



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

September 28, 2023

Mr. David P. Rhoades  
Senior Vice President  
Constellation Energy Generation, LLC  
President and Chief Nuclear Officer  
Constellation Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 – PROPOSED  
ALTERNATIVE REQUEST RV-23H ASSOCIATED WITH THE SIXTH 10-YEAR  
INSERVICE TESTING INTERVAL (EPID L-2022-LLR-0077)

Dear Mr. Rhoades:

By letter dated November 1, 2022 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML22305A578), as supplemented by letter dated March 14, 2023 (ML23073A061), Constellation Energy Generation, LLC (the licensee) submitted alternative request RV-23H to the U.S. Nuclear Regulatory Commission (NRC). The request proposed an alternative to certain inservice testing (IST) requirements of American Society of Mechanical Engineers (ASME) Operation and Maintenance (OM) Code for use during the sixth 10-year interval of the inservice testing (IST) program at Dresden Nuclear Power Station (DNPS), Units 2 and 3.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), 50.55a(z)(1), the licensee requested to implement proposed alternative request RV-23H, for the high-pressure coolant injection (HPCI) drain pot solenoid valves at DNPS, Units 2 and 3, as an alternative to the test requirements in the ASME OM Code on the basis that the proposed alternative will provide an acceptable level of quality and safety.

The NRC staff has reviewed the subject alternative request and concluded, as set forth in the enclosed safety evaluation, that the proposed alternative request RV-23H, as supplemented, for indirect functional testing for the HPCI drain pot solenoid valves and for an extension of interval between the functional tests to every refueling outage, or once every two years, will provide reasonable assurance of the operational readiness of these valves to perform their safety function. Accordingly, the NRC staff concludes that the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1) and authorizes the use of alternative request RV-23H, as supplemented, for the sixth 10-year IST interval program at DNPS, Units 2 and 3, which will begin on November 1, 2023, and is scheduled to end on October 31, 2033.

All other ASME OM Code requirements as incorporated by reference in 10 CFR 50.55a for which an alternative was not specifically requested and approved remain applicable.

D. Rhoades

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If you have any questions on this action, please contact the NRC Project Manager Surinder Arora at 301-415-1421 or via e-mail at [Surinder.Arora@nrc.gov](mailto:Surinder.Arora@nrc.gov).

Sincerely,

Jeffrey A. Whited, Chief  
Plant Licensing Branch III  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket Nos. 50-237 and 50-249

Enclosure:  
Safety Evaluation

cc: Listserv



UNITED STATES  
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ALTERNATIVE REQUEST RV-23H

RELATED TO SIXTH 10-YEAR INSERVICE TESTING INTERVAL PROGRAM

CONSTELLATION ENERGY GENERATION, LLC

DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3

DOCKET NOS. 50-237 AND 50-249

EPID NO. L-2022-LLR-0077

1.0 INTRODUCTION

By a letter dated November 1, 2022 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML22305A578), as supplemented by the letter dated March 14, 2023 (ML23073A061), Constellation Energy Generation LLC (CEG, the licensee) submitted alternative request RV-23H to the U.S. Nuclear Regulatory Commission (NRC) for the use of an alternative to specific inservice testing (IST) requirements of the 2017 Edition of the American Society of Mechanical Engineers (ASME) Operation and Maintenance of Nuclear Power Plants, Division 1, OM Code: Section IST (OM Code) during the sixth 10-year IST interval program at Dresden Nuclear Power Station (DNPS), Units 2 and 3.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.55a(z)(1), the licensee requested to implement the proposed alternative request RV-23H to conduct a functional verification test on the drain pot level limit switches and the associated control room annunciators for the high-pressure coolant injection (HPCI) drain pot solenoid valves at DNPS, Units 2 and 3, at least once every 2 years, as an alternative to the test requirements in the ASME OM Code on the basis that the proposed alternative will provide an acceptable level of quality and safety.

The DNPS, Units 2 and 3, sixth 10-year IST interval program will start on November 1, 2023, and is scheduled to end on October 31, 2033.

2.0 REGULATORY EVALUATION

The NRC regulations in 10 CFR 50.55a(f)(4), "Inservice testing standards requirement for operating units," state, in part, that throughout the service life of a boiling- or pressurized-water-cooled nuclear power facility, pumps and valves that are within the scope of the ASME OM Code must meet the IST requirements (except design and access provisions) set forth in the ASME OM Code and addenda that become effective subsequent to editions and addenda specified in 10 CFR 50.55a(f)(2) and (3) and that are incorporated by reference in 10 CFR 50.55a(a)(1)(iv), to the extent practical within the limitations of design, geometry, and materials of construction of the components.

The NRC regulations in 10 CFR 50.55a(z), "Alternatives to codes and standards requirements," state that alternatives to the requirements of paragraphs (b) through (h) of this section, or portions thereof, may be used when authorized by the Director, Office of Nuclear Reactor Regulation. A proposed alternative must be submitted and authorized prior to implementation. The applicant or licensee must demonstrate that:

(1) Acceptable level of quality and safety. The proposed alternative would provide an acceptable level of quality and safety; or

(2) Hardship without a compensating increase in quality and safety. Compliance with the specified requirements of this section would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

### 3.0 TECHNICAL EVALUATION

The information provided by the licensee in support of the request for an alternative to IST requirements in the ASME OM Code, as incorporated by reference in 10 CFR 50.55a, has been evaluated and the bases for disposition are documented in this safety evaluation (SE).

#### 3.1 Licensee's Alternative Request RV-23H

##### Applicable Code Edition

The ASME OM Code of Record for the sixth 10-year IST interval program at DNPS, Units 2 and 3, is the 2017 Edition of ASME OM Code as incorporated by reference in 10 CFR 50.55a.

##### ASME Code Components Affected

In its submittal, the licensee proposed alternative testing for the following solenoid valves:

<u>Component Number</u>	<u>System</u>	<u>Code Class</u>	<u>OM Category</u>
2-2301-32	HPCI	2	B
3-2301-32	HPCI	2	B

##### Applicable ASME OM Code Requirements

The IST requirements in the ASME OM Code, subsection ISTC, "Inservice Testing of Valves in Light-Water Reactor Nuclear Power Plants," as incorporated by reference in 10 CFR 50.55a, related to alternative request RV-23H, are as follows:

Paragraph 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.

Paragraph ISTC-3310, Effects of Valve Repair, Replacement, or Maintenance or 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.

Paragraph ISTC-3500, "Valve Testing Requirements," states:

Active and passive valves in the categories defined in paragraph ISTC-1300 shall be tested in accordance with the paragraphs specified in Table ISTC-3500-1 and the applicable requirements of paragraphs ISTC-5100 and ISTC-5200.

Paragraph 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 paragraph ISTC-3510.

Paragraph ISTC-5151, "Valve Stroke Testing," states in part:

- (a) Active valves shall have their stroke times measured when exercised in accordance with paragraph 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.

Paragraph ISTC-5152, "Stroke Test Acceptance Criteria," states, in part:

Test results shall be compared to reference values established in accordance with paragraph ISTC-3300, ISTC-3310, or ISTC-3320.

Paragraph ISTC-5153, "Stroke Test Corrective Action," subparagraph (b) states:

Valves with measured stroke times that do not meet the acceptance criteria of paragraph 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 hr [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 (see paragraph ISTC-9210).

#### Proposed Alternative and Basis for Use

In alternative request RV-23H, the licensee proposes to conduct a functional verification test on the drain pot level limit switches and the associated control room annunciators for the HPCI drain pot solenoid valves at DNPS, Units 2 and 3, at least once every 2 years. The licensee states that 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.

The licensee states that the following provisions of ASME OM Code, subsection ISTC, paragraph ISTC-5153, continue to 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.

The licensee indicates that maintenance activities have been instituted to compensate for testing deficiencies. The licensee states that the valves are currently scheduled for replacement every third cycle (6 years) in addition to the above testing.

The NRC staff summarizes the licensee's basis for its alternative as follows:

The licensee states that failure of these valves to perform their safety function would be indicated by a drain pot high level alarm during operation with low pressure steam. Additionally, condensate entrapped in the steam would cause significant fluctuations in exhaust steam header pressure. The licensee asserts that these two conditions will provide indications that the solenoid valve did not perform as expected in order to prompt investigation and potential corrective actions. The licensee specifies that functional tests are conducted on the drain pot level alarm switches at least once each cycle to verify their operability.

The licensee indicates that these valves will be exercised biennially using the hand switch. The valves will also be functionally tested biennially. During the test, valve 2(3)-2301-32 actuation will be verified by the receipt of the "HPCI turbine exh[aust] drain pot high level" alarm (i.e., water level increase) and reset (i.e., water level decrease due to the open exercise of valves 2(3)-2301-32). During this test, the valve solenoid will also be verified to actuate (i.e., valve solenoid is magnetized) by use of a test probe. The licensee asserts that this testing approach will provide reasonable assurance that the valves are functioning as required.

Because exercising these valves without stroke timing provides no measure of valve degradation, the licensee has instituted maintenance activities to compensate for testing deficiencies. Following its discussions with the manufacturer regarding valve design and application, the licensee decided to replace these valves every third operating cycle.

The licensee reports that a review of the corrective action program, work history, and the IST history of these valves did not identify any instances of these valves failing to stroke open over the past 20 years. The licensee stated that DNPS currently has a preventive maintenance activity to replace these valves once every 6 years. The licensee indicates that this activity was last performed on March 3, 2020, on DNPS, Unit 2, and March 23, 2015, on DNPS, Unit 3, with no defects noted.

The licensee asserts that using the provisions of its request as an alternative to the specific requirements of ASME OM Code, subsection ISTC, paragraph ISTC-5150, will provide adequate indication of valve performance and continue to provide an acceptable level of

quality and safety. Therefore, the licensee requests approval of the alternative to the specific ASME OM Code IST requirements identified in this request pursuant to 10 CFR 50.55a(z)(1).

### Reason for Request

The NRC staff summarizes the reason for the request specified by the licensee as follows:

The licensee stated that the basis of the request is that the proposed alternative would provide an acceptable level of quality and safety.

The licensee specified that the valves within the scope of the request 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 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, condensate collects in the drain pot faster than it can be drained through the trap. Under these conditions, the licensee stated that valve 2301-32 opens automatically to drain the gland seal condenser upon receipt of a signal from a drain pot level switch when the drain pot level reaches the high-level alarm setpoint. The licensee noted that a high-level condition sounds an alarm in the control room.

The licensee stated that these valves are not equipped with position indicators. Therefore, the 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.

The licensee considers the 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 steam line drain pot is not equipped with direct level indication. Thus, the time required for the alarm to clear might vary significantly and stroke timing of the valves 2(3)-2301-32 cannot be verified by operation of the hand switch.

The licensee stated that 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. The licensee also indicated the modifications would be costly for installing a remote valve indication for meeting the ASME OM Code requirement as supplemented by 10 CFR 50.55a(b)(3)(xi).

### 3.2 NRC Staff Evaluation

In alternative request RV-23H, the licensee requests to conduct a functional verification test on the drain pot level limit switches and the associated control room annunciators for the HPCI drain pot solenoid valves at DNPS, Units 2 and 3, at least once every 2 years as an alternative to the requirements in ASME OM Code, subsection ISTC, paragraph ISTC-5150, including paragraphs ISTC-5151, ISTC-5152, and ISTC-5153. In alternative request RV-23H, the licensee specifies that the functional testing for valve actuation will include 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. The licensee's basis for this request is that the proposed alternative would provide an acceptable level of quality and safety for the testing of

the HPCI drain pot solenoid valves in accordance with 10 CFR 50.55a(z)(1) for the sixth 10-year IST interval program at DNPS, Units 2 and 3.

In alternative request RV-23H, the licensee proposes that 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.” In the “Proposed Alternative and Basis for Use” section, the licensee states, in part:

Using the provisions of this request (i.e., quarterly exercising and semi-annual 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.

In reviewing alternative request RV-23H, the NRC staff provided a request for additional information (RAI) (ML23052A065) to the licensee regarding the basis for the functional verification test schedule in alternative request RV-23H for the sixth 10-year IST interval program in comparison to the statement, “provisions of this request (i.e., quarterly exercising and semi-annual functional testing combined with the enhanced maintenance activities) as an alternative to the specific requirements of ISTC-5150.”

In its letter dated March 14, 2023, the licensee responded in part as follows:

Dresden Nuclear Power Station (DNPS) relief RV-23H for alternative testing of high pressure coolant injection (HPCI) system valves 2-2301-32 and 3-2301-32 was authorized for the 5th Inservice Testing (IST) Program interval in ML13297A515 based on the alternative functional verification testing occurring semi-annually (i.e., every six months). The original 6th IST interval Request RV-23H referenced the 5th IST interval RV-23H authorization as a precedent; however, the proposed frequency in the 6th IST interval request is not the same as the fifth interval (i.e., every refueling outage, or once every two (2) year functional test for the 6th interval versus semi-annually for the 5th interval). The cited reference to semi-annual functional testing in EMIB-RAI-1 was erroneously included in Constellation Energy Generation, LLC’s (CEG’s) November 1, 2022, request. The testing for 2(3)-2301-32 for which IST Program credit is proposed for the DNPS, Units 2 and 3, 6th IST interval is a quarterly exercise and a two-year, or biennial functional test.

In its March 14, 2023, letter, the licensee clarified its current request by stating that alternative request RV-23H for the fifth 10-year IST interval program is not a precedent for the alternative request RV-23H for the sixth 10-year IST interval program at DNPS, Units 2 and 3. In alternative request RV-23H (as supplemented) for the sixth 10-year IST interval program at DNPS, Units 2 and 3, the licensee provided a revised justification that the proposed alternative would provide an acceptable level of quality and safety for the testing of the HPCI drain pot solenoid valves. In particular, the licensee reported that its review of the corrective action program, work history, and IST history of the HPCI drain pot solenoid valves did not identify any instances where these valves failed to stroke open since their initial addition to the IST program scope at DNPS, Units 2 and 3, in 1994. Also in its request, the licensee indicates that the testing of the subject valves while online exposes personnel to an industrial safety hazard because the test requires connecting to and draining the drain pot level switch volume which might contain hot, pressurized, steam.

The NRC staff reviewed the alternative functional testing of the HPCI drain pot solenoid valves described in alternative request RV-23H (as supplemented). As specified in this request, the



functional testing for valve actuation will include 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. The NRC staff finds that this indirect functional testing of the HPCI drain pot solenoid valves provides reasonable assurance of the operational readiness of these valves to perform their safety functions.

Based on its review, the NRC staff finds that the licensee has justified that the provisions of alternative request RV-23H (as supplemented) for performing indirect functional testing of the HPCI drain pot solenoid valves and extending the interval for performance of the functional tests to every refueling outage, or once every 2 years, will provide reasonable assurance of the operational readiness of the HPCI drain pot solenoid valves within the scope of the request. Therefore, the staff finds that alternative request RV-23H for the HPCI drain pot solenoid valves provides an acceptable level of quality and safety for testing the subject valves pursuant to 10 CFR 50.55a(z)(1) for implementation during the sixth 10-year IST interval program at DNPS, Units 2 and 3.

#### 4.0 CONCLUSION

As described in this SE, the NRC staff concludes that the licensee has justified that the approach proposed in alternative request RV-23H, as supplemented, for indirect functional testing of the HPCI drain pot solenoid valves and for an extension of the interval between functional tests to every refueling outage, or once every 2 years, will provide reasonable assurance of the operational readiness of the subject valves to perform their safety functions. Accordingly, the licensee has adequately addressed the regulatory requirements set forth in 10 CFR 50.55a(z)(1) for an acceptable level of quality and safety with respect to alternative request RV-23H. Therefore, the NRC staff authorizes the supplemented alternative request, RV-23H, for the sixth 10-year IST interval program at DNPS, Units 2 and 3, which is scheduled to start on November 1, 2023, and end on October 31, 2033.

All other ASME OM Code requirements as incorporated by reference in 10 CFR 50.55a for which relief or an alternative was not specifically requested, and granted or authorized (as appropriate), in the subject request remain applicable.

Principal Contributors:           Tristan Villarreal, NRR/DEX/EMIB  
  Thomas Scarbrough, NRR/DEX/EMIB

Dated: September 28, 2023

SUBJECT: DRESDEN NUCLEAR POWER STATION, UNITS 2 AND 3 – PROPOSED ALTERNATIVE REQUEST RV-23H ASSOCIATED WITH THE SIXTH 10-YEAR INSERVICE TESTING INTERVAL (EPID L-2022-LLR-0077) DATED SEPTEMBER 28, 2023

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