TENNESSEE VALLEY AUTHORITY

TVA Alternative Request to Utilize Mechanical Agitation for the next Sequoyah Nuclear Plant (SQN) and Watts Bar Nuclear Plant (WBN) Inservice Testing (IST) Intervals

January 14, 2026

Agenda

- Introduction
- Background
- Format and Methodology for the Alternative Requests for Mechanical Agitation for the next Sequoyah Nuclear Plant (SQN), Units 1 and 2 and the Watts Bar Nuclear Plant (WBN), Units 1 and 2, inservice testing (IST) intervals
- Path Forward

Introduction

- Tennessee Valley Authority (TVA) is currently developing alternative requests for the next SQN Units 1 and 2 and the WBN Units 1 and 2, IST intervals. TVA is currently in the fourth IST interval for SQN Units 1 and 2, and the third IST interval for WBN Unit 1, and the first IST interval for WBN Unit 2.
- The fourth IST interval for SQN Units 1 and 2, originally scheduled to end on June 30, 2026, was extended to December 15, 2026, as allowed by ISTA-3120(d). Therefore, the fifth IST interval for SQN Units 1 and 2 is required to begin no later than December 16, 2026. The WBN Unit 1 third IST interval, and the WBN Unit 2 first IST interval, are currently scheduled to end on October 18, 2026, for both units, but can be extended to May 27, 2027, as allowed by ISTA-3120(d). Therefore, the fourth IST interval for WBN Unit 1 and the second IST interval for WBN Unit 2 is required to begin no later than May 28, 2027. However, TVA is currently planning to commence the next WBN IST intervals as the same date as SQN.

Introduction

- The Nuclear Regulatory Commission (NRC) previously approved an alternative request (RV-02) for the use of mechanical agitation for the SQN Units 1 and 2 pressure isolation valves (PIVs) for the remainder of the current SQN Units 1 and 2 IST interval.
- TVA plans to request an alternative request for the forthcoming SQN Units 1 and 2 and the WBN Units 1 and 2 IST intervals to allow for mechanical agitation.
- TVA plans to adopt the 2022 Edition of the ASME OM Code for these intervals.
- Purpose of the meeting is to discuss the level of detail needed for these alternative requests.

Background

- NRC initially approved the use of mechanical agitation for SQN Units 1 and 2 on September 29, 2022 (ML22263A375).
- The above NRC safety evaluation also took credit for an NRC audit (ML22263A008) of the TVA technical evaluation (EWR No. 22-DEC-063-050) describing the methodology and process for performing mechanical agitation. (Note: WBN has developed an identical technical evaluation [EWR23CIV063075]).

Background

- On March 6, 2025, TVA submitted a revision to SQN IST alternative request RV-02 (ML25085A280). The specific changes were:
  - Updated the frequency of SQN Units 1 and 2 Surveillance Requirement (SR) 3.4.14.1 regarding PIVs.
  - Revised the Description of the Proposed Alternative to include “For PIVs that have been mechanically agitated and subsequently opened by flow during shutdowns, the required seat leakage tests will be performed, and acceptable results obtained prior to entering Mode 2 or the plant cannot start up. If needed, the mechanical agitation can be re-performed.”
- NRC approved the revision to SQN IST alternative request RV-02 on September 17, 2025 (ML25251A095)
- TVA is also working with ASME OM Code Committee to develop a Code Case for the use of Mechanical Agitation

Mechanical Agitation for the Forthcoming SQN and WBN IST intervals

- As previously noted, TVA plans to request the use of mechanical agitation for the SQN and WBN PIVs for their next IST intervals.
- The methodology, proposed alternative and basis for the alternative for performing mechanical agitation that was approved by NRC for SQN also applies to WBN
- Therefore, TVA plans to submit a single alternative request for both SQN and WBN for the use of mechanical agitation.
- TVA will provide any experience with mechanical agitation and leak rate history for the WBN PIVs similar to what was provided for SQN (ML22179A357)

Mechanical Agitation for the Forthcoming SQN and WBN IST intervals

- In the alternative request, rather than repeating information that was previously reviewed and approved by the NRC, TVA proposes to reference the previous TVA and NRC correspondence, if acceptable to NRC.
- Since NRC approval of the Mechanical Agitation Alternative Request, there have not been any instances at SQN where the alternative request has been employed.
- Examples shown on following pages:

Sequoyah Nuclear Plant (SQN) Unit 1 and 2
Watts Bar Nuclear Plant (WBN), Units 1 and 2
American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM)
SQN and WBN Mechanical Agitation Alternative Request

The following alternative request is similar to Alternative Request RV-02 for the SQN Units 1 and 2 fourth inservice testing (IST) interval, which was approved by NRC in References 1, 2, and 3.

I. ASME OM Code Components Affected

SQN

See TVA letter to NRC, CNL-22-024 dated March 15, 2022 (ML22074A315)

WBN

Site/Unit	Component ID	Component Description	Valve Type	OM Code Class	OM Category
WBN Unit 1 and 2	1/2-CKV-63-543/545/547/549	Safety Injection System (SIS) Hot Leg Secondary Check Valves	2" Y-Pattern Piston Check	1	A/C
WBN Unit 1 and 2	1/2-CKV-63-551/553/555/557	SIS Cold Leg Secondary Check Valves	2" Y-Pattern Piston Check	1	A/C
WBN Unit 1 and 2	1/2-CKV-63-558/559/641/644	SI/Residual Heat Removal (RHR) Hot Leg Primary Check Valves	6" Inclined Vertical Seat Swing Check	1	A/C
WBN Unit 1 and 2	1/2-CKV-63-560/561/562/563	SI Cold Leg Primary Check Valves	10" Vertical Seat Swing Check	1	A/C
WBN Unit 1 and 2	1/2-CKV-63-622/623/624/625	SIS Cold Leg Accumulator (CLA) Secondary Check Valves	10" Vertical Seat Swing Check	1	A/C
WBN Unit 1 and 2	1/2-CKV-63-632/633/634/635	RHR Cold Leg Secondary Check Valves	6" Inclined Vertical Seat Swing Check	1	A/C
WBN Unit 1 and 2	1/2-CKV-63-640/643	RHR Hot Leg Secondary Check Valves	8" Vertical Seat Swing Check	1	A/C

II. ASME Code Edition and Addenda

TVA plans to adopt, in its entirety, the 2022 Edition of the ASME OM Code for the SQN Units 1 and 2 Fifth Inservice Testing (IST) interval, the WBN Unit 1 fourth IST interval, and the WBN Unit 2 second IST interval.

III. Applicable Code Requirements

See TVA letter to NRC, CNL-22-024 dated March 15, 2022 (ML22074A315)

IV. Reason for Request

SQN Units 1 and 2 and WBN Units 1 and 2 each have two separate, but related requirements, for leakage rate testing of PIVs [i.e., Technical Specifications (TS) and Inservice Testing (IST) Program.]

SQN Units 1 and 2 and WBN Units 1 and 2 TS 3.4.14, "RCS Pressure Isolation Valve (PIV) Leakage," has the following requirements.

- TS Limiting Condition for Operation (LCO) 3.4.14 is applicable in "Modes 1, 2, 3, and Mode 4, except valves in the residual heat removal (RHR) flow path when in, or during the transition to or from, the RHR mode of operation."
- Surveillance Requirement (SR) 3.4.14.1 states, "Verify leakage from each RCS PIV is equivalent to ≤ 0.5 gpm per nominal inch of valve size up to a maximum of 5 gpm at an RCS pressure ≥ 2215 psig and ≤ 2255 psig."
- The current frequency of SQN SR 3.4.14.1 is: "In accordance with the Inservice Testing Program." The current frequency of WBN SR 3.4.14.1 is "In accordance with the Surveillance Frequency Control Program AND Prior to entering MODE 2 whenever the unit has been in MODE 5 for 7 days or more, if leakage testing has not been performed in the previous 9 months AND Within 24 hours following valve actuation due to automatic or manual action or flow through the valve." [Note: in Reference 4, TVA submitted a Licensee Amendment Request to adopt Technical Specification Task Force (TSTF) traveler 596 which revises the frequency of the above SRs to be solely in accordance with the Surveillance Frequency Control Program (SFCP).]
- If SR 3.4.14.1 is not satisfied, then TS 3.4.14 Required Action A.2 requires the reactor coolant system (RCS) PIV to be restored within limits within 72 hours, otherwise SQN Units 1 and 2 and WBN Units 1 and 2 TS 3.4.14 Required Actions B.1 and B.2 require the unit to be in Mode 3 in six hours and Mode 5 in 36 hours, respectively.

The proposed alternative request does not affect the above TS and SR.

The SQN Units 1 and 2 and WBN Units 1 and 2 IST Programs implement the ASME OM Code as required by SQN Units 1 and 2 TS 5.5.6 and WBN Units 1 and 2 TS 5.7.2.11, "Inservice Testing Program" and Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(f). As previously noted, the planned Code of Record for SQN Units 1 and 2 and WBN Units 1 and 2, is the 2022 edition of the ASME OM Code, which requires the following.

vessel to perform repair or replacement of the failed PIV. This would have a significant impact on startup and outage duration and require emergent plant maneuvering to achieve the required configuration necessary for repair or replacement along with an increased shutdown safety risk. This evolution would also subject plant personnel to increased dose rates in a heat stress environment for an extended period of time to perform the actual repair or replacement. Work for one of these PIVs would require emergent support activities [e.g., work order (WO) planning and issue, scaffolds, insulation removal, radiological control (RADCON) surveys and coverage, operations tag outs and system alignments, engineering (various) inspections and support, quality control and inservice inspection support.]

Therefore, compliance with Subsections ISTC-3630, ISTC-3630(f), ISTC-5221(a)(1), and ISTC-5224, for the PIVs listed in the Section I of this enclosure, would cause a hardship or unusual difficulty without a compensating increase in the level of quality or safety in order to perform the repair or replacement activity required by ISTC-3630(f).

V. Proposed Alternative

See TVA letter to NRC, CNL-25-033 dated March 26, 2025 (ML25085A280)

VI. Basis for Proposed Alternative

See TVA letter to NRC, CNL-25-033 dated March 26, 2025 (ML25085A280). Specific information for WBN is provided below.

Further justification for the proposed alternative is provided below.

1. Review of Maintenance History of the WBN PIVs

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2. Leak Rate History of the PIVs

(a) The PIV leak test history provided in Section VI, Item 1 of this Alternative Request, refers to the "frequency" of test performances where leakage is detected and is not indicative of the "quantity" of leakage. The most probable cause for the high occurrence of leakage is attributed to testing these valves at low system pressure. Reactor coolant system pressure is used to backseat the primary (inboard) check valves, while cold leg accumulator pressure is used to backseat the secondary (outboard) valves. In the cases with the 6-inch and 10-inch valves, more pressure is needed to adequately backseat these valves. The tests are normally performed during startup from a refueling outage starting in Mode 5 where typical RCS pressure is approximately 350 pounds per square inch (psig), up to Mode 3 when RCS pressure is near normal operating pressure. Performance of these tests at low RCS pressure minimizes personnel hazard and provides a conservative leak rate, which provides early indication of potential problems.

(b) The 8-inch PIVs are 1-CKV-63-640, 1-CKV-63-643, 2-CKV-63-640, and 2-CKV-63-643 for WBN. They are vertical seat swing check valves with a leakage acceptance criterion of four gallons per minute (gpm). As shown in Tables 1, 2, 3 and 4, these valves have been good performers with no failures to date.

Table 1 for WBN Unit 1		
Unit 1 Outage	1-CKV-63-640 leakage (gpm)	1-CKV-63-643 leakage (gpm)

Table 2 for WBN Unit 2		
Unit 2 Outage	2-CKV-63-640 leakage (gpm)	2-CKV-63-643 leakage (gpm)

3. Description of the mechanical agitation to be used, if needed.

   See TVA letter to NRC, CNL-25-033 dated March 26, 2025 (ML25085A280)

   The process for performing mechanical agitation is described in a SQN Engineering Work Request, which was audited by the NRC in Reference 5 and subsequently incorporated into various SQN procedures. A similar engineering work request for WBN has also been developed and will be incorporated into WBN procedures.

4. Design of the PIV check valves

   See TVA letter to NRC, CNL-25-033 dated March 26, 2025

Path Forward

- The proposed SQN and WBN mechanical agitation alternative requests will be included in the TVA IST alternative requests for the upcoming SQN Units 1 and 2 fifth IST intervals, the WBN Unit 1 fourth IST interval, and the WBN Unit 2 second IST interval. TVA plans to adopt the 2022 Edition of the ASME OM Code for these intervals.
- TVA plans to have another presubmittal meeting with NRC to address all of the IST alternative requests for SQN and WBN for their upcoming IST intervals.
- TVA tentatively plans to request the next presubmittal meeting in March 2026.


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