

October 7, 2022

10 CFR 50.55a

RS-22-112

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555-0001Quad Cities Nuclear Power Station, Units 1 and 2  
Renewed Facility Operating License Nos. DPR-29 and DPR-30  
NRC Docket Nos. 50-254 and 50-265Subject: Submittal of RV-04 Relief Request Associated with the Sixth Inservice  
Testing Interval

The purpose of this letter is to request approval of a proposed relief request in accordance with 10 CFR 50.55a, "Codes and standards." The attached relief request is associated with the Sixth 10-Year Inservice Testing (IST) Program Interval for Quad Cities Nuclear Power Station (QCNPS). The Sixth 10-Year Interval begins on February 18, 2023 and is required by 10 CFR 50.55a(f)(4) to comply with the requirements of the American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code (2017 Edition, no Addenda).

The QCNPS IST Sixth 10-year Interval will be in effect from February 18, 2023 to February 17, 2033. Accordingly, Constellation Energy Generation, LLC (CEG) requests approval of the enclosed relief request by February 17, 2023.

Should you have any questions concerning this letter, please contact Ms. Rebecca L. Steinman at 630-657-2831.

Respectfully,

Patrick R. Simpson  
Sr. Manager Licensing  
Constellation Energy Generation, LLCAttachment: Quad Cities Nuclear Power Station Inservice Testing Program Sixth 10-Year  
Interval Proposed RV-04 Relief Requestcc: Regional Administrator – NRC Region III  
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

Alternative to High Pressure Coolant Injection (HPCI) Drain Pot Solenoid Valve Requirements  
Proposed In Accordance with 10 CFR 50.55a(z)(1),  
"Alternate Provides Acceptable Level of Quality and Safety"

1. **ASME Code Components Affected**

<u>Component Number</u>	<u>System</u>	<u>Code Class</u>	<u>Category</u>
1-2301-032-SO	HPCI	2	B
2-2301-032-SO	HPCI	2	B

2. **Applicable Code Edition and Addenda**

ASME OM Code, *Operation and Maintenance of Nuclear Power Plants*, 2017 Edition, no Addenda

3. **Applicable Code Requirement**

ISTC-3300, *Reference Values*, states, in part, "Reference values shall be determined from the results of preservice testing or from the results of inservice testing."

ISTC-3310, *Effects of Valve Repair, Replacement, or Maintenance on Reference Values*, states, in part, "When a valve or its control system has been replaced, repaired, or has undergone maintenance that could affect the valve's performance, a new reference value shall be determined or the previous value reconfirmed ... "

ISTC-3500, *Valve Testing Requirements*, states, "Active and passive valves in the categories defined in ISTC-1300 shall be tested in accordance with the paragraphs specified in Table ISTC-3500-1 and the applicable requirements of ISTC-5100 and ISTC-5200."

ISTC-3560, *Fail-Safe Valves*, states, in part, "Valves with fail-safe actuators shall be tested by observing the operation of the actuator upon loss of valve actuating power in accordance with the exercising frequency of ISTC-3510."

ISTC-5151, *Valve Stroke Testing*, states, in part:

- "(a) Active valves shall have their stroke times measured when exercised in accordance with ISTC-3500.
- (b) The limiting value(s) of full-stroke time of each valve shall be specified by the Owner.
- (c) Stroke time shall be measured to at least the nearest second."

ISTC-5152, *Stroke Test Acceptance Criteria*, states, in part, "Test results shall be compared to reference values established in accordance with para. ISTC-3300, ISTC-3310, or ISTC-3320."

ISTC-5153, *Stroke Test Corrective Action*, subparagraph (b) states, "Valves with measured stroke times that do not meet the acceptance criteria of para. ISTC-5152 shall be immediately retested or declared inoperable. If the valve is retested and the second set of data also does not meet the acceptance criteria, the data shall be analyzed within 96 hour to verify that the new stroke time represents acceptable valve operation, or the valve shall be declared inoperable. If the second set of data meets the acceptance criteria, the cause of the initial deviation shall be analyzed and the results documented in the record of tests."

**4. Reason for Request**

Pursuant to 10 CFR 50.55a, *Codes and standards*, paragraph (z)(1), an alternative is proposed to the requirement of ASME OM Code subsection ISTC-5150 (specifically subsections ISTC-5151, 5152, and 5153) for the subject valves. The basis of the request is that the proposed alternative would provide an acceptable level of quality and safety.

These solenoid valves 1(2)-2301-032-SO function as a backup to the exhaust line drain pot steam trap. During normal operation of the HPCI turbine using high quality steam, the drain path from the drain pot to the torus via the steam trap is adequate to remove condensate from the turbine exhaust line. However, during HPCI turbine operation with low pressure and low quality steam (e.g., during certain HPCI surveillance tests), condensate collects in the drain pot faster than it can be drained through the trap. Under these conditions, solenoid valves 1(2)-2301-032-SO open automatically to drain to the gland seal condenser upon receipt of a signal from a drain pot high level switch when the drain pot level reaches the high level alarm set point. The high level condition alarms a control room annunciator.

These valves are equipped with hand switches to enable remote manual operation from the control room; however, they are not equipped with position indicators and the valves are totally enclosed, so valve position cannot be verified by direct observation. Due to the absence of a visible valve stem and light indication, "switch to light" stroke-timing cannot be performed.

Valve actuation may be indirectly verified by removing the HPCI system from service, filling the drain pot with water until the high-level alarm is received, and observing that the high-level alarm clears. The time for the alarm to clear would depend primarily on variables such as the rate of filling and the level of the drain pot when the filling is secured. The steam line drain pot is not equipped with direct level indication; therefore, the time required for the alarm to clear may vary significantly and stroke timing of valve 1(2)-2301-032-SO cannot be verified by operation of the hand switch.

Compliance with the quarterly stroke timing and fail-safe requirements of the ASME OM Code would require either system modification to replace these valves with ones of a testable design, or to purchase non-intrusive test equipment and develop new test methods and procedures.

In order to perform stroke timing of these valves, a design change would have to be implemented. The modification would include: (1) changing the valve design to include position limit switches, (2) routing light indication cabling from the plant through containment boundaries to the control room, and (3) installing position indication lights in the main control room panels. It is estimated that this modification would cost in excess of \$300,000 per unit. This remote valve indication would be installed solely for meeting the ASME OM Code requirements and would serve no other operational purpose.

**5. Proposed Alternative and Basis for Use**

A functional verification test will be conducted on the drain pot level limit switches and the associated control room annunciators at least once every 2 years. Valve actuation will be indirectly verified by removing the HPCI system from service, filling the drain pot with water until the high-level alarm is received, and observing a positive draining of the HPCI drain pot as indicated by a level increase in gland seal condenser and the high-level alarm clearing.

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The following provisions of ISTC-5153, *Stroke Test Corrective Action* still apply:

- If a valve fails to exhibit the required change of obturator position, the valve shall be immediately declared inoperable.
- Valves declared inoperable may be repaired, replaced, or the data may be analyzed to determine the cause of the deviation and the valve shown to be operating acceptably.
- Valve operability based upon analysis shall have the results of the analysis recorded in the record of tests (see ISTC-9120).
- Before returning a repaired or replacement valve to service, a test demonstrating satisfactory operation shall be performed.

#### Basis for Use

These solenoid valves function as a backup to the exhaust line drain pot steam trap. As discussed above, failure of these valves to perform their safety function would be indicated by a drain pot high level alarm. Additionally, condensate entrapped in the steam would cause significant fluctuations in exhaust steam header pressure. These two conditions provide two indications that the solenoid valve did not perform as expected in order to prompt investigation and potential corrective actions.

A biennial exercise of the 1(2)-2301-032-SO valves is currently performed, and its associated level switches operate as proven by the receipt of the "HPCI TURBINE EXH DRAIN POT HIGH LEVEL" alarm (i.e., water level increase) and reset (i.e., water level decrease due to the open exercise of valves 1(2)-2301-032-SO). During this same evolution, the valve solenoid is also verified as actuated (i.e., valve solenoid is magnetized) by use of a test probe. This testing approach provides adequate assurance that the valves function as required and satisfies the exercising and fail-safe test requirements of ISTC-3510 and ISTC-3560.

A review of the corrective action program and work and the Inservice Testing (IST) history of these valves did not identify any cases of these valves failing to stroke-open since they were added to the IST program scope in November 1994.

The station has a preventive maintenance activity to replace these valves once every sixth refueling outage (i.e., approximately every 12 years). This activity was last performed on March 23, 2021, on Unit 1, and on April 9, 2020, on Unit 2, and no defects were noted.

Using the provisions of this request (i.e., biennial exercising and functional testing combined with the enhanced maintenance activities) as an alternative to the specific requirements of ISTC-5150 identified above will provide adequate indication of valve performance and continue to provide an acceptable level of quality and safety. Therefore, pursuant to 10 CFR 50.55a(z)(1) QCNPS requests approval of the alternative to the specific ISTC requirements identified in this request.

#### **6. Duration of Proposed Alternative**

The proposed alternative will be utilized for the entire Sixth 120-month IST Program Interval, which is scheduled to begin on February 18, 2023, and end on February 17, 2033.

7. **Precedent**

Letter from J. Wiebe (U.S. Nuclear Regulatory Commission) to M. J. Pacilio (Exelon Nuclear), "Quad Cities Nuclear Power Station, Units 1 and 2 – Safety Evaluation in Support of Request for Relief Associated with the Fifth 10 Year Interval Inservice Testing Program (TAC Nos. ME7981, ME7982, ME7983, ME7984, ME7985, ME7986, ME7987, ME7988, ME7990, ME7991, ME7992, ME7993, ME7994, and ME7995)," dated February 14, 2013 (ADAMS Accession No. ML13042A348)