Tennessee Valley Authority, Post Office Box 2000, Soddy Daisy, Tennessee 37384-2000

November 12, 2008

TVA-SQN-TS-08-07 10 CFR 50.90

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

In the Matter of	)	Docket Nos. 50-327
Tennessee Valley Authority (TVA)	)	50-328

SEQUOYAH NUCLEAR PLANT (SQN) - UNITS 1 AND 2 - "LICENSE AMENDMENT REQUEST (LAR) TS-08-07 TO REVISE REACTOR COOLANT SYSTEM LEAKAGE DETECTION SYSTEMS" - EXIGENT CHANGE REQUEST

Pursuant to 10 CFR 50.90, Tennessee Valley Authority (TVA) is submitting a request for an amendment (TS-08-07) to Licenses DPR-77 and DPR-79 for SQN. The amendment revises Technical Specification (TS) TS 3.3.3.1, "Radiation Monitoring," and TS 3.4.6.1, "Reactor Coolant System Leakage Detection Systems," at each unit to remove the requirement for one operable containment atmosphere gaseous radioactivity monitor, leaving the requirement for one containment atmosphere particulate radioactivity monitor to be operable in Modes 1, 2, 3 and 4. Corresponding changes to Surveillance Requirements (SRs) 4.3.3.1 and 4.4.6.1 are proposed for each unit. Additionally, the proposed change includes modifications to existing TS 3.4.6.1 Action requirements.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the TS change qualifies for categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosure to the Tennessee State Department of Public Health.

TVA requests that NRC provide an exigent review of this LAR in accordance with 10 CFR 50.91(a)(6) and approval by December 6, 2008 in order to avoid a plant shutdown of Units 1 and 2 in accordance with Limiting Condition for Operation (LCO) 3.4.6.1.b.

SQN Unit 1 (1845 on November 6, 2008) and Unit 2 (0426 on November 7, 2008) have entered LCO 3.4.6.1 because of a concern that the gaseous radiation monitor channel is unable to detect a one gallon per minute (gpm) reactor coolant system (RCS) leak. LCO 3.4.6.1 Action b allows operation to continue for up to 30 days provided grab samples of the lower containment atmosphere are analyzed once per 24 hours, or SR 4.4.6.2.1 is performed once per 24 hours. The proposed change would resolve this condition.

Prior to entry into TS LCO 3.4.6.1 for an inoperable gaseous radiation channel, TVA's application of the licensing basis did not require the gaseous channel to be capable of detecting one gpm in one hour for all plant conditions. On November 6, 2008, the NRC provided the perspective that the capability to detect one gpm in one hour is required for the channel to be operable. To move forward with resolving this issue, TVA agreed to declare the channel inoperable and comply with the TS.

There are no regulatory commitments associated with this submittal. TVA will continue to monitor the NRC/Industry resolution of this issue and may request further amendments in the future.

The SQN Plant Operations Review Committee and the Nuclear Safety Review Board have reviewed this proposed change and determined that operation of SQN Units 1 and 2 in accordance with the proposed change will not adversely affect the health and safety of the public.

If you have any questions about this change, please contact me at (423) 843-7170.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 12th day of November, 2008.

Sincerely,

James D. Smith
Manager, Site Licensing and
Industry Affairs

Enclosure:
Evaluation of the Proposed Change

cc: See page 3

Enclosure
cc (Enclosure):

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ENCLOSURE

SEQUOYAH NUCLEAR PLANT (SQN) - UNITS 1 AND 2
LICENSE AMENDMENT REQUEST (LAR) TS-08-07

EVALUATION OF THE PROPOSED CHANGE

The proposed changes would modify Technical Specification (TS) 3.3.3.1, "Radiation Monitoring," and TS 3.4.6.1, "Reactor Coolant System Leakage Detection Systems," to specifically require only one containment radioactivity monitor (particulate channel) to be operable in Modes 1, 2, 3 and 4. Additionally, corresponding changes to Surveillance Requirement (SR) 4.4.6.1 are proposed for each unit.

1.0 SUMMARY DESCRIPTION

This evaluation supports a license amendment request (LAR) to amend Operating Licenses DPR-77 and DPR-79 for SQN Units 1 and 2.

This proposed amendment requests to remove the TS operability requirement for one of the three reactor coolant system (RCS) leakage detection systems currently required by TSs. Specifically, the proposed amendment would remove operability requirement for the gaseous radiation monitor for RCS leakage detection. Improvements in nuclear fuel reliability over time have resulted in the reduction of effectiveness of the gaseous monitors in detecting very small leaks and changes in leak rate. The proposed amendment request also addresses required changes to the actions and SRs as a result of the removal of the operability requirement for the gaseous radiation monitor.

2.0 DETAILED DESCRIPTION

The amendment revises TS 3.3.3.1, "Radiation Monitoring," and TS 3.4.6.1, "Reactor Coolant System Leakage Detection Systems," by removing the operability requirement for the operable containment atmosphere gaseous radioactivity monitor, leaving the requirement for one containment atmosphere particulate radioactivity monitor to be operable in Modes 1, 2, 3 and 4. Corresponding changes to SRs 4.3.3.1 and 4.4.6.1 are proposed for each unit. Additionally, the proposed change includes modifications to existing TS 3.4.6.1 action requirements. Marked pages of the proposed TS and Bases changes are found in Attachment 1 of this enclosure.

Currently SQN TS 3.4.6.1 allows continued operation of the respective facility for up to 30 days when the gaseous radiation monitor channel is unavailable for RCS leakage detection. While this monitor continues to provide leakage detection and trending capability, improvements in nuclear fuel reliability over time have resulted in baseline RCS coolant radioactivity being reduced to a level far below that used for original design specification for these monitors. The reduction in baseline activity limits the effectiveness of the monitor relative to detecting very small leaks or very small changes in the leakrate. Under these circumstances, SQN believes it is prudent to remove the requirements for these monitors from TSs.

As the gaseous channels of the containment atmosphere radiation monitors are only used for RCS leakage detection, it is appropriate to remove the gaseous channels from the radiation monitoring TS for each unit (i.e., TS 3.3.3.1, Tables 3.3-6 and 4.3-3).

At SQN, both units have entered Limiting Condition for Operation (LCO) 3.4.6.1 because of a concern that the gaseous radiation monitor channel is unable to detect a one gallon per minute (gpm) RCS leak. LCO 3.4.6.1 Action b allows operation to continue for up to 30 days provided grab samples of the lower containment atmosphere are analyzed once per 24 hours, or SR 4.4.6.2.1 is performed once per 24 hours. The proposed change would resolve this condition.

3.0 TECHNICAL EVALUATION

Updated Final Safety Analysis Report (UFSAR) Section 5.2.7.1.1 describes the Containment Building Upper Compartment Air Radiation Monitor and Containment Building Lower Compartment Air Radiation Monitor as follows:

The containment air from the lower and upper compartments is normally sampled and monitored by separate monitor assemblies. One assembly normally monitors the lower compartment and one assembly normally monitors the upper compartment. Each assembly consists of a particulate and noble gas monitors.

These separate monitor systems are interconnected by stainless steel tubing to allow monitoring lower containment by either monitor in case one monitor assembly malfunctions. The particulate and noble gas monitors are each indicated, recorded, and annunciated in the main control room (MCR). Visual and audible alarms are initiated on high radiation and instrument malfunction.

The integrated computer system (ICS) utilizes the count rate input signal from these radiation monitors to calculate an ICS alarm setpoint to further comply with general design criterion (GDC) 30, “Quality of Reactor Coolant Pressure Boundary” and Regulatory Guide (RG) 1.45, “Reactor Coolant Pressure Boundary Leakage Detection Systems, Revision 0.” The ICS alarm setpoint is calculated with a predetermined percent increase of count rate above a continuous updated hourly background count rate which reflects current plant conditions. When the lower containment one minute current average background count rate exceeds the predetermined percent increase of the hourly averaged background count rate, an ICS computer alarm in the MCR will initiate.

UFSAR Section 5.2.7.4, “Characteristics of the Leakage Detection Methods for Containment Radioactive Gas Monitors” provides the follow information:

Radioactive gas resulting from abnormal leakage is normally monitored by the containment building lower compartment air monitor system; the detector is a plastic beta scintillator. As in the case of the particulate monitor, the response time of the gas detector has an absolute minimum value which lies somewhere between 50 and 120 seconds. The response time is the sum of this minimum and a time which is dependent on the abnormal leakage rate, normal baseline leakage, and the amount of gaseous fission product activity in the coolant. While less important than the case of the particulate detector the frequency of containment purging is also a consideration.

The noble gas detection response capability will vary significantly depending on the containment background count rate. The higher the lower containment atmosphere background count rate the slower the detector response. The detection of RCS leakage with the noble gas monitors ultimately is a function of the quantity of isotopes that are contained in the RCS. For cases where there is little or no activity (such as when there are no fuel leaks and/or at startup), these monitors cannot satisfy the one gpm leakage detection (since there is no activity to detect). In addition, for cases where fuel leaks and

RCS leakage has occurred simultaneously for example at one percent reactor coolant mass per day for three months, it may be difficult for these monitors to satisfy the one gpm leakage detection. This is because of the masking affect high containment atmosphere background activity will have on a new RCS leakrate. Other methods of RCS leakage detection specified in RG-1.45, Revision 0, would be necessary as discussed in UFSAR Section 5.2.7.

The proposed TS change would change the required RCS leakage instrumentation by removing reference to the containment atmosphere gaseous radioactivity monitor from TS LCO 3.3.3.1, "Monitoring Instrumentation," and TS LCO 3.4.6.1, "Reactor Coolant System Leakage." The proposed change to SQN TS LCO 3.4.6.1 would require the containment atmosphere particulate radioactivity monitor and the containment pocket sump level monitor to be operable in Modes 1, 2, 3, and 4. These proposed changes are consistent with the guidance of Regulatory Position C.2.3 of RG-1.45, Revision 1; and NUREG-1431, "Standard Technical Specifications - Westinghouse Plants," Revision 3.0, TS 3.4.15.

It should be noted that SQN intends to maintain the containment atmosphere gaseous radioactivity monitor functional and available in accordance with normal non-TS equipment practices.

The SQN reactor coolant pressure boundary leakage detection system is based on a diverse set of leakage detection methods. As discussed in Section 5.2.7 of the UFSAR, these detection methods can include containment particulate radiation monitors, containment radioactive gas monitors, humidity monitors, reactor vessel flange leak-off detectors, condenser vacuum pump radiation monitors, component cooling system radiation monitors, steam generator blowdown radiation monitors, charging pump flow rate and excessive makeup volume detection, main steam line radiation monitors as well as the reactor building floor and equipment drain sump level monitors. The diversity and sensitivity of these detection systems were reviewed by NRC as part of the initial plant licensing basis. Based on the review of the overall leakage detection capability, NRC concluded in Section 5.2.4 of the plant safety evaluation report (NUREG-0011) that the SQN leakage detection system satisfied the overall requirements of GDC 30 and was acceptable.

In support of the licensing amendment which permitted the elimination of dynamic effects of postulated primary loop pipe ruptures from the design basis using the "leak-before-break" (LBB) methodology of GDC 4, “Environmental and Dynamic Effect Design Basis,” TVA indicated that the integrated leak detection system is capable of detecting a primary system leak rate of one gpm in approximately one hour. Even, if the diversity of the leak detection system is reduced by lack of sufficient primary system activity to credit operation of the gaseous radiation monitor discussed in Section 5.2.7 of the UFSAR, sufficient diversity and sensitivity exist in the remaining portions of the leak detection system to meet the design basis leak detection requirement (one gpm in approximately one hour). The ability to detect a leakage rate of one gpm in approximately one hour also creates a large margin to the minimum required sensitivity for the application of LBB analysis methodology. The established capability of the SQN detection system is a factor of 10 more sensitive than required by the guidelines in NUREG-1061, Volume 3, "Report of the NRC Piping Review Committee, Evaluation of Potential Pipe Breaks".

Given: 1) the continued ability of the RCS leak detection system to detect a one gpm primary system leak in approximately one hour when no credit is taken for the gaseous radiation monitor and 2) the large margin afforded by the sensitivity of the system to minimum sensitivity requirements for the application of LBB analysis methodology, the lack of gaseous radiation monitor detection associated with low RCS activity does not affect the SQN licensing basis for elimination of dynamic effects of primary loop pipe ruptures using LBB methodology.

The required RCS leak detection systems will continue to provide diverse methods of leak detection that satisfy the intent of GDC 30 as described in the SQN UFSAR. The leakage detection capability is adequate to support the application of the LBB methodology at SQN. Therefore, the proposed deletion of the containment atmosphere gaseous radiation monitor from TS 3.4.6.1 is acceptable.

The proposed change to TS 3.3.3.1 deletes the containment atmosphere gaseous radioactivity instrumentation from SQN TS Tables 3.3-6 and 4.3-3, which specify the instrumentation subject to TS LCO 3.3.3.1 and the associated SRs, respectively. Since the proposed change to remove the SQN containment atmosphere gaseous radioactivity monitors from TS LCO 3.4.6.1 is acceptable, it is consistent to also remove these monitors from TS LCO 3.3.3.1. Therefore, the proposed removal of the containment atmosphere gaseous radioactivity monitor from TS LCO 3.3.3.1 is acceptable.

The Reason For The Exigent TS Change.

Prior to the present entry into TS LCO 3.4.6.1 for an inoperable gaseous radiation channel, TVA application of the licensing basis did not require the gaseous channel to be capable of detecting one gpm in one hour for all plant conditions. On November 6, 2008, NRC provided the perspective that the capability to detect one gpm in one hour for all plant conditions is required for the channel to be operable. To move forward in resolving this issue, TVA agreed to declare the channel inoperable and enter the appropriate TS action statements. Because there is insufficient activity in the RCS under current operating conditions to enable a gaseous monitor to sense a one gpm leak within one hour, the TS is being changed to resolve this issue. Because TVA is currently in a 30-day TS action statement allowed outage time, this change is being processed as an exigent change in order to prevent an unnecessary shutdown and to continue to operate the plant safely.

Why The Need For The Requested Action Could Not Reasonably Have Been Identified Earlier.

Information Notice 2005-24 was written to inform licensees of the non-conservatisms in the leakage detection sensitivity. TVA had previously recognized the detection sensitivity limitations and took actions to clarify these in the TS Bases and UFSAR as well as create a rate of rise alarm on the plant computer for the gaseous channel. Based on our understanding of the operability requirements for the gaseous channel (one gpm within one hour was not an explicit criterion based on the design basis source terms), no further actions were deemed necessary. TVA continued to monitor the pending resolution of the industry issue. A subsequent draft improved standard TS (ISTS) change has been identified by the PWR Owners Group (WOG-196) and is currently out for industry comment. TVA has operated in good faith in acting upon the information NRC provided to the industry. However, TVA did not recognize NRC's position that the gaseous channel must meet the specific requirements of RG-1.45, Revision 0, for all plant conditions to be operable until the present entry into TS LCO 3.4.6.1.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

General Design Criterion (GDC) 30, "Quality of Reactor Coolant Pressure Boundary," of Appendix A to Title 10 of the Code of Federal Regulations Part 50 (10 CFR 50), addresses in part, the means for providing, detecting, and to the extent practical, identifying the location of the source of reactor coolant leakage. Regulatory Guide (RG) 1.45, "Reactor Coolant Pressure Boundary Leakage Detection Systems," describes acceptable methods of implementing GDC 30 with regard to the selection of leakage detection systems for the reactor coolant pressure boundary (RCPB). Position C.3 of RG-1.45, Revision 0, states that at least three different detection methods should be employed. Two of these methods should be sump level and flow monitoring and airborne particulate radioactivity monitoring. The third method may involve either monitoring of condensate flow rate from air coolers or monitoring of gaseous radioactivity.

RG-1.45 recommended that the sensitivity and response time of each leakage detection system employed for unidentified leakage should be adequate to detect a leakage rate, or its equivalent, of one gallon per minute (gpm) in less than one hour.

In May 2008, the NRC staff issued Revision 1 to RG-1.45. Section B, "Discussion," of RG-1.45, Revision 1, describes that the effectiveness of airborne gaseous radioactivity monitors depends primarily on the activity of the reactor coolant and also, in part, on the containment volume and the background activity level. Because of improvements in fuel integrity, many operating plants have reported experiencing very long gaseous radioactivity monitor response times to RCS leakage, considering realistic coolant activities. Accordingly, Position C.2.3 of RG-1.45, Revision 1, states that plant TSs should identify at least two independent and diverse methods and recommends considering the following leakage detection methods for incorporation in the TSs: monitoring containment sump level or flow; monitoring airborne particulate radioactivity; and monitoring condensate flow rate from air coolers. That position also recommended considering several other methods for supplemental detection of leakage, including containment gaseous radioactivity monitoring.

GDC 4 states that "...dynamic effects associated with postulated pipe ruptures in nuclear power units may be excluded from the design basis when analyses reviewed and approved by the Commission demonstrated that the probability of fluid system piping rupture is extremely low under conditions consistent with the design basis for the piping..." The NRC allows the application of leak-before-break (LBB) technology on the primary piping systems under the broad-scope revision to 10 CFR Part 50, Appendix A, GDC 4 (Volume 52 of the Federal Register pages 41288-41295, October 27, 1987). Specific guidance on LBB evaluation is discussed in Standard Review Plan (SRP) Section 3.6.3, “Leak-Before-Break Evaluation Procedures.” Section 3.6.3 of the SRP specifies that leak detection systems be reliable, redundant, diverse and sensitive, and that substantial margin exists to detect the leakage from the through-wall flaw used in the deterministic fracture mechanics evaluation.

The SQN reactor coolant pressure boundary leakage detection system is based on a diverse set of leakage detection methods. As discussed in Section 5.2.7 of the UFSAR, these detection methods can include containment particulate radiation monitors, containment radioactive gas monitors, humidity monitors, reactor vessel flange leak-off detectors, condenser vacuum pump radiation monitors, component cooling system radiation monitors, steam generator blowdown radiation monitors, charging pump flow rate and excessive makeup volume detection, main steam line radiation monitors as well as the reactor building floor and equipment drain sump level monitors. The diversity and sensitivity of these detection systems were reviewed by NRC as part of the initial plant licensing basis. Based on the review of the overall leakage detection capability, NRC concluded in Section 5.2.4 of the plant safety evaluation report (NUREG-0011) that the SQN leakage detection system satisfied the overall requirements of GDC 30 and was acceptable.

In support of the licensing amendment which permitted the elimination of dynamic effects of postulated primary loop pipe ruptures from the design basis using the LBB methodology of GDC 4, TVA indicated that the integrated leak detection system is capable of detecting a primary system leak rate of one gpm in approximately one hour. Even if the diversity of the leak detection system is reduced by lack of sufficient primary system activity to credit operation of the gaseous radiation monitor discussed in Section 5.2.7 of the UFSAR, sufficient diversity and sensitivity exist in the remaining portions of the leak detection system to meet the design basis leak detection requirement (one gpm in approximately one hour). The ability to detect a leakage rate of one gpm in approximately one hour also creates a large margin to the minimum required sensitivity for the application of LBB analysis methodology. The established capability of the SQN detection system is a factor of 10 more sensitive than required by the guidelines in NUREG-1061, Volume 3, "Report of the NRC Piping Review Committee, Evaluation of Potential Pipe Breaks".

Given 1) the continued ability of the RCS leak detection system to detect a one gpm primary system leak in approximately one hour when no credit is taken for the gaseous radiation monitor and 2) the large margin afforded by the sensitivity of the system to minimum sensitivity requirements for the application of LBB analysis methodology, the lack of gaseous radiation monitor detection associated with low RCS activity does not affect the SQN licensing basis for elimination of dynamic effects of primary loop pipe ruptures using LBB methodology.

The required RCS leak detection systems will continue to provide diverse methods of leak detection that satisfy the intent of GDC 30 as described by the SQN UFSAR. The required leakage detection capability is adequate to support the application of the LBB methodology at SQN. Therefore, the proposed changes to delete the containment atmosphere gaseous radiation monitor from TS 3.3.3.1 and TS 3.4.6.1 are acceptable.

4.2 Precedent

With respect to the removal of the containment atmosphere gaseous radioactivity monitor, the NRC approved similar license amendments for South Texas Project, Units 1 and 2, (TAC Nos. MC7258 and MC7259), on October 17, 2005, and for Byron Station, Units 1 and 2, and Braidwood Station, Units 1 and 2, (TAC NOS. MC0509, MC0510, MC0507, and MC0508), on January 14, 2005, and for Millstone Power Station, Unit No.2, and to Renewed Facility Operating License No. NPF-49 for the Millstone Power Station, Unit No.3, respectively, on

September 30, 2008 (TAC NOS. MD6640 and MD6641)

In review of the Dominion Nuclear Connecticut license amendment request (LAR) the NRC asked for additional information concerning the LAR. The NRC's questions and TVA's response are provided below.

NRC Question

1. *Provide additional technical justification to support continued plant operation when all automatic leakage detection systems are inoperable.*

TVA Response

TVA is electing to not pursue a change that would permit continued operation with all automatic detection systems inoperable at this time.

NRC Question

2. *Provide additional technical and regulatory justification for the lack of any frequency in which the operator must monitor other alternate leakage detection systems when all leakage detection instrumentation is inoperable.*

TVA Response

TVA is electing to not pursue a change that would permit continued operation with all automatic detection systems inoperable at this time.

NRC Question

3. *Describe any current reference to the gaseous radiation monitors in the leak-before-break analysis assumptions and identify any impact the proposed amendment has on the analysis assumption for SQN. Also, identify the available leak detection systems with overall response times (i.e., response times that consider transport and holdup of the measured leakage constituents) adequate to support the leak-before-break analysis assumptions that are provided in addition to the gaseous radiation monitors.*

TVA Response

The LBB issue is discussed in Section 3.0, "Technical Evaluation" and Section 4.1, "Applicable Regulatory Requirements/Criteria", where it is noted that leakage detection capability is adequate to support the application of the LBB methodology.

NRC Question

4. *Explain how the proposed action statements affect the redundancy and minimal functionality of leak detection instrumentation necessary to support the leak-before-break analysis.*

TVA Response

The LBB issue is discussed in Section 3.0 and Section 4.1, where it is noted that leakage detection capability is adequate to support the application of the LBB methodology.

4.3 Significant Hazards Consideration

SQN has evaluated whether a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed change has been evaluated and determined to not increase the probability or consequences of an accident previously evaluated. The proposed change does not make any hardware changes and does not alter the configuration of any plant system, structure or component (SSC). The containment atmosphere gaseous radioactivity monitor is not credited for use in the initiation of any protective functions. The proposed change only removes the containment atmosphere gaseous radioactivity monitor for meeting the operability requirements for Technical Specification (TS) 3.4.6.1 and TS 3.3.3.1. Therefore, the probability of occurrence of an accident is not increased. The TS will continue to require diverse means of leakage detection equipment, thus ensuring that leakage due to cracks would continue to be identified prior to breakage and the plant shutdown accordingly. Therefore, the consequences of an accident are not increased.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No

The proposed change does not involve the use or installation of new equipment and the currently installed equipment will not be operated in a new or different manner. No new or different system interactions are created and no new processes are introduced. The proposed changes will not introduce any new failure mechanisms, malfunctions, or accident initiators not already considered in the design and licensing bases. The proposed change does not affect any SSC associated with an accident initiator. Based on this evaluation, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No

The proposed change does not make any alteration to any RCS leakage detection components. The proposed change removes the gaseous channel of the containment atmosphere radioactivity monitor from TS 3.4.6.1 and TS 3.3.3.1. The proposed amendment continues to require diverse means of leakage detection equipment with capability to promptly detect RCS leakage.

Additional diverse means of leakage detection capability are available, although not provided in the TSs. Based on this evaluation, the proposed change does not involve a significant reduction in a margin of safety. Based on the above, SQN concludes that the proposed amendment involves no significant hazards consideration under the standards set forth in 10 CFR 50.92, and a finding of "no significant hazards consideration" is justified.

5.0 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 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 amendment involves no significant hazards consideration. 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.

6.0 REFERENCES

The following documents were consulted:

a. SQN UFSAR 5.2.7 “RCPB Leakage Detection System”
b. SQN Plant Safety Evaluation Report, NUREG-0011
c. September 30, 2008 NRC Letter, “Millstone Power Station, Unit Nos. 2 and 3 - Issuance of Amendment Re: Technical Specifications Regarding Reactor Coolant System Leakage Detection Systems (TAC Nos. MD6640 and MD6641)”, as well as the related License Application Request and responses to request for additional information
d. NRC Information Notice 2005-24, *Nonconservatism in Leakage Detection Sensitivity*
e. NRC Administrative Letter 98-10, *Dispositioning of Technical Specifications that are Insufficient to Assure Plant Safety*
f. NRC Regulatory Guide 1.45, *Guidance on Monitoring and Responding to Reactor Coolant System Leakage*, Revisions 1
g. NRC Regulatory Guide 1.45, *Reactor Coolant Pressure Boundary Leakage Detection Systems,* Revision 0
h. Letter from NRC to Oliver D. Kingsley, Jr. dated July 19, 1989, “Elimination of Primary Loop Pipe Breaks, General Design Criterion 4 (TAC Nos. 72829/72830) - Sequoyah Nuclear Plant, Units 1 and 2

ATTACHMENTS

1. Technical Specifications Page Markups
2. Bases Page Markups

ATTACHMENT 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

TECHNICAL SPECIFICATIONS PAGE MARKUPS

I. AFFECTED PAGE LIST

Unit 1
3/4.3-40
3/4.3-42
3/4.4-13

Unit 2
3/4.3-41
3/4.3-43
3/4.4-17

II. MARKED PAGES

TABLE 3.3-6

RADIATION MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION
1. AREA MONITOR					
a. Fuel Storage Pool Area	1	*	≤ 151 mR/hr	10^{-1} - 10^{4} mR/hr	26
2. PROCESS MONITORS					
a. Containment Purge Air	1	1, 2, 3, 4 & 6	≤ 8.5x 10^{-3} μCi/cc	10 - 10^{7} cpm	28
b. Containment	Deleted				
i. ~~Gaseous Activity~~					
~~RCS Leakage Detection~~	~~1~~	~~1, 2, 3 & 4~~	~~N/A~~	~~10 - 10^{7} cpm~~	~~27~~
ii. Particulate Activity					
RCS Leakage Detection	1	1, 2, 3 & 4	N/A	10 - 10^{7} cpm	27
c. Control Room Isolation	2	ALL MODES and during movement of irradiated fuel assemblies	≤ 400 cpm**	10 - 10^{7} cpm	29

* With fuel in the storage pool or building

** Equivalent to 1.0 x 10^{-5} μCi/cc.

TABLE 4.3-3

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE REQUIRED
1. AREA MONITOR				
a. Fuel Storage Pool Area	S	R	Q	*
2. PROCESS MONITORS				
a. Containment Purge Air Exhaust	S	R	Q	1, 2, 3, 4 & 6
b. Containment	Deleted			
i. ~~Gaseous Activity RCS Leakage Detection~~	~~S~~	~~R~~	~~Q~~	~~1, 2, 3, & 4~~
ii. Particulate Activity RCS Leakage Detection	S	R	Q	1, 2, 3, & 4
c. Control Room Isolation	S	R	Q	ALL MODES

*With fuel in the storage pool or building.

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System leakage detection instrumentation shall be OPERABLE:

a. ~~Two~~ One lower containment atmosphere particulate radioactivity monitoring channel ~~(gaseous and particulate)~~, and

b. The containment pocket sump level monitor.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With both containment pocket sump monitors inoperable, operation may continue for up to 30 days provided SR 4.4.6.2.1 is performed once per 24 hours*; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With ~~either or both~~ the ~~gaseous or~~ particulate lower containment atmosphere radioactivity ~~monitors~~ monitor inoperable, operation may continue for up to 30 days provided grab samples of the lower containment atmosphere are analyzed once per 24 hours or SR 4.4.6.2.1 is performed once per 24 hours*; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With both containment pocket sump monitors and ~~both~~ the lower containment atmosphere radioactivity ~~monitors~~ monitor inoperable, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The leakage detection instrumentation shall be demonstrated OPERABLE by:

a. Performance of the lower containment atmosphere ~~gaseous and~~ particulate monitor CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST at the frequencies specified in Table 4.3-3, and

b. Performance of containment pocket sump level monitor CHANNEL CALIBRATION at least once per 18 months.

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* Surveillance performance not required until 12 hours after establishment of steady state operation.

TABLE 3.3-6
RADIATION MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ALARM/TRIP SETPOINT	MEASUREMENT RANGE	ACTION
1. AREA MONITOR					
a. Fuel Storage Pool Area	1	*	≤151 mR/hr	10^{-1} - 10^{4} mR/hr	26
2. PROCESS MONITORS					
a. Containment Purge Air	1	1, 2, 3, 4 & 6	≤8.5 x 10^{-3} μCi/cc	10 - 10^{7} cpm	28
b. Containment		Deleted			
i. ~~Gaseous Activity~~					
~~RCS Leakage Detection~~	~~1~~	~~1, 2, 3 & 4~~	~~N/A~~	~~10 - 10^{7} cpm~~	~~27~~
ii. Particulate Activity					
RCS Leakage Detection	1	1, 2, 3 & 4	N/A	10 - 10^{7} cpm	27
c. Control Room Isolation	2	ALL MODES and during movement of irradiated fuel assemblies	≤ 400 cpm**	10 - 10^{7} cpm	29

* With fuel in the storage pool or building

** Equivalent to 1.0 x 10^{-5} μCi/cc.

TABLE 4.3-3

RADIATION MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. AREA MONITOR				
a. Fuel Storage Pool Area	S	R	Q	*
2. PROCESS MONITORS				
a. Containment Purge Air Exhaust	S	R	Q	1, 2, 3, 4 & 6
b. Containment				
i. ~~Gaseous Activity~~				
~~RCS Leakage Detection~~	~~S~~	~~R~~	~~Q~~	~~1, 2, 3, & 4~~
ii. Particulate Activity				
RCS Leakage Detection	S	R	Q	1, 2, 3 & 4
c. Control Room Isolation	S	R	Q	ALL MODES

Deleted

* With fuel in the storage pool or building.

REACTOR COOLANT SYSTEM

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

LEAKAGE DETECTION INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.4.6.1 The following Reactor Coolant System leakage detection instrumentation shall be OPERABLE:

a. ~~Two~~ One lower containment atmosphere particulate radioactivity monitors ~~(gaseous and particulate)~~ channel, and

b. One containment pocket sump level monitor.

APPLICABILITY: MODES 1, 2, 3 and 4.

ACTION:

a. With both containment pocket sump monitors inoperable, operation may continue for up to 30 days provided SR 4.4.6.2.1 is performed once per 24 hours*; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

b. With ~~either or both~~ the ~~gaseous or~~ particulate lower containment atmosphere radioactivity ~~monitors~~ monitor inoperable, operation may continue for up to 30 days provided grab samples of the lower containment atmosphere are analyzed once per 24 hours or SR 4.4.6.2.1 is performed once per 24 hours*; otherwise, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

c. With both containment pocket sump monitors and ~~both~~ the lower containment atmosphere radioactivity ~~monitors~~ monitor inoperable, be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.6.1 The leakage detection instrumentation shall be demonstrated OPERABLE by:

a. Performance of the lower containment atmosphere ~~gaseous and~~ particulate monitor CHANNEL CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST at the frequencies specified in Table 4.3-3, and

b. Performance of containment pocket sump level monitor CHANNEL CALIBRATION at least once per 18 months.

* Surveillance performance not required until 12 hours after establishment of steady state operation.

ATTACHMENT 2

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

BASES PAGE MARKUPS

I. AFFECTED PAGE LIST

Unit 1
B 3/4 4-4b
B 3/4 4-4c
B 3/4 4-4e
B 3/4 4-4f

Unit 2
B 3/4 4-4
B 3/4 4-4a
B 3/4 4-4c
B 3/4 4-4d

II. MARKED PAGES

See attached.

Bases Insert 1

An atmospheric gaseous radioactivity monitor will provide a positive indication of leakage in the event that high levels of reactor coolant gaseous activity exist due to fuel cladding defects. The effectiveness of the atmospheric gaseous radioactivity monitors depends primarily on the activity of the reactor coolant and also, in part, on the containment volume and the background activity level. Shortly after startup and also during steady state operation with low levels of fuel defects, the level of radioactivity in the reactor coolant may be too low for the containment atmosphere gaseous radiation monitors to detect a reactor coolant leak of one gpm within one hour. Atmospheric gaseous radioactivity monitors are not required by this LCO.

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION INSTRUMENTATION

BACKGROUND

GDC 30 of Appendix A to 10 CFR 50 (Ref. 1) requires means for detecting and, to the extent practical, identifying the location of the source of reactor coolant system (RCS) leakage. Regulatory Guide 1.45 (Ref. 2) describes acceptable methods for selecting leakage detection systems.

Leakage detection systems must have the capability to detect significant reactor coolant pressure boundary (RCPB) degradation as soon after occurrence as practical to minimize the potential for propagation to a gross failure. Thus, an early indication or warning signal is necessary to permit proper evaluation of all UNIDENTIFIED LEAKAGE.

Industry practice has shown that water flow changes of 0.5 to 1.0 gpm can be readily detected in contained volumes by monitoring changes in water level, in flow rate, or in the operating frequency of a pump. The containment pocket sump used to collect UNIDENTIFIED LEAKAGE is instrumented to alarm for increases of 1.0 gpm in the normal flow rates into the sump within one hour. This sensitivity is acceptable for detecting increases in UNIDENTIFIED LEAKAGE.

The environmental conditions during power operations and the physical configuration of lower containment will obstruct the total RCS leakage (including steam) from directly entering the Pocket Sump and subsequently, will lengthen the sump's level response time. Therefore, reactor coolant system pressure boundary leakage detection by the Pocket Sump will typically occur following other means of leakage detection.

The reactor coolant contains radioactivity that, when released to the containment, can be detected by radiation monitoring instrumentation. Reactor coolant radioactivity levels will be low during initial reactor startup and for a few weeks thereafter, until activated corrosion products have been formed and fission products appear from fuel element cladding contamination or cladding defects. Instrument ~~sensitivities of 10^{-9} μCi/cc radioactivity for particulate monitoring and of 10-6 μCi/cc radioactivity for gaseous monitoring are practical for these leakage detection systems. Radioactivity detection systems are included for monitoring both particulate and gaseous activities because of their sensitivities and rapid responses to RCS leakage.~~

sensitivity of 10^{-9} μ Ci/cc radioactivity for particulate monitoring is practical for this leakage detection system.

A radioactivity detection system is included for monitoring particulate activity because of its sensitivity and rapid response to RCS

Bases Insert 1

An increase in humidity of the containment atmosphere would indicate release of water vapor to the containment. Dew point temperature measurements can thus be used to monitor humidity levels of the containment atmosphere as an indicator of potential RCS leakage.

Since the humidity level is influenced by several factors, a quantitative evaluation of an indicated leakage rate by this means may be questionable and should be compared to observed increases in liquid flow into or from the containment sump. Humidity level monitoring is considered most useful as an indirect alarm or indication to alert the operator to a potential problem. Humidity monitors are not required by this LCO.

Air temperature and pressure monitoring methods may also be used to infer UNIDENTIFIED LEAKAGE to the containment. Containment temperature and pressure fluctuate slightly during plant operation, but a rise above the normally indicated range of values may indicate RCS leakage into the containment. The relevance of temperature and pressure measurements are affected by containment free volume and, for temperature, detector location. Alarm signals from these instruments can be valuable in recognizing rapid and sizable leakage to the containment. Temperature and pressure monitors are not required by this LCO.

APPLICABLE SAFETY ANALYSES

The need to evaluate the severity of an alarm or an indication is important to the operators, and the ability to compare and verify with indications from other systems is necessary. The system response times and sensitivities are described in the FSAR (Ref. 3). Multiple instrument locations are utilized, if needed, to ensure that the transport delay time of the leakage from its source to an instrument location yields an acceptable overall response time.

The safety significance of RCS leakage varies widely depending on its source, rate, and duration. Therefore, detecting and monitoring RCS leakage into the containment area is necessary. Quickly separating the IDENTIFIED LEAKAGE from the UNIDENTIFIED LEAKAGE provides quantitative information to the operators, allowing them to take corrective action should a leakage occur detrimental to the safety of the unit and the public. Exclusions to the requirements of General Design Criteria 4, for the dynamic effects of the RCS piping, have been utilized based on the leak detection capability to identify leaks before a pipe break would occur.

RCS leakage detection instrumentation satisfies Criterion 1 of the NRC Policy Statement.

LCO

One method of protecting against large RCS leakage derives from the ability of instruments to rapidly detect extremely small leaks. This LCO requires instruments of diverse monitoring principles to be OPERABLE to provide a high degree of confidence that extremely small leaks are detected in time to allow actions to place the plant in a safe condition, when RCS leakage indicates possible RCPB degradation.

The LCO is satisfied when monitors of diverse measurement means are available. Thus, one containment pocket sump monitor, in combination with a ~~gaseous and~~ particulate radioactivity monitor, provides an acceptable minimum.

Action b:

channel

With ~~either~~ the ~~gaseous or~~ particulate containment atmosphere radioactivity monitoring instrumentation ~~channels~~ inoperable, alternative action is required. Either grab samples of the containment atmosphere must be taken and analyzed or water inventory balances, in accordance with Surveillance 4.4.6.2.1, must be performed to provide alternate periodic information.

With a sample obtained and analyzed or water inventory balance performed every 24 hours, the reactor may be operated for up to 30 days to allow restoration of the containment atmosphere radioactivity monitors.

The 24 hour interval provides periodic information that is adequate to detect leakage. A footnote is added allowing that SR 4.4.6.2.1 is not required to be performed until 12 hours after establishing steady state operation (stable pressure, temperature, power level, pressurizer and makeup tank levels, makeup, letdown, and RCP seal injection and return flows). The 12-hour allowance provides sufficient time to collect and process all necessary data after stable plant conditions are established. The 30 day Completion Time recognizes at least one other form of leakage detection is available.

If the requirements of Action b cannot be met, the plant must be brought to a MODE in which the requirement does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within the following 30 hours. The allowed completion times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

Action c:

With all required monitors inoperable, no automatic means of monitoring leakage are available, and immediate plant shutdown to a MODE in which the requirement does not apply is required. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within the following 30 hours.

SURVEILLANCE REQUIREMENTS

Surveillance 4.4.6.1.a

channel is

monitor

This surveillance requires the performance of a CHANNEL CHECK of the required containment atmosphere radioactivity ~~monitors~~. The check gives reasonable confidence that the ~~monitors are~~ operating properly. The frequency of 12 hours is based on instrument reliability and is reasonable for detecting off normal conditions.

monitor.

This surveillance requires the performance of a CHANNEL CALIBRATION for the required containment atmosphere radioactivity ~~monitors.~~ The calibration verifies the accuracy of the instrument string, including the instruments located inside containment. The frequency of 18 months is a typical refueling cycle and considers channel reliability. Operating experience has proven that this frequency is acceptable.

monitor.

This surveillance requires the performance of a CHANNEL FUNCTIONAL TEST on the required containment atmosphere radioactivity ~~monitors.~~ The test ensures that the ~~monitors~~ can perform ~~their functions~~ in the desired manner. The test verifies the alarm setpoint and relative accuracy of the instrument string. The frequency of 92 days considers instrument reliability, and operating experience has shown that it is proper for detecting degradation.

its function

The surveillance frequencies for these tests are specified in Table 4.3-3.

Surveillance 4.4.6.1.b

This surveillance requires the performance of a CHANNEL CALIBRATION for the required containment pocket sump monitors. The calibration verifies the accuracy of the instrument string, including the instruments located inside containment. The frequency of 18 months is a typical refueling cycle and considers channel reliability. Again, operating experience has proven that this frequency is acceptable.

REFERENCES

1. 10 CFR 50, Appendix A, Section IV, GDC 30.
2. Regulatory Guide 1.45~~.~~ , May 1973
3. FSAR, Sections 5.2.7 "RCBP Leakage Detection Systems" and 12.2.4 "Airborne Radioactivity Monitoring."

REACTOR COOLANT SYSTEM

BASES

3/4.4.6 REACTOR COOLANT SYSTEM LEAKAGE

3/4.4.6.1 LEAKAGE DETECTION INSTRUMENTATION

BACKGROUND

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Bases Insert 1

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REACTOR COOLANT SYSTEM

BASES

Action b:

channel

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SURVEILLANCE REQUIREMENTS

Surveillance 4.4.6.1.a

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Surveillance 4.4.6.1.b

This surveillance requires the performance of a CHANNEL CALIBRATION for the required containment pocket sump monitors. The calibration verifies the accuracy of the instrument string, including the instruments located inside containment. The frequency of 18 months is a typical refueling cycle and considers channel reliability. Again, operating experience has proven that this frequency is acceptable.

REFERENCES

1. 10 CFR 50, Appendix A, Section IV, GDC 30.

2. Regulatory Guide 1.45~~.~~ , May 1973

3. FSAR, Sections 5.2.7 “RCBP Leakage Detection Systems” and 12.2.4 “Airborne Radioactivity Monitoring.”