

February 5, 2003

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 MISSED SURVEILLANCES  
(TAC NOS. MB6267 AND MB6268)

Dear Mr. Scalice:

The Commission has issued the enclosed Amendment No. 280 to Facility Operating License No. DPR-77 and Amendment No. 271 to Facility Operating License No. DPR-79 for the Sequoyah Nuclear Plant, Units 1 and 2, respectively. These amendments are in response to your application dated September 3, 2002, as supplemented October 17, 2002, and January 29, 2003.

The amendments revise the TS by: (1) modifying the wording of the current Surveillance Requirement (SR) 4.0.1 and SR 4.0.3 to be consistent with NUREG-1431, Revision 2, Standard Technical Specifications (STS) wording for SR 3.0.1 and SR 3.0.3; (2) modifying the current TS 6.8 by adding a new subsection 6.8.4.j, which will include the NUREG-1431, Revision 2, STS wording for TS 5.5.14 that discusses the TS Bases Control Program; and (3) modifying the STS wording, adopted in item 1 above for SR 4.0.3, to allow a delay period of 24 hours or up to the surveillance frequency interval prior to entering the Limiting Condition for Operation following a missed surveillance, whichever is greater, and to require a risk analysis to be performed for any surveillance delayed greater than 24 hours.

Changes to the Bases of the revised TS, as described in your submittals, should be made in accordance with the TS Bases Control Program.

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

Sincerely,

/RA/

Raj K. Anand, 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. 280 to  
License No. DPR-77  
2. Amendment No. 271 to  
License No. DPR-79  
3. Safety Evaluation

cc w/enclosures: See next page

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AMENDMENT NOS. 280 and 271 TO FACILITY OPERATING LICENSE NOS. DPR-77 and  
DPR-79 - SEQUOYAH UNITS 1 AND 2

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TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-327

SEQUOYAH NUCLEAR PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 280  
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 September 3, 2002, as supplemented by letters dated October 17, 2002, and January 29, 2003, 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. 280, 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.

FOR THE NUCLEAR REGULATORY COMMISSION

**/RA/**

Allen G. Howe, 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 5, 2003

ATTACHMENT TO LICENSE AMENDMENT NO. 280

FACILITY OPERATING LICENSE NO. DPR-77

DOCKET NO. 50-327

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

REMOVE

3/4 0-2

B 3/4 0-3

B 3/4 0-3a

B 3/4 0-4

6-11

INSERT

3/4 0-2

B 3/4 0-3

B 3/4 0-3a

B 3/4 0-4

6-11

TENNESSEE VALLEY AUTHORITY

DOCKET NO. 50-328

SEQUOYAH NUCLEAR PLANT, UNIT 2

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 271  
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 September 3, 2002, as supplemented by letters dated October 17, 2002, and January 29, 2003, 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. 271, 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.

FOR THE NUCLEAR REGULATORY COMMISSION

**/RA/**

Allen G. Howe, 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 5, 2003



ATTACHMENT TO LICENSE AMENDMENT NO. 271

FACILITY OPERATING LICENSE NO. DPR-79

DOCKET NO. 50-328

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

REMOVE

3/4 0-2  
B 3/4 0-3  
B 3/4 0-3a  
B 3/4 0-4  
B 3/4 0-5  
6-10  
6-11

INSERT

3/4 0-2  
B 3/4 0-3  
B 3/4 0-3a  
B 3/4 0-4  
B 3/4 0-5  
6-10  
6-11

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 280 TO FACILITY OPERATING LICENSE NO. DPR-77  
AND AMENDMENT NO. 271 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 letter dated September 3, 2002, as supplemented by letters dated October 17, 2002, and January 29, 2003, the Tennessee Valley Authority (the licensee) requested amendments to Operating Licenses DPR-77 and DPR-79 for Sequoyah Nuclear Plant (SQN) Units 1 and 2, respectively, by revising the Technical Specifications (TS).

The proposed amendment would revise the TS by: (1) modifying the wording of the current Surveillance Requirement (SR) 4.0.1 and SR 4.0.3 to be consistent with NUREG-1431, Revision 2, Standard Technical Specifications (STS) wording for SR 3.0.1 and SR 3.0.3; (2) modifying the current TS 6.8 by adding a new subsection 6.8.4.j, which would include the NUREG-1431, Revision 2, STS wording for TS 5.5.14 that discusses the TS Bases Control Program; and (3) modifying the STS wording, adopted in item 1 above for SR 4.0.3, to allow a delay period of 24 hours or up to the surveillance frequency interval prior to entering the Limiting Condition for Operation (LCO) following a missed surveillance, whichever is greater, and to require a risk analysis to be performed for any surveillance delayed greater than 24 hours.

The licensee's supplementary submittals dated October 17, 2002, and January 29, 2003, did not affect the original proposed no significant hazards determination, or expand the scope of the request as noticed in the *Federal Register* on November 12, 2002 (67 FR 68745).

**2.0 REGULATORY EVALUATION**

As stated in Title 10, *Code of Federal Regulations* (10 CFR), Section 50.59(c)(1)(i), a licensee is required to submit a license amendment pursuant to 10 CFR 50.90 if a change to the TS is required. Furthermore, the requirements of 10 CFR 50.59 necessitate that the U.S. Nuclear Regulatory Commission (NRC, the Commission) approve the TS changes before the TS changes are implemented. The licensee's submittal meets the requirements of 10 CFR 50.59(c)(1)(i) and 10 CFR 50.90. The staff's evaluation of the proposed changes are discussed in the technical evaluation section.

The licensee is proposing only minor variations or deviations from the TS changes in TSTF-358, Revision 6, which was approved by the NRC on October 1, 2001, or in the staff's model safety evaluation dated June 14, 2001, as modified by the comments and responses published in the *Federal Register* on September 28, 2001 (66 FR 49714). These minor variations include nonsubstantive changes, such as replacing "SR 3.0.3" with "SR 4.0.3" and "Conditions" with "Actions," in order to substitute section numbers and terminology in the SQN custom TS for the equivalent section numbers and terminology of TSTF-358 and the STS.

This safety evaluation (SE) is based on the SE published in the *Federal Register* on June 14, 2001 (66 FR 32400). The NRC staff has since made minor, editorial, changes to the SE.

The regulations contained in 10 CFR 50.36, "Technical Specifications," require that TS include surveillance requirements. Surveillance requirements are requirements relating to test, calibration, or inspection to ensure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the LCOs will be met. The TS require surveillance tests to be performed periodically (e.g., weekly or monthly). The periodic test interval defined in the TS is called the surveillance frequency or surveillance interval. The majority of surveillance tests included in the TS are designed to ensure that standby safety systems will be operable when they are needed to mitigate an accident. By testing these components, failures that may have occurred since the previous test can be detected and corrected.

The TS state that SRs shall be met during the MODES or other specified conditions in the applicability for individual LCOs and that failure to perform a surveillance within the specified frequency shall be a failure to meet the LCO, except as provided in SR 4.0.3.

The current SR 4.0.3 requires that, if it is found that a surveillance test was not performed within its specified frequency, the associated LCO be declared not met (e.g., equipment be declared inoperable) unless the missed surveillance test is completed successfully within 24 hours from the time it was discovered that the test was not performed, if the allowable outage time limits of the LCO Action requirements are less than 24 hours. The requirements in SR 4.0.3 are based on NRC Generic Letter (GL) 87-09, "Sections 3.0 and 4.0 of the Standard Technical Specification (STS) of the Applicability of Limiting Conditions for Operation and Surveillance Requirements," dated June 4, 1987.

GL 87-09 was published to address three specific issues with the application of TS. One of those issues was missed surveillances. The GL states:

The second problem involves unnecessary shutdowns caused by Specification 4.0.3 when surveillance intervals are inadvertently exceeded. The solution is to clarify the applicability of the Action Requirements, to specify a specific acceptable time limit for completing a missed surveillance in certain circumstances, and to clarify when a missed surveillance constitutes a violation of the Operability Requirements of an LCO. It is overly conservative to assume that systems or components are inoperable when a surveillance has not been performed because the vast majority of surveillances do in fact demonstrate that systems or components are OPERABLE. When a surveillance is missed, it is primarily a question of operability that has not been verified by the performance of a Surveillance Requirement. Because the allowable outage time limits of

some Action Requirements do not provide an appropriate time for performing a missed surveillance before Shutdown Requirements apply, *the TS[s] should include a time limit that allows a delay of required actions to permit the performance of the missed surveillance based on consideration of plant conditions, adequate planning, availability of personnel, the time required to perform the surveillance, and, of course, the safety significance of the delay in completing the surveillance.* The staff has concluded that 24 hours is an acceptable time limit for completing a missed surveillance when the allowable outage times of the Action Requirements are less than this limit, or when time is needed to obtain a temporary waiver<sup>1</sup> of the Surveillance Requirement. [emphasis added]

The proposed change would extend the delay time for declaring the LCO not met and entering the required actions by allowing more time to perform the missed surveillance test. This will be achieved by modifying SR 4.0.3 to allow a delay period from 24 hours up to the surveillance frequency, *whichever is greater*, to perform a missed surveillance prior to having to declare the LCO not met. The change will add a sentence to SR 4.0.3 that states, “A risk evaluation shall be performed for any surveillance delayed greater than 24 hours and the risk impact shall be managed.”

The objective of the proposed change is to minimize the impact on plant risk resulting from the performance of a missed surveillance test by allowing flexibility in considering the plant conditions and other plant activities without compromising plant safety. In addition, implementation of the proposed change would reduce the need for the licensee to apply for regulatory relief to delay the performance of missed surveillances.

The basis for establishing the changes to requirements for missed surveillances in GL 87-09 continues to apply to the current proposed change to SR 4.0.3. As evidenced by the discussion in GL 87-09, the intent of the change proposed in the GL was to reduce the impact on plant risk resulting from the performance of a missed surveillance test by allowing some flexibility in the performance of missed tests. The delay time of 24 hours was selected using engineering judgement in the absence of suitable tools to determine a delay period on a case-by-case basis. In addition, the staff recognized in GL 87-09 that even a 24-hour delay period would not be sufficient in some cases and licensees would need to seek regulatory relief in those cases.

The recent revision to the Maintenance Rule to establish the requirement in 10 CFR 50.65(a)(4) to assess and manage the increase in risk that may result from maintenance activities provides a framework to allow a more risk-informed approach to addressing missed surveillances. This approach is consistent with the Commission’s policy to increase the use of probabilistic risk assessment (PRA) technology in all regulatory matters to the extent supported by the state-of-the-art in PRA methods and data, and continues to support the objectives outlined by the staff in GL 87-09.

The NRC staff believes that the proposed change to SR 4.0.3 is appropriate because: (1) the number of missed surveillance tests is a very small fraction of the total number of such tests

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<sup>1</sup>The terminology “temporary waiver” was subsequently revised to refer to the practice as “enforcement discretion.”

performed at a nuclear plant each year, (2) the change applies to unintentionally missed surveillance tests and is not intended to be used as an operational convenience to extend surveillance frequencies, and (3) missed surveillances will be placed in the licensee's corrective action program.

The NRC staff has determined that the proposed change is applicable to all licensees. In GL 87-09, the staff concluded that the proposed modifications would result in improved TS for all plants and no limitations were put on the applicability of the proposed changes. Because the basis for this proposed change is largely the same as for the change proposed in GL 87-09, the staff believes the same broad applicability is appropriate. In addition, every licensee is required to comply with the Maintenance Rule and, therefore, will have implemented programs to comply with 10 CFR 50.65(a)(4) to assess and manage risk associated with maintenance and other operational activities.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Changes to 4.0.3 and Addition of TS Bases Control Program

The proposed change would modify SR 4.0.3 to allow a delay period from 24 hours up to the surveillance frequency, whichever is greater, to perform a missed surveillance prior to having to declare the LCO not met. The proposed change would also add a sentence to SR 4.0.3 that states, "A risk evaluation shall be performed for any surveillance delayed greater than 24 hours and the risk impact shall be managed."

The proposed change will not allow equipment known to be inoperable to be considered operable until the missed surveillance is performed. If it is known that the missed surveillance could not be met, SR 4.0.1 would require that the LCO be declared not met and the appropriate condition(s) entered. In addition, the proposed Bases for SR 4.0.3 state that the use of the delay period established by SR 4.0.3 is a flexibility which is not intended to be used as an operational convenience to extend surveillance intervals, but only for the performance of missed surveillances.

The modification also includes changes to the Bases for SR 4.0.1 and SR 4.0.3 that provide details on how to implement the new requirements. The Bases changes provide guidance for surveillance frequencies that are not based on time intervals but are based on specified unit conditions, operating situations, or requirements of regulations. In addition, the Bases changes state that the licensee is expected to perform any missed surveillance test at the first reasonable opportunity, taking into account appropriate considerations, such as the impact on plant risk and accident analysis assumptions, consideration of unit conditions, planning, availability of personnel, and the time required to perform the surveillance. The Bases also state that the risk impact should be managed through the program in place to implement 10 CFR 50.65(a)(4) and its implementation guidance, NRC Regulatory Guide (RG) 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants," dated May 2000, and that the missed surveillance should be treated as an emergent condition as discussed in RG 1.182. In addition, the Bases state that the degree of depth and rigor of the evaluation should be commensurate with the importance of the component and that missed surveillances for important components should be analyzed quantitatively. The Bases also state that, if the results of the risk evaluation determine that the risk increase is significant, the

evaluation should be used to determine the safest course of action. Finally, the Bases state that all missed surveillances will be placed in the licensee's Corrective Action Program.

The licensee has in its application the addition of a Bases Control Program to the administrative section of the TS as proposed TS 6.8.4.j. Prior to issuance of the STS (NUREGS 1430-1434), the control of TS Bases was not clearly defined by either TS or NRC regulations. The administrative requirements for a Bases Control Program were added to the STS to define a methodology for evaluating changes to and providing updates of the TS Bases. The addition of the TS Bases Control Program for plants that have not adopted the STS will provide the same benefits in terms of defining a methodology for the maintenance of the TS Bases. The licensee has proposed administrative controls that are consistent with the STS provisions and, therefore, satisfy the condition that was included in the *Federal Register* Notice for the use of Consolidated Line Item Improvement Process (CLIIP) for this TS change. The staff finds the addition of the TS Bases Control Program acceptable.

Key elements provided by the licensee to justify the proposed TS change are listed below. These elements were built into the process to ensure that every time a surveillance is missed, the risk will be properly assessed and managed. In addition, such elements facilitate regulatory oversight.

- A risk evaluation shall be performed for any surveillance test delayed longer than 24 hours and the risk impact shall be managed.
- Although the proposed change to SR 4.0.3 allows an increase of the delay time, the missed surveillance test should be performed at the "first reasonable opportunity."
- The "first reasonable opportunity" will be determined by taking into consideration the risk impact from delaying the surveillance test (including risk from changing plant configurations or shutting the plant down to perform the surveillance, whenever applicable) as well as the impact on any analysis assumptions, in addition to unit conditions, planning, availability of personnel, and the time required to perform the surveillance.
- A missed surveillance will be treated as an emergent condition in the same fashion as other unplanned maintenance activities. The risk impact of the condition will be managed through the program in place to implement 10 CFR 50.65(a)(4) and its implementation guidance, RG 1.182.
- A missed surveillance will be placed in the licensee's corrective action program, thus providing the NRC staff with a means to verify that the number of missed surveillances continues to be very low.
- The NRC's operating reactor oversight process will provide the framework for inspectors and other NRC staff to review missed surveillances and assess the licensee's actions and performance.

The NRC staff finds that a process containing these key elements is appropriate in this case for the following reasons:

- As stated in 10 CFR 50.65(a)(4), licensees are required to implement programs to assess and manage increases in risk that may result from planned maintenance activities. This program is suitable to assess and manage the risk impact of missed surveillances because missed surveillances can be treated as emergent conditions and their risk impact will be assessed and managed in an integrated fashion with concurrent maintenance activities.
- Inspection procedures are in place that will allow NRC staff to oversee the implementation of Maintenance Rule requirements, including the adequacy of risk assessments performed by licensees for maintenance configurations.
- The number of missed surveillance tests is a very small fraction of the total number of such tests performed at a nuclear plant each year. The proposed change is not intended to be used as an operational convenience to extend surveillance frequencies.
- This process is similar to other improvements that have been made to the TS that allow the use of a controlled decision-making process by licensees when the process has some high-level regulatory oversight. Two examples of this are the adoption of the Core Operating Limits Report and the Pressure/Temperature Limits Report. In each of these cases, the NRC staff approved the methodology behind the calculation of certain TS parameter limits and then allowed the specific limits to be removed from TS and controlled by the licensee using the approved methodology. Similarly, for this proposed change, the NRC staff has already approved guidance that outlines a process for complying with 10 CFR 50.65(a)(4) and, therefore, can allow the licensee to use that guidance to determine the most prudent course of action in the case of a missed surveillance.

The guidance outlining an acceptable process for licensees to assess and manage increases in risk that may result from planned maintenance activities is found in RG 1.182. RG 1.182 endorses a revised Section 11 to NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," Revision 2, dated February 22, 2000, updated by Nuclear Energy Institute.

Section 11 of NUMARC 93-01 provides guidance for assessing and managing risk impact resulting from performance of maintenance activities, including guidance for establishing action thresholds based on qualitative and quantitative considerations as well as risk management actions. The objective of risk management is to control the temporary and aggregate risk increases from maintenance activities such that the plant's average baseline risk is maintained within a minimal range. This is accomplished by using the results of the risk assessment to plan and schedule maintenance such that the risk increases are limited, and to take additional actions beyond routine work controls to address situations where the temporary risk increase is above a certain threshold.

In order to gain additional insights into the proposed change, the NRC staff referred to the guidance provided in RG 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," dated July 1998 and in RG 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications," dated August 1998, although these RGs do not specifically address the type of change in this proposal. RG 1.177 provides the NRC staff's recommendations for utilizing risk information to evaluate changes to nuclear power plant TS by assessing the impact of such proposed changes on the risk associated with plant operation. The approach documented in

RG 1.177 was taken into consideration by the NRC staff in evaluating the risk information provided in support of the proposed changes in SR 4.0.3 to increase the time allowed to perform a missed surveillance.

One portion of the guidance in RG 1.177 includes the assessment of the risk impact of the proposed change for comparison to acceptance guidelines consistent with the Commission's Safety Goal Policy Statement, as documented in RG 1.174. In addition, the approach outlined in the guidance aims at ensuring that the plant risk does not increase unacceptably at any time during the implementation of the proposed change (i.e., during the extended surveillance interval).

Another portion of the guidance addresses the need for identifying risk-significant configurations resulting from maintenance or other operational activities and taking appropriate compensatory measures to avoid such configurations. This type of evaluation is directly addressed by the requirement to perform a risk assessment for missed surveillances delayed longer than 24 hours.

The NRC staff believes that insights from the guidance provided in RGs 1.174 and 1.177 can be used to show how the proposed change is expected to result in, at most, an increase in risk which is small and consistent with the Commission's Safety Goal Policy Statement. The NRC staff believes that in the majority of the cases of missed surveillances, implementation of the proposed change will result in a risk benefit due to the proposed requirement for the licensee to evaluate the risk impact for missed surveillances that would require a delay of longer than 24 hours.

### 3.1.1 Risk Impact of the Proposed Change

The NRC staff made a qualitative assessment of the risk impact of the proposed change for comparison with the intent of the acceptance guidelines documented in RG 1.174, consistent with the Commission's Safety Goal Policy Statement. Such risk impact is measured by the average (yearly) risk change. In addition, the NRC staff took into consideration guidance in RG 1.177 aimed at ensuring that the plant risk does not increase unacceptably at any time during the implementation of the proposed change (i.e., during an extended surveillance interval in this case). The NRC staff's qualitative assessment is summarized below.

#### 3.1.1.1 Average Risk Impact

The probability that a standby active component, such as a pump or a circuit breaker, will fail when demanded during an accident is based on the assumption that the component fails due to "standby" stresses (i.e., stresses which are present while the component is in standby, such as corrosion, dirt, lack of lubrication). This probability, also called the component's average "unavailability," is used in PRAs and is most frequently calculated by the following equation:

$$q = \frac{1}{2} * \lambda * T$$

where:

q = the component's average unavailability,  
λ = the component's failure rate (assumed constant) while in standby, and  
T = the interval at which the component is tested for operability.



The average unavailability of a structure, system, or component (SSC), calculated by using the above equation, reflects the potential vulnerability of the component to “standby” stresses. Such vulnerability increases with time between operability checks (tests) assuming corrective action is taken to restore failed components identified by the test. Thus, the risk impact of a missed surveillance is reflected by the increased unavailability of the related SSCs due to the increase of the interval between surveillance tests. If the missed surveillance affects two or more components, some “standby” stresses may impact multiple components. In such a case, the missed surveillance would also increase the average common cause failure (CCF) unavailability of two or more components and this should be addressed in the risk assessment (CCF unavailabilities are calculated by adjusting the single component failure unavailability using standard PRA techniques, such as the beta factor or the Multiple Greek Letter method).

The thresholds of the aggregate risk impacts are based on the permanent change guidelines discussed in RG 1.174. The licensee will be expected to manage the risk from the proposed TS change in conjunction with the risk from other concurrent plant activities to ensure that any risk increase, in terms of Core Damage Frequency (CDF) and Large Early Release Frequency (LERF), will be small and consistent with the Commission’s Safety Goal Policy Statement.

Risk insights from existing PRAs and the low frequency of missed surveillances indicate that the proposed technical specification change is highly unlikely to lead to a significant increase in the average (yearly) risk, in terms of CDF or LERF. Significant risk increases can occur only under the following conditions:

- The number of missed surveillances is allowed to increase significantly;
- High risk configurations are allowed (e.g., by allowing certain combinations of multiple missed surveillances and/or outages); and
- Poor risk management of plant operational activities is allowed.

Any of these conditions would be in violation of proposed SR 4.0.3, its underlying assumptions, or 10 CFR 50.65(a)(4), and could trigger a review by NRC of the licensee’s actions and performance. The implementation guidance found in the proposed SR 4.0.3 Bases is intended to ensure that such conditions would not occur. Licensees are already required to manage risk associated with online maintenance activities. Furthermore, the addition of missed surveillances (rather rare plant conditions) to the maintenance activities is not expected to increase risk. On the contrary, insights from existing risk assessments indicate that there are plant conditions during which it is preferable and safer not to have to complete missed surveillance tests for some SSCs. Therefore, the proposed TS change will allow the licensee to make informed decisions and take appropriate actions to control risk.

#### 3.1.1.2 Temporary Risk Impact

In addition to changes in the mean values of CDF and LERF, the incremental conditional core damage probability and the incremental conditional large early release probability are proposed by RG 1.177 as appropriate measures of the increase in probability of core damage and large early release, respectively, during the period of implementation of a proposed technical specification change (i.e., during the extended surveillance period in the case of a missed surveillance). RG 1.182 provides guidance for controlling temporary risk increases resulting

from maintenance activities. Such guidance, which is consistent with guidance provided in RG 1.177, establishes action thresholds based on qualitative and quantitative considerations as well as risk management actions. The NRC staff expects that the licensee will implement this guidance for assessing temporary risk increases from missed surveillances concurrently with maintenance and other operational activities.

Instantaneous and temporary risk increases from a missed surveillance are assessed by considering the time-dependent unavailability, most often calculated by the following equation.

$$q(t) = \lambda * t$$

where:

$q(t)$  = the component's unavailability at time  $t$   
 $\lambda$  = the component's failure rate (assumed constant) while in standby, and  
 $t$  = time from end of surveillance frequency of a missed surveillance test.

If the missed surveillance affects two or more components, some "standby" stresses may impact multiple components. In such a case, the missed surveillance would also increase the time-dependent CCF unavailability of two or more components and this should be addressed in the risk assessment.

Significant temporary risk increases following a missed surveillance can occur only under the following conditions:

- High risk configurations are allowed (e.g., by allowing certain combinations of multiple missed surveillances and/or outages), and
- Poor risk management of plant operation activities is allowed.

Any of these conditions would be in violation of proposed SR 4.0.3 or 10 CFR 50.65(a)(4) and could trigger an NRC review of the licensee's actions and performance. The requirements associated with the proposed change are intended to ensure that such conditions would not occur. Thus, the proposed technical specification change is not expected to lead to significant temporary risk increases. Following the discovery of an unintentionally missed surveillance, the licensee will have to assess temporary risk increases, qualitatively or quantitatively depending on the importance of the component affected by the missed surveillance, if the surveillance cannot be performed within 24 hours from the time it has been discovered.

### 3.1.2 Risk-Informed Configuration Risk Management

RG 1.177 addressed the need for identifying risk significant configurations resulting from maintenance or other operational activities and taking appropriate compensatory measures to avoid such configurations. The objective of such guidance for this review is to ensure that plant safety will be maintained and monitored during the period of an extended surveillance testing interval (associated with an unintentionally missed surveillance). The licensee proposes to use the program in place to implement the Maintenance Rule to identify "high-risk" configurations resulting from missed surveillance tests in conjunction with outages associated with maintenance activities. It is worth noting that the guidance provided in RG 1.177 with regard to

the Configuration Risk Management Program was used as the basis for developing the guidance contained in RG 1.182 for the 10 CFR 50.65(a)(4) provisions of the Maintenance Rule. This provides additional assurance that the proposed process for evaluating the risk impact of missed surveillances is consistent with guidance provided in RG 1.177.

### 3.1.3 Quality of PRA

Once a missed surveillance is discovered and the licensee determines that the surveillance cannot be performed within 24 hours, the licensee will have to use a risk assessment to determine the most prudent course of action. The risk assessment can be done qualitatively or quantitatively depending on the importance of the component affected by the missed surveillance (missed surveillances for risk important components should be analyzed quantitatively). Such a risk assessment will be consistent with the program to implement the Maintenance Rule guidance to assess and account for both aggregate and temporary risk increases associated with “emergent” plant conditions as well as before undertaking online maintenance or other operational activities.

All licensees must have the capability to assess and manage increases in risk from maintenance activities as required by the Maintenance Rule. Risk assessments performed pursuant to 10 CFR 50.65(a)(4) may use qualitative, quantitative or blended methods. The degree of depth and rigor of the evaluation should be commensurate with the complexity of the proposed configuration to be assessed. Section 11 of NUMARC 93-01 provides guidance for using qualitative, quantitative or blended methods to assess risk. Current inspection programs allow the NRC staff to oversee licensee implementation of 10 CFR 50.65(a)(4) requirements, including the adequacy of premaintenance risk assessments performed by licensees.

For the reasons listed below, the NRC staff finds that the same “quality” of PRA or PRA insights used to perform risk assessments pursuant to 10 CFR 50.65(a)(4) is also appropriate when assessing the impact of missed surveillances.

- The number of “emergent” conditions resulting from missed surveillances is very small (in both absolute terms and in comparison to the frequency of “emergent” conditions resulting from equipment failures). The licensee is expected to implement the proposed change to SR 4.0.3 in a manner that ensures that this statement remains valid.
- A missed surveillance is equivalent to a one-time surveillance frequency extension. Therefore, the risk exposure is limited to the duration of the surveillance frequency extension. Risk increases are small compared to similar increases associated with equipment failures. The average (conditional) risk increase, given a missed surveillance, may be comparable to the risk increase from equipment failures. However, due to the rarity of missed surveillances, the average (yearly) risk increase from missed surveillances is expected to be small compared to the risk increase from equipment failures.
- PRA insights indicate that the risk impact from missed surveillances is significant only for a relatively small set of standby equipment. This equipment, such as auxiliary feedwater, high pressure injection pumps, and emergency diesel generators, is located outside containment and generally can be easily tested in a short time, if necessary.

- NRC inspection programs allow NRC staff to oversee the implementation of 10 CFR 50.65(a)(4) requirements, including the adequacy of pre-maintenance risk assessments performed by licensees.

#### 3.1.4 Summary

The NRC staff has reviewed the application and finds that the process proposed by the licensee for addressing missed SRs meets Commission guidance for allowing TS changes. Key elements of the proposed change are listed below.

- A risk evaluation shall be performed for any surveillance delayed longer than 24 hours, and the risk impact shall be managed.
- The missed surveillance test should be performed at “the first reasonable opportunity.”
- The “first reasonable opportunity” will be determined by taking into consideration the risk impact from delaying the surveillance test as well as the impact on any analysis assumptions, in addition to unit conditions, planning, availability of personnel, and the time required to perform the surveillance.
- A missed surveillance will be treated as an “emergent” condition in the same fashion as other unplanned maintenance activities. The risk impact of the condition will be managed through the program in place to implement 10 CFR 50.65(a)(4) and its implementation guidance (NRC RG 1.182). Rescheduling of missed surveillances pursuant to RG 1.182 will ensure the necessary provisions for managing the risk impact of performing the surveillance in conjunction with other ongoing plant configuration changes.
- The NRC’s operating reactor oversight process will provide the framework for inspectors and other NRC staff to review missed surveillances and assess the licensee’s actions and performance. Inspection procedures are in place which will allow NRC staff to oversee the implementation of Maintenance Rule requirements, including the adequacy of pre-maintenance risk assessments performed by licensees.
- A missed surveillance will be placed in the licensee’s corrective action program, thus providing the NRC staff with a means to verify that the number of missed surveillances continues to be very low.
- The number of missed surveillance tests is a very small fraction of the total number of such tests performed at a nuclear plant each year. The proposed change is not intended to be used as an operational convenience to extend surveillance frequencies.
- This process is similar to other improvements that have been made to the TS that allow the use of a controlled decision making process by licensees when the process has some high-level regulatory oversight. Two examples of this are the adoption of the Core Operating Limits Report and the Pressure/Temperature Limits Report. In each of these cases, the NRC staff approved the methodology behind the calculation of certain TS parameter limits and then allowed the specific limits to be removed from TS and controlled by the licensee using the approved methodology. Similarly, for this proposed

change, the NRC staff has already approved guidance that outlines a process for complying with 10 CFR 50.65(a)(4) and, therefore, can allow the licensee to use that guidance to determine the most prudent course of action in the case of a missed surveillance.

For these reasons, the NRC staff finds that the proposed change to SR 4.0.3, to be implemented in accordance with the above listed key elements, is acceptable.

### 3.2 Changes to SR 4.0.1

The wording of SR 4.0.1 will be completely replaced to reflect the changed requirements for missed surveillances discussed above. The NRC staff finds this modification acceptable based on the proposed change being consistent with the wording for SR 3.0.1 of NUREG-1431, Revision 2.

### 3.0 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.

### 4.0 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 and changes surveillance requirements. 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 (67 FR 68745). 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.

### 5.0 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.

Principal Contributor: CLIP Safety Evaluation for Missed Surveillance (66 FR 32400)

Dated: February 5, 2003

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