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

January 15, 2002

TVA-SQN-TS-01-13 10 CFR 50.90

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

Gentlemen:

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

SEQUOYAH NUCLEAR PLANT (SQN) - UNITS 1 AND 2 - TECHNICAL SPECIFICATION (TS) CHANGE NO. 01-13, EXTENSION OF REACTOR COOLANT PUMP (RCP) MOTOR FLYWHEEL INSPECTION

In accordance with the provisions of 10 CFR 50.90, TVA is submitting a request for an amendment to SQN's Licenses DPR-77 and 79 to change the TSs for Units 1 and 2. The proposed change will revise TS Section 4.0.5.c, to provide an exception to the recommendations of Regulatory Position c.4.b of NRC Regulatory Guide (RG) 1.14, Revision 1, "Reactor Coolant Pump Flywheel Integrity," dated August 1975. This change is in accordance with the NRC approved Improved Standard TS Generic Change Traveler TSTF-237, Revision 1, Westinghouse Electrical Corporation Topical Report WCAP-14535A, "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination." In addition, precedence has been established by similar NRC approved license amendments for Braidwood and Byron Units 1 and 2, and Seabrook Station.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the change is exempt from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). The SQN Plant Operations Review Committee and the SQN Nuclear Safety Review

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Board have reviewed this proposed change and determined that operation of SQN Units 1 and 2, in accordance with the proposed change, will not endanger the health and safety of the public. Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter to the Tennessee State Department of Public Health.

Enclosure 1 to this letter provides the description and evaluation of the proposed change. This includes TVA's determination that the proposed change does not involve a significant hazards consideration, and is exempt from environmental review. Enclosure 2 contains copies of the appropriate TS pages from Units 1 and 2 marked-up to show the proposed change. Enclosure 3 forwards the revised TS pages for Units 1 and 2 which incorporate the proposed change.

TVA requests approval of the proposed change prior to the upcoming Unit 2 Cycle 11 refueling outage, that is scheduled to begin April 14, 2002. This would support implementation of the revised RCP flywheel inspection criteria for the Unit 2 Cycle 11 refueling outage, thus resulting in dose, schedule, and cost savings. In addition, TVA requests the revised TS be made effective within 45 days of NRC approval. There are no new regulatory commitments being made by this submittal. This letter is being sent in accordance with NRC Regulatory Issue Summary 2001-05. If you have any questions about this change, please telephone me at (423) 843-7170 or J. D. Smith at (423) 843-6672.

Sincerely,

Pedro Salas
Licensing and Industry Affairs Manager

Subscribed and sworn to before me
on this 15th day of January

Peggy M. Billingsley
Notary Public

My Commission Expires October 9, 2002

Enclosures

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2
DOCKET NOS. 327 AND 328

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE NO. TSC 01-13
DESCRIPTION AND EVALUATION OF THE PROPOSED CHANGE

I. DESCRIPTION OF THE PROPOSED CHANGE

TVA is proposing a change to the TS of Facility Operating License Nos. 50-327 and 50-328 for the SQN Units 1 and 2, respectively, in accordance with 10 CFR 50.90. This change will revise Section 4.0.5.c of the TS, to provide an exception to the recommendations of Regulatory Position c.4.b of NRC Regulatory Guide (RG) 1.14, Revision 1, "Reactor Coolant Pump Flywheel Integrity," dated August 1975. The proposed change would allow for an acceptable in-place inspection method of either a volumetric examination (i.e., ultrasonic [UT] examination) over the volume from the inner bore of the flywheel to the circle of one-half the outer radius, or a surface examination (i.e., magnetic particle [MT] and/or liquid penetrant [PT]) of the exposed surfaces of the removed flywheel to be conducted at approximately 10-year intervals. Specifically, the change would add the following insertion to Units 1 and 2 TS Section 4.0.5.c:

"or in lieu of Position c.4.b(1) and c.4.b(2), a qualified in-place ultrasonic examination over the volume from the inner bore of the flywheel to the circle one-half of the outer radius or a surface examination (magnetic particle and/or liquid penetrant) of exposed surfaces of the removed flywheels may be conducted at approximately 10-year intervals coinciding with the Inservice Inspection schedule as required by ASME Section XI"

This proposed change is in accordance with the NRC approved Improved Standard TS Generic Change Traveler TSTF-237, Revision 1, Westinghouse Electrical Corporation Topical Report WCAP-14535A, "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination."

II. REASON FOR THE PROPOSED CHANGE

Based on the conclusions presented in WCAP-14535A, which are re-stated below, continued inspection of reactor coolant pump (RCP) flywheels are not necessary.

- Flywheels are carefully designed and manufactured from excellent quality steel, which has a high fracture toughness.

- Flywheel overspeed is the critical loading, but leak-before-break has limited the maximum speed to less than 1500 revolutions per minute.

- Flywheel inspections have been performed for 20 years, with no indications of service induced flaws.

- Flywheel integrity evaluations show high flaw tolerance for the flywheel.

- Crack extension over a 60-year service life is negligible.

- Structural reliability studies have shown that eliminating inspections after 10 years of plant life will not significantly change the probability of failure.

- Inspections result in man-rem exposure and the potential for flywheel damage during assembly and reassembly.

Subsequent to the 37 flywheel inspections reported in WCAP-14535A, SQN has performed an additional 20 RCP flywheel inspections with results that show no flaws effecting flywheel integrity. It was noted in WCAP-14535A that the effect on potential flywheel failure from damage through disassembly and reassembly for inspection was not evaluated. However, WCAP-14535A added that this effect could demonstrate that the risk of failure by continuing flywheel inspections is the same as or greater that the risk by eliminating the inspections. In addition to eliminating the risk of potential damage to flywheels during disassemble and reassembly, SQN estimates a savings of personnel irradiation exposure of 60 millirem per inspection not including exposure from related inspection activities such as RCP motor flywheel housing cover removal and installation.

III. SAFETY ANALYSIS

An integral part of the reactor coolant system (RCS) in a pressurized water reactor is the RCP. The RCP ensures an adequate cooling flow rate by circulating large volumes of the primary coolant water at high temperature and pressure through the RCS. Following an assumed loss of power to the RCP motor, the flywheel, in conjunction with the impeller and motor assembly, provides sufficient rotational inertia to assure adequate core cooling flow during RCP coastdown.

During normal power operation, the RCP flywheel possesses sufficient kinetic energy to produce high-energy missiles in the event of failure. Conditions which may result in overspeed of the RCP increase both the potential for failure and the kinetic energy of the flywheel. This led to the issuance of RG 1.14, which was published in 1971 and revised in 1975. The regulatory position of RG 1.14, Revision 1, for each flywheel is as follows.

1. An in-place UT examination of the areas of higher stress concentration at the bore and keyway at approximately three-year intervals, during the refueling or maintenance shutdown coinciding with the inservice inspection schedule as required by American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code (B&PV) Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components."

2. A surface examination of all exposed surfaces and complete UT examination at approximately 10-year intervals, during the plant shutdown coinciding with the inservice inspection schedule as required by Section XI of the ASME B&PV Code.

With 20 years of flywheel inspection reporting no flaw effecting flywheel integrity, licensee's concern over inspection cost and personnel radiation exposure, Westinghouse was commissioned to present the safety case for flywheels and to quantify the effects of complete elimination of such inspections. This commission ultimately resulted in the NRC approval of WCAP-14535, on September 12, 1996. Although complete elimination of flywheel inspections was not granted, the NRC issued the safety evaluation (SE) of the WCAP-14535 with the following provisions:

- Inspections need only be done on a 10-year interval instead of the current 40-month interval.

- Acceptable inspection methods are either UT examination or surface examination.

- UT examination coverage is required only on the inner half of the flywheel radius.

- Surface examination coverage is the exposed surfaces of the flywheel when the pump is disassembled for maintenance.

- Licensees can reference the SE for WCAP-14535A in license applications and detailed technical reviews of the submittals will not be required unless new technical information is presented.

The SE also stated that licensees who planned to submit a plant-specific application of the topical report for flywheels made of SA 533 Grade B material needed to confirm that their flywheels are made of SA 533 Grade B material. Further, licensees having Group 15 flywheels need to demonstrate that material properties of their A516 material is equivalent to SA 533 Grade B material, and its reference temperature, RT_{ndt}, is less than 30 degrees Fahrenheit. All nine flywheels, including the one spare RCP motor at SQN, are identified as Group 4 flywheels in WCAP-14535A and are identified in the SQN Updated Final Safety Analysis Report, Revision 16, Section 5.2.6, "Pump Flywheel," as being made of SA 533 Grade B material. Since these flywheels do not belong to Group 10 or Group 15 flywheels, no additional analyses are required. Therefore, the plant-specific applicability of WCAP-14535A to SQN is confirmed and the 10-year inspection requirement stated above is acceptable.

IV. NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

TVA has concluded that operation of Sequoyah (SQN) Units 1 and 2, in accordance with the proposed change to the technical specifications (TS), does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91(a)(1), of the three standards set forth in 10 CFR 50.92(c).

TS 4.0.5.c requires the inspection of each reactor coolant pump (RCP) flywheel in general conformance with the recommendations of Regulatory Position c.4.b of Regulatory Guide (RG) 1.14, Revision 1, "Reactor Coolant Pump Flywheel Integrity," dated August 1975. Regulatory Positions c.4.b(1) requires an in-place ultrasonic (UT)

examination of the areas of higher stress concentration and the bore and keyway at approximately 3-year intervals and c.4.b(2) requires a surface examination (i.e., magnetic particle [MT] and/or liquid penetrant [PT]) of all exposed surfaces and complete UT examination at approximately 10-year intervals. The proposed change revises TS 4.0.5.c to provide an exception to the recommendations of Regulatory Position c.4.b which would allow either a qualified in-place UT examination over the volume from the inner bore of the flywheel to the circle of one-half the outer radius or a surface examination of exposed surfaces of the removed flywheel to be conducted at approximately 10-year intervals. The proposed change with SQN' s confirmation that its RCP motor flywheels are SA 533 Grade B material, meets and is in accordance with the NRC approved Improved Standard TS Generic Change Traveler TSTF-237, Revision 1.

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

An integral part of the Reactor Coolant System (RCS) in a pressurized water reactor is the RCP. The RCP ensures an adequate cooling flow rate by circulating large volumes of the primary coolant water at high temperature and pressure through the RCS. Following an assumed loss of power to the RCP motor, the flywheel, in conjunction with the impeller and motor assembly, provides sufficient rotational inertia to assure adequate core cooling flow during RCP coastdown.

Westinghouse Electric Corporation Topical Report WCAP-14535A, "Topical Report on Reactor Coolant Pump Flywheel Inspection Elimination," dated November 1996, provides the technical basis for the elimination of inspection requirements for RCP flywheels for all domestic Westinghouse plants. In the Safety Evaluation for WCAP-14535, dated September 1996, the NRC stated that the evaluation methodology described in WCAP-14535 is appropriate and the criteria are in accordance with the design criteria of RG 1.14.

RCP flywheel inspections have been performed for 20 years with no indications of service induced flaws. Flywheel integrity evaluations show a very high flaw tolerance for the RCP flywheels. Crack extension over a 60-year service life is negligible. Structural reliability studies have shown that eliminating inspections after 10 years of plant life will not significantly change the probability of failure.

The proposed change does not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, and configuration of the facility or the manner in which the plant is operated and maintained. The proposed change does not alter or prevent the ability of structures, systems, and components (SSC) from performing their intended function to mitigate the consequences of an initiating event within the acceptance limits assumed in the SQN Updated Final Safety Analysis Report (UFSAR). The proposed changes do not affect the source term, containment isolation, or radiological release assumptions used in evaluating the radiological consequences of an accident previously evaluated in the SQN UFSAR.

Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

The proposed change does not modify the design or function of the RCP flywheels. Based upon the results of WCAP-14535A, no new failure mechanisms will be introduced by the revised RCP Flywheel Inservice Inspection Program. As presented in WCAP-14535A, detailed stress analysis and risk assessments have been performed that indicate that there would be no change in the probability of failure for RCP flywheels if all inspections were eliminated. In addition, the flywheel integrity evaluations show that RCP flywheels exhibit a very high tolerance for the presence of flaws.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

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

There is no significant mechanism for in-service degradation of the flywheels since they are isolated from the primary coolant environment. Additionally, WCAP-14535A analyses have shown there is no significant deformation of the flywheels even at maximum overspeed conditions. Likewise, the results of RCP flywheel inspections performed throughout the

industry and at SQN identified no indications that would affect flywheel integrity.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

V. ENVIRONMENTAL IMPACT CONSIDERATION

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

ENCLOSURE 2

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

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE 01-13
MARKED PAGES

I. AFFECTED PAGE LIST

Unit 1

3/4 0-2

Unit 2

3/4 0-2

II. MARKED PAGES

See attached.

APPLICABILITY

SURVEILLANCE REQUIREMENTS

4.0.1 Surveillance Requirements shall be met during the OPERATIONAL MODES or other conditions specified for individual Limiting Conditions for Operation unless otherwise stated in an individual Surveillance Requirement.

4.0.2 Each Surveillance Requirement shall be performed within the specified surveillance interval with a maximum allowable extension not to exceed 25 percent of the specified surveillance interval.

4.0.3 Failure to perform a Surveillance Requirement within the allowed surveillance interval, defined by Specification 4.0.2, shall constitute noncompliance with the OPERABILITY requirements for a Limiting Condition for Operation. The time limits of the ACTION requirements are applicable at the time it is identified that a Surveillance Requirement has not been performed. The ACTION requirements may be delayed for up to 24 hours to permit the completion of the surveillance when the allowable outage time limits of the ACTION requirements are less than 24 hours. Surveillance Requirements do not have to be performed on inoperable equipment.

4.0.4 Entry into an OPERATIONAL MODE or other specified condition shall not be made unless the Surveillance Requirement(s) associated with the Limiting Condition for Operation have been performed within the specified surveillance interval or as otherwise specified. This provision shall not prevent passage through or to OPERATIONAL MODES as required to comply with ACTION requirements.

4.0.5 Surveillance Requirements for inservice inspection and testing of ASME Code Class 1, 2 and 3 components shall be as follows:

Inservice Inspection Program

This program provides controls for inservice inspection of ASME Code Class 1, 2, and 3 components, including applicable supports. The program shall include the following:

a. Provisions that inservice testing of ASME Code Class 1, 2 and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50.55a;

b. The provisions of SR 4.0.2 are applicable to the frequencies for performing inservice inspection activities;

c. Inspection of each reactor coolant pump flywheel per the recommendation of Regulation Position c.4.b of Regulatory Guide 1.14, Revision 1, August 1975; and

INSERT

d. Nothing in the ASME Boiler and Pressure Vessel Code shall be construed to supersede the requirement of any TS.

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d. Nothing in the ASME Boiler and Pressure Vessel Code shall be construed to supersede the requirement of any TS.

INSERT

or in lieu of Position c.4.b(1) and c.4.b(2), a qualified in-place ultrasonic examination over the volume from the inner bore of the flywheel to the circle one-half of the outer radius or a surface examination (magnetic particle and/or liquid penetrant) of exposed surfaces of the removed flywheels may be conducted at approximately 10-year intervals coinciding with the Inservice Inspection schedule as required by ASME Section XI

ENCLOSURE 3

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

PROPOSED TECHNICAL SPECIFICATION (TS) CHANGE 01-13
REVISED PAGES

I. AFFECTED PAGE LIST

Unit 1

3/4 0-2

Unit 2

3/4 0-2

II. REVISED PAGES

See attached.

APPLICABILITY

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Inservice Inspection Program

This program provides controls for inservice inspection of ASME Code Class 1, 2, and 3 components, including applicable supports. The program shall include the following:

a. Provisions that inservice testing of ASME Code Class 1, 2 and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50.55a;

b. The provisions of SR 4.0.2 are applicable to the frequencies for performing inservice inspection activities;

c. Inspection of each reactor coolant pump flywheel per the recommendation of Regulation Position c.4.b of Regulatory Guide 1.14, Revision 1, August 1975 or in lieu of Position c.4.b(1) and c.4.b(2), a qualified in-place ultrasonic examination over the volume from the inner bore of the flywheel to the circle one-half of the outer radius or a surface examination (magnetic particle and/or liquid penetrant) of exposed surfaces of the removed flywheels may be conducted at approximately 10-year intervals coinciding with the Inservice Inspection schedule as required by ASME Section XI; and

d. Nothing in the ASME Boiler and Pressure Vessel Code shall be construed to supersede the requirement of any TS.

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c. Inspection of each reactor coolant pump flywheel per the recommendation of Regulation Position c.4.b of Regulatory Guide 1.14, Revision 1, August 1975 or in lieu of Position c.4.b(1) and c.4.b(2), a qualified in-place ultrasonic examination over the volume from the inner bore of the flywheel to the circle one-half of the outer radius or a surface examination (magnetic particle and/or liquid penetrant) of exposed surfaces of the removed flywheels may be conducted at approximately 10-year intervals coinciding with the Inservice Inspection schedule as required by ASME Section XI; and

d. Nothing in the ASME Boiler and Pressure Vessel Code shall be construed to supersede the requirement of any TS.