature Coefficient Limit Report per Specification 6.9.1.15.

Insert B

5. WCAP-13749-P-[A], "SAFETY EVALUATION SUPPORTING THE CONDITIONAL EXEMPTION OF THE MOST NEGATIVE EOL MODERATOR TEMPERATURE COEFFICIENT MEASUREMENT," May, 1993 (Proprietary) (Methodology for Specification 3.1.1.3 - Moderator Temperature Coefficient.)

Insert C

6.9.1.15 The Most Negative MTC Report shall be prepared at least 60 days prior to the date the limit would become effective and maintained on file. This report will include the data required for the determination of the Revised Prediction of the 300 ppm/ARO/RTP MTC per WCAP-13749-P-[A].

ENCLOSURE 2

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-95-07)

DESCRIPTION AND JUSTIFICATION FOR TS CHANGE 95-07,

"CONDITIONAL EXEMPTION TO END-OF-LIFE MODERATOR

TEMPERATURE COEFFICIENT SURVEILLANCE MEASUREMENT"

Description of Change

TVA proposes to modify the Sequoyah Nuclear Plant (SQN) Units 1 and 2 technical specifications (TSs) to revise Surveillance Requirement (SR) 4.1.1.3 and associated administrative specifications to conditionally exempt the end-of-life (EOL) moderator temperature coefficient (MTC) measurement. Accordingly, the following changes are proposed:

1. SR 4.1.1.3, MTC SR - This specification is modified to provide for the suspension of the EOL MTC surveillance measurement in the event specified reactor core model benchmark criteria and a revised EOL MTC prediction are satisfied. Reference is also made to a new most negative moderator temperature coefficient limit report. Please note, there is a grammatical correction made to the Unit 1 SR.

2. TS 6.9.1.14, Core Operating Limits Report (COLR) - WCAP-13749-P-[A], "Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement," is added to the list of references.

3. TS 6.9.1.15, Most Negative EOL MTC Limit Report - This new specification provides for the preparation of the most negative EOL MTC limit report. The report will be filed and available for NRC audit.

Reason for Change

The proposed changes to the TSs are requested because it is believed that relaxation of the existing criteria for performing the MTC measurement near EOL is justifiable while still ensuring the EOL MTC is within the safety analysis limits. Incorporating these changes would eliminate the surveillance measurement when it is certain from other indicators that the EOL MTC limit would not be exceeded. The proposed change is desired for the following reasons: (1) The measurement of the EOL MTC requires inducing a temperature transient upon the reactor by deviating from the T_{avg} program. Any operation that can be avoided in such an abnormal condition is desirable from a reliability and reactivity management standpoint; (2) The current TS surveillance program requires measurements within seven effective full power days (EFPD) of reaching an equilibrium concentration of 300 parts per million (ppm). Potential regulatory issues would be raised if equilibrium conditions could not be reached within this seven EFPD window because of plant equipment problems or a trip situation; and (3) This measurement is very difficult to make and has the potential for large measurement uncertainties. It is possible that due to the large inherent uncertainty the measurement may not meet the acceptance criteria. In this event, the measurement would be required to be repeated every 14 EFPD for the remainder of the fuel cycle.

Justification for Changes

For Updated Final Safety Analysis Report (UFSAR) accident analyses, the transient response of the plant is dependent on reactivity feedback effects, in particular, the moderator density coefficient (MDC) and the Doppler power coefficient. Because of the sensitivity of accident analyses results to the MDC value assumed, it is important that the actual core MDC remain within the bounds of the limiting values assumed in the UFSAR accident analyses. While core neutronics analyses will confirm that the MDC is within these bounds during an operating cycle, SQN TSs currently place limits on the MTC during normal operation. MTC measurements are performed at the beginning of cycle (BOC) prior to initial operation above five percent rated thermal power (RTP) and at RTP conditions within seven EFPD after reaching an equilibrium boron concentration of 300 ppm.

In order to ensure a bounding accident analysis, the MDC is assumed to be at its most limiting value for the analysis conditions appropriate to each accident. The most positive MDC limiting value is based on the EOL core conditions corresponding to maximum fuel burnup and minimum boron concentration assuming 100 percent RTP.

Most accident analyses use a constraint MDC designed to bound the MDC at the worst set of initial conditions as well as at the most limiting set of transient conditions. This value of MDC forms the licensing basis for the UFSAR accident analysis as well as the bases for the current EOL MTC TS requirements. Converting the MDC used in the accident analysis to a corresponding MTC requires a calculation, which accounts for the rate of change of moderator density with temperature at the conditions of interest.

TSs place both Limiting Conditions for Operation (LCO) 3.1.1.4 and SR 4.1.1.4 constraints on the MTC, based on the accident analysis assumptions of the MDC. The most negative MTC LCO limit applies to Modes 1, 2, and 3, and requires that the MTC be less negative than the specified limit value for the all rods withdrawn, end-of cycle, rated thermal power condition. To demonstrate compliance with the most negative MTC LCO, the TS surveillance calls for verification of the MTC After 300 ppm equilibrium boron concentration is obtained. Because the hot full power (HFP) MTC value will gradually become more negative with further core burnup and boron concentration reduction, a 300 ppm SR value of the MTC should necessarily be less negative than the EOL LCO limit.

To account for this effect, the 300 ppm SR value is sufficiently less negative than the EOL LCO limit value, which is specified in the COLR, thereby providing assurance that the LCO limit will be met as long as the 300 ppm surveillance criterion is met.

Currently, SQN Units 1 and 2 TSs require measurements of MTC at beginning of life (BOL) to verify the most positive MTC limit and near EOL to verify the most negative MTC limit. At BOL, the measurement of the isothermal temperature coefficient and subsequent MTC calculation are relatively simply to perform. The measurement is done at hot zero power isothermal conditions and is not complicated by changes in the enthalpy rise or the presence of xenon. The measurement made near EOL differs from the BOL measurement as it is performed at or near HFP conditions. MTC measurements at HFP are more difficult to perform because of small variations in soluble boron concentration and changes in xenon concentration and distribution, fuel temperature, and enthalpy rise created by small changes in the core average power during the measurement. Changes in each of these parameters must be accurately accounted for when reducing the measurement data, or additional measurement uncertainties will be introduced. Even though these additional uncertainties may be small, the total reactivity change associated with the swing in moderator temperature is also relatively small. The resulting MTC measurement uncertainty created by even a small change in power level can then become significant and, if improperly accounted for, can yield misleading measurement results.

The method to calculate the revised predicted MTC for determining whether the EOL MTC SR is satisfied is described in Reference 1. If the revised predicted MTC meets the SR then the measurement is not required.

In summary, the conditional exemption from the measurement is sought to improve plant availability and minimize disruptions to normal operation of Units 1 and 2 at SQN. As documented in References 1 and 2, it has been concluded that plant safety will not be compromised by the conditional exemption of this measurement.

References

1. Westinghouse Commercial Atomic Power (WCAP) - 13749-P, "Safety Evaluation Supporting the Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement, May 1993."

2. Letter NTD-NRC-95-4384 from Nicholas J. Liparulo, Manager Nuclear Safety and Regulatory Activities of Westinghouse Electric Corporation to R. C. Jones, Reactor Systems Branch Chief, Division of Engineering and System Technology of U.S. NRC, dated January 16, 1995.

Environmental Impact Evaluation

The proposed change does not involve an unreviewed environmental question because operation of SQN Units 1 and 2 in accordance with this change would not:

1. Result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement (FES) as modified by NRC's testimony to the Atomic Safety and Licensing Board, supplements to the FES, environmental impact appraisals, or decisions of the Atomic Safety and Licensing Board.

2. Result in a significant change in effluents or power levels.

3. Result in matters not previously reviewed in the licensing basis for SQN that may have a significant environmental impact.

ENCLOSURE 3

PROPOSED TECHNICAL SPECIFICATION CHANGE

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-95-07)

DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

Significant Hazards Evaluation

TVA has evaluated the proposed technical specification (TS) change and has determined that it does not represent a significant hazards consideration based on criteria established in 10 CFR 50.92(c). Operation of Sequoyah Nuclear Plant (SQN) in accordance with the proposed amendment will not:

1. Involve a significant increase in the probability or consequences of an accident previously evaluated.

   The conditional exemption of the most negative moderator temperature coefficient (MTC) measurement does not change the most negative MTC surveillance requirement (SR) and limiting condition of operation (LCO) limits in the TSs. Since these MTC values are unchanged, and since the basis for the derivation of these values from the safety analysis moderator density coefficient (MDC) is unchanged, the constant MDC assumed for the Updated Final Safety Analysis Report (UFSAR) safety analyses will also remain unchanged. Therefore, no change in the modeling (i.e., probabilities) of the accident analysis conditions or response is necessary in order to implement the change to the conditional exemption methodology. In addition, since the constant MDC assumed in the safety analyses is not changed by the conditional exemption of the most negative MTC SR measurement, the consequences of an accident previously evaluated in the UFSAR are not increased. The dose predictions presented in the UFSAR for a steam generator tube rupture remain valid such that more severe consequences will not occur. Additionally, since mass and energy releases for a loss-of-coolant accident and a steamline break are not increased as a result of the unchanged MDC, the dose predictions for these events presented in the UFSAR also remain bounding.

2. Create the possibility of a new or different kind of accident from any previously analyzed.

   Since the end-of-life MTC is not changed by the conditional exemption methodology of WCAP-13749-P, the possibility of an accident, which is different than any already evaluated in the UFSAR, has not been created. No new or different failure modes have been defined for any system or component nor has any new limiting single failure been identified. Conservative assumptions for the MDC have already been modeled in the UFSAR analyses. These assumptions will remain valid since the conditional exemption methodology documented in WCAP-13749-P does not change the safety analysis MDC nor the TS values of the MTC.

3. Involve a significant reduction in a margin of safety.

   The conditional exemption methodology is documented in WCAP-13749-P. This WCAP has been evaluated (Reference: SECL 93-117,R1) relative to the design basis, including the TSs, and has been determined to bound the conditions under which the specifications permit operation. The results as presented in the UFSAR remain bounding since the MDC assumed in the safety analyses and the limiting conditions for operation and SR MTCs in the TSs remain unchanged. Therefore, the margin of safety, as defined in the bases to these TSs, is not reduced.

ENCLOSURE 4

PROPOSED TECHNICAL SPECIFICATION CHANGE

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-95-07)

CORE OPERATING LIMIT REPORT

MARKUPS

SEQUOYAH NUCLEAR PLANT UNIT 1, CYCLE 7

CORE OPERATING LIMITS REPORT

REVISION 3

September 6, 1994

Prepared: _____ / 9-6-94
Nuclear Fuel — Date

Reviewed:
_____ OBE / 9-9-94
Reactor Engineering Supervisor — Date

_____ / 9/13/94
Technical Support Manager — Date

_____ / 9/15/94
PORC Chairman — Date

Revision 3

Pages affected all

Reason for Revision Add revised W(z) functions and corresponding reduced axial flux difference limits. Revised Figure 1 to require fully withdrawn position > 226 for cycle burnup to 9,000 MWd/MTU.

2.1.2 The 300 ppm surveillance limit is:

The measured 300 ppm/ARO/RTP-MTC should be less negative than or equal to -3.75×10^{-4} $\Delta k/k/°F$.

INSERT D

2.2 Shutdown Rod Insertion Limit (Specification 3/4.1.3.5)

2.2.1 The shutdown rods shall be withdrawn to a position as defined below:

Cycle Burnup (MWD/MTU)	Steps Withdrawn
$\leq$ 9,000	$\geq$ 226 to $\leq$ 231
> 9,000 to < 14,000	$\geq$ 222 to $\leq$ 231
$\geq$ 14,000	$\geq$ 226 to $\leq$ 231

2.3 Control Rod Insertion Limits (Specification 3/4.1.3.6)

2.3.1 The control rod banks shall be limited in physical insertion as shown in Figure 1.

2.4 Axial Flux Difference - AFD (Specification 3/4.2.1)

2.4.1 The axial flux difference (AFD) limits provided in Figure 2 shall be used when the W(z) functions provided in Figures 5-9 are used.

The axial flux difference (AFD) limits provided in Figure 3 shall be used when the W(z) functions provided in Figures 10-17 are used.

2.5 Heat Flux Hot Channel Factor - $F_Q(z)$ (Specification 3/4.2.2)

$$F_Q(z) \leq \frac{F_Q^{RTP}}{P} * K(z) \quad \text{for } P > 0.5$$

$$F_Q(z) \leq \frac{F_Q^{RTP}}{0.5} * K(z) \quad \text{for } P \leq 0.5$$

Insert D

2.1.3 The EOL MTC Revised Prediction shall be calculated from the algorithm defined in Table 3-3 of Reference 5 in Technical Specification 6.9.1.14.a. The MTC data required for this calculation shall be provided in a Most Negative Moderator Temperature Coefficient Limit Report per Technical Specification 6.9.1.15. If the Revised Predicted MTC is less negative than the surveillance requirement of -3.75×10^{-4} $\Delta k/k/°F$, and all benchmark criteria listed in Table 3-2 of Reference 5 are met, then a measurement is not required per Technical Specification 4.1.1.3.b.

SEQUOYAH NUCLEAR PLANT UNIT 2, CYCLE 7

CORE OPERATING LIMITS REPORT

REVISION 0

August 12, 1994

Prepared:

_____ / 8-12-94
Nuclear Fuel — Date

Reviewed:

_____ / 8-16-94
Reactor Engineering Supervisor — Date

_____ / 8/22/94
Technical Support Manager — Date

_____ / 8/27/94
PORC Chairman — Date

Revision 0

Pages affected ____

Reason for Revision _____

2.1.2 The 300 ppm surveillance limit is:

The measured 300 ppm/ARO/RTP-MTC should be less negative than or equal to -3.75×10^{-4} $\Delta k/k/°F$.

INSERT D

2.2 Shutdown Rod Insertion Limit (Specification 3/4.1.3.5)

2.2.1 The shutdown rods shall be withdrawn to a position as defined below:

Cycle Burnup (MWD/MTU)	Steps Withdrawn
$\leq$ 4,000	$\geq$ 226 to $\leq$ 231
> 4,000 to < 14,000	$\geq$ 222 to $\leq$ 231
$\geq$ 14,000	$\geq$ 226 to $\leq$ 231

2.3 Control Rod Insertion Limits (Specification 3/4.1.3.6)

2.3.1 The control rod banks shall be limited in physical insertion as shown in Figure 1.

2.4 Axial Flux Difference - AFD (Specification 3/4.2.1)

2.4.1 The axial flux difference (AFD) limits are provided in Figure 2.

2.5 Heat Flux Hot Channel Factor - $F_Q(z)$ (Specification 3/4.2.2)

$$F_Q(z) \leq \frac{F_Q^{RTP}}{P} * K(z) \quad \text{for } P > 0.5$$

$$F_Q(z) \leq \frac{F_Q^{RTP}}{0.5} * K(z) \quad \text{for } P \leq 0.5$$

where $P = \frac{\text{THERMAL POWER}}{\text{RATED THERMAL POWER}}$

Insert D

2.1.3 The EOL MTC Revised Prediction shall be calculated from the algorithm defined in Table 3-3 of Reference 5 in Technical Specification 6.9.1.14.a. The MTC data required for this calculation shall be provided in a Most Negative Moderator Temperature Coefficient Limit Report per Technical Specification 6.9.1.15. If the Revised Predicted MTC is less negative than the surveillance requirement of -3.75×10^{-4} $\Delta k/k/°F$, and all benchmark criteria listed in Table 3-2 of Reference 5 are met, then a measurement is not required per Technical Specification 4.1.1.3.b.

ENCLOSURE 5

PROPOSED TECHNICAL SPECIFICATION CHANGE

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2

DOCKET NOS. 50-327 AND 50-328

(TVA-SQN-TS-95-07)

WESTINGHOUSE SAFETY EVALUATION CHECK LIST 93-117,R1

SECL-93-117, R1

Customer Reference No(s).

Westinghouse Reference No(s).

WESTINGHOUSE
SAFETY EVALUATION CHECK LIST

1) NUCLEAR PLANT(S): Sequoyah Units 1 and 2

) CHECK LIST APPLICABLE TO: Conditional Exemption from Measurement of EOL MTC

3) The written safety evaluation of the revised procedure, design change or modification required by 10CFR50.59(b) has been prepared to the extent required and is attached. If a safety evaluation is not required or is incomplete for any reason, explain on Page 2. Parts A and B of this Safety Evaluation Check List are to be completed only on the basis of the safety evaluation performed.

CHECK LIST - PART A - 10CFR50.59(a)(1)

3.1) Yes ___ No X A change to the plant as described in the FSAR?
3.2) Yes ___ No X A change to procedures as described in the FSAR?
3.3) Yes ___ No X A test or experiment not described in the FSAR?
3.4) Yes X No ___ A change to the plant technical specifications Appendix A to the Operating License)?

4) CHECK LIST - PART B - 10CFR50.59(a)(2) (Justification for Part B answers must be included on page 2.)

4.1) Yes ___ No X Will the probability of an accident previously evaluated in the FSAR be increased?
4.2) Yes ___ No X Will the consequences of an accident previously evaluated in the FSAR be increased?
4.3) Yes ___ No X May the possibility of an accident which is different than any already evaluated in the FSAR be created?
4.4) Yes ___ No X Will the probability of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?
4.5) Yes ___ No X Will the consequences of a malfunction of equipment important to safety previously evaluated in the FSAR be increased?
4.6) Yes ___ No X May the possibility of a malfunction of equipment important to safety different than any already evaluated in the FSAR be created?
4.7) Yes ___ No X Will the margin of safety as described in the bases to any technical specification be reduced?

If the answer to any of the above questions is unknown, indicate under 5.) REMARKS and explain below.

If the answer to any of the above questions in Part A (3.4) or Part B cannot be answered in the negative, based on written safety evaluation, the change review would require an application for license amendment as required by 10CFR50.59(c) and submitted to the NRC pursuant to 10CFR50.90.

5) REMARKS:

The answers given in Section 3, Part A, and Section 4, Part B, of the Safety Evaluation Checklist, are based on the attached Safety Evaluation.

FOR FSAR UPDATE

Section: N/A Pages: _____ Tables: _____ Figures: _____

Reason for / Description of Change: N/A

6.0 APPROVAL LADDER

Nuclear Safety Preparer: L.V. Tomasic Date: 4.11.95

Nuclear Safety Reviewer: T.J. Kitchen Date: 4/11/95

Sequoyah Nuclear Plant, Units 1 and 2
Conditional Exemption of the Most Negative
EOL Moderator Temperature Coefficient Measurement
Safety Evaluation

1.0 BACKGROUND

Revision 1 removes proprietary material from this safety evaluation.

For FSAR accident analyses, the transient response of the plant is dependent on reactivity feedback effects, in particular, the moderator density coefficient (MDC) and the Doppler power coefficient. Because of the sensitivity of accident analysis results to the MDC value assumed, it is important that the actual core MDC remain within the bounds of the limiting values assumed in the FSAR accident analyses. While core neutronics analyses will have confirmed that the MDC is within these bounds, the Technical Specifications also place limits on the moderator temperature coefficient (MTC) that can be obtained during normal operation. MTC measurements are performed at the beginning of the cycle prior to initial operation above 5% rated thermal power. Most plants also currently have a requirement to measure the MTC at rated thermal power conditions within 7 EFPD after reaching an equilibrium boron concentration of 300 ppm.

In order to ensure a bounding accident analysis, the MDC is assumed to be at its most negative value for the analysis conditions appropriate to each accident. The most positive MDC limiting value is based on the end of life (EOL) core conditions corresponding to maximum fuel burnup and minimum boron concentration assuming 100% rated thermal power. Two different Technical Specification bases relating the accident analysis MDC to the most negative MTC have been previously licensed for Westinghouse plants as described in Chapter 2 of Reference 1.

Most accident analyses use a constant MDC designed to bound the MDC at the worst set of initial conditions as well as at the most limiting set of transient conditions. This value of MDC forms the licensing basis for the FSAR accident analysis as well as the bases for the current EOL MTC Technical Specification requirements. Converting the MDC used in the accident analyses to a corresponding MTC is a simple calculation which accounts for the rate of change of moderator density with temperature at the conditions of interest.

Technical Specifications place both Limiting Condition for Operation (LCO) and Surveillance Requirement (SR) constraints on the MTC, based on the accident analysis assumptions of the MDC. The most negative MTC LCO limit applies to Modes 1, 2, and 3, and requires that the MTC be less negative than the specified limit value for the all rods withdrawn, end of cycle life, rated thermal power condition. To demonstrate compliance with the most negative MTC LCO, the Technical Specification SR calls for verification of the MTC after 300 ppm equilibrium boron concentration is obtained. Because the HFP MTC value will gradually become more negative with further core burnup and boron concentration reduction, a 300 ppm SR value of MTC should necessarily be less negative than the EOL LCO limit. To account for this effect, the 300 ppm SR value is sufficiently less negative than the EOL LCO limit value, providing assurance that the LCO limit will be met as long as the 300 ppm surveillance criterion is met.

Currently, the Technical Specifications require measurements of MTCs at BOL to verify the most positive MTC limit and near EOL to verify the most negative MTC limit. At BOL, the measurement of the isothermal temperature coefficient is relatively simple to perform since it is done at hot zero power isothermal conditions and is not complicated by changes in the enthalpy rise or the presence of xenon. The measurement made near EOL differs from the BOL measurement as it is performed at or near hot full power conditions. MTC measurements at HFP are more difficult to perform due to small variations in soluble boron concentration and changes in xenon concentration and distribution, fuel temperature, and enthalpy rise created by small changes in the core average power during the measurement. Changes in each of these parameters must be accurately accounted for when reducing the measurement data or additional measurement uncertainties will be introduced. Even though these additional uncertainties may be small, the total reactivity change associated with the swing in moderator temperature is also relatively small. The resulting MTC measurement uncertainty created by even a small change in power level can then become significant and, if improperly accounted for, can yield misleading measurement results.

The method to calculate the revised predicted MTC for determining whether the EOL MTC SR is satisfied is described in Reference 1. If the revised predicted MTC meets the SR then the measurement is not required.

The purpose of this safety evaluation is to provide justification that the conditional exemption from the measurement of the 300 ppm SR MTC does not represent an Unreviewed Safety Question.

2.0 LICENSING BASIS

The change to the MTC LCO and SR Technical Specifications and COLR sections is evaluated with respect to the acceptance criteria for the accidents addressed in Chapter 15 of the FSAR.

3.0 EVALUATION

3.1 Nuclear Design Evaluation

The Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement methodology is described in detail in Reference 1. The Technical Specification Bases of the most negative MTC LCO and SR and the values of these limits are not altered. Instead, a revised prediction is compared to the SR MTC to determine if the SR limit is met. The method for calculating the revised prediction is described in Reference 1.

3.2 Impact on Safety Analysis

The safety analysis assumption of a constant MDC, and the actual value assumed, will NOT change. Therefore, a conditional exemption from the HFP near-EOL 300 ppm MTC measurement based on the margin to the SR limit will NOT have an adverse impact on the safe operation of the plant.

3.3 Impact on Technical Specifications

The proposed Technical Specification SR (i.e. Specification 4.1.1.3) and COLR changes required to support the conditional exemption are described in Reference 1. These Technical Specification changes will NOT change the LCO or SR MTC limits (i.e. Specification 3.1.1.3). The Bases describing the derivation of these MTC limits from the safety analysis MDC will also remain unchanged.

The specific values of the SR and LCO MTCs remain unchanged by the conditional exemption methodology documented in Reference 1. One additional Technical Specification will be added (i.e. 6.9.1.15) which will define the Most Negative Moderator Temperature Coefficient Limit Report. This cycle-specific report will provide the information required for calculating the margin to the SR limit. Reference 1 will also be added to the list of references in Technical Specification 6.9.1.14.

3.4 Impact on Other Safety Related Areas

The following safety related areas are not impacted by the conditional exemption of the HFP 300 ppm MTC:

- mechanical and fluid systems
- instrumentation and controls
- containment analysis
- radiological consequences
- non-LOCA analysis
- LOCA and LOCA related analyses, including Large Break and Small Break LOCA hydraulic forces, post-LOCA subcriticality, and hot leg switchover
- steam generator tube rupture
- probabilistic risk assessment
- emergency operating procedures
- protection system setpoints

4.0 DETERMINATION OF NO UNREVIEWED SAFETY QUESTION

The evaluation presented above forms the basis upon which specific responses to the questions in Section 4 of the Checklist can be provided.

1. Will the probability of an accident previously evaluated in the FSAR be created ?

   No. The conditional exemption of the most negative MTC measurement does not change the most negative MTC SR and LCO limits in the Technical Specifications. Since these MTC values are unchanged, and since the basis for the derivation of these values from the safety analysis MDC is unchanged, the constant MDC assumed for the FSAR safety analyses will also remain unchanged. Therefore, no change in the modeling of the accident analysis conditions or response is necessary in order to implement the change to the conditional exemption methodology.

2. Will the consequences of an accident previously evaluated in the FSAR be increased :

   No. Since the constant MDC assumed in the safety analyses is not changed by the conditional exemption of the most negative MTC SR measurement, the consequences of an accident previously evaluated in the FSAR are not increased. The dose predictions presented in the FSAR for a SGTR remain valid such that more severe consequences will not occur. Additionally, since mass and energy releases for LOCA and steamline break are not increased as a result of the unchanged MDC, the dose predictions for these events presented in the FSAR also remain bounding.

3. May the possibility of an accident which is different than any already evaluated in the FSAR be created ?

   No. Since the EOL MTC is not changed by the conditional exemption methodology of Reference 1, the possibility of an accident which is different than any already evaluated in the FSAR has not been created. No new failure modes have been defined for any system or component nor has any new limiting single failure been identified. Conservative assumptions for MDC have already been modeled in the FSAR analyses. These assumptions will remain valid since the conditional exemption methodology documented in Reference 1 does not change the safety analysis MDC nor the Technical Specification values of the MTC.

4. Will the probability of a malfunction of equipment important to safety previously evaluated in the FSAR be created ?

   No. The probability of a malfunction of equipment important to safety will not increase due to the conditional exemption methodology documented in Reference 1. As stated previously, component and system performance will not be adversely affected since the methodology in Reference 1 does not change the MDC assumed as part of the current analyses of record.

5. Will the consequences of a malfunction of equipment important to safety previously evaluated; in the FSAR be increased ?

   No. The consequences of a malfunction of equipment important to safety previously evaluated in the FSAR will not increase since the MDC assumed in the safety analyses remains unchanged by the conditional exemption methodology of Reference 1. No malfunction of equipment other than those currently defined in the FSAR are expected as a result of the conditional exemption from the most negative MTC measurement. The evaluations performed for SGTR, steamline break and LOCA have confirmed that the dose predictions presented in the FSAR remain bounding. The acceptance criteria for radiological consequences continue to be met.

6. May the possibility of malfunction of equipment important to safety different than any already evaluated in the FSAR be created ?

   No.The conditional exemption methodology of Reference 1 will not create the possibility of a malfunction of equipment important to safety different than any already evaluated in the FSAR. All original design and performance criteria continue to be met such that there is no unanticipated malfunction of equipment expected.

7. Will the margin of safety as described in the bases to any Technical Specification be reduced ?

   No. The evaluation of the conditional exemption methodology documented in Reference 1 has taken into account the applicable Technical Specifications and has bounded the conditions under which the Specifications permit operation. The applicable Technical Specifications are the Surveillance specification 4.1.1.3 and for those plants with a COLR, Reference 1 is added to the list of references in Specification 6.9.1.14a. An additional Specification 6.9.1.15 is added to define the requirements for the Most Negative Moderator Temperature Coefficient Limit Report, which is described in Appendices A, B and D of Reference 1. The COLR has also been modified as described in Appendix B of Reference 1. The analyses which support these Technical Specifications have been evaluated. The results as presented in the FSAR remain bounding since the MDC assumed in the safety analyses and the LCO and SR MTCs in the Technical Specifications remain unchanged. Therefore, the margin of safety, as defined in the bases to these Technical Specifications, is not reduced.

5.0 CONCLUSION

It is concluded that operation with a conditional exemption from the most negative MTC measurement as described in Reference 1 and this evaluation does not involve an unreviewed safety question as defined in 10 CFR 50.59.

6.0 REFERENCES

1. WCAP-13749, "Safety Evaluation Supporting The Conditional Exemption of the Most Negative EOL Moderator Temperature Coefficient Measurement", May, 1993.