



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

August 3, 2022

Ms. Nicole L. Flippin  
H. B. Robinson Steam Electric Plant  
Site Vice President  
Duke Energy Progress, LLC  
3581 West Entrance Road, RNPA11  
Hartsville, SC 29550

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 - ISSUANCE OF  
AMENDMENT NO. 271 REGARDING CORRECTION TO NON-  
CONSERVATIVE TECHNICAL SPECIFICATIONS FIGURE 3.4.3-2,  
PRESSURE/TEMPERATURE LIMIT COOLDOWN CURVES  
(EPID L-2021-LLA-0223)

Dear Ms. Flippin:

The U.S. Nuclear Regulatory Commission (the Commission) has issued the enclosed Amendment No. 271 to Renewed Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant, Unit No. 2 (Robinson). This amendment changes the Robinson Technical Specifications (TS) in response to your application dated December 9, 2021. The amendment modifies TS 3.4.3, "RCS [Reactor Coolant System] Pressure and Temperature (P/T) Limits." Specifically, a portion of TS Figure 3.4.3-2, P/T limit cooldown curves, is being corrected because it does not reflect the data approved in Amendment No. 248.

A copy of our related Safety Evaluation is enclosed. Notice of Issuance will be included in the Commission's monthly *Federal Register* notice.

Sincerely,

/RA/

Luke Haeg, Project Manager  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-261

Enclosures:

1. Amendment No. 271 to DPR-23
2. Safety Evaluation

cc w/encls: Listserv



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

DUKE ENERGY PROGRESS, LLC

DOCKET NO. 50-261

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 271  
Renewed License No. DPR-23

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by Duke Energy Progress, LLC (the licensee), dated December 9, 2021, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;
  - B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;
  - C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;
  - D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and
  - E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications, as indicated in the attachment to this license amendment; and paragraph 3.B. of Renewed Facility Operating License No. DPR-23 is hereby amended to read as follows:

B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 271 are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance and shall be implemented within 120 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

David J. Wrona, Chief  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment:  
Changes to the Renewed Facility  
Operating License and  
Technical Specifications

Date of Issuance: August 3, 2022

ATTACHMENT TO LICENSE AMENDMENT NO. 271

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

RENEWED FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

Replace the following page of the Renewed Facility Operating License No. DPR-23 with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

Renewed Facility Operating License No. DPR-23

Remove

Insert

Page 3

Page 3

Replace the following page of the Appendix A, Technical Specifications with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

Remove

Insert

3.4-8

3.4-8

- D. Pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess, and use in amounts as required any byproduct, source, or special nuclear material without restriction to chemical or physical form for sample analysis or instrument and equipment calibration or associated with radioactive apparatus or components;
  - E. Pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not separate, such byproduct and special nuclear materials as may be produced by operation of the facility.
3. This renewed license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations: 10 CFR Part 20, Section 30.34 of 10 CFR Part 30, Section 40.41 of 10 CFR Part 40, Section 50.54 and 50.59 of 10 CFR Part 50, and Section 70.32 of 10 CFR Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:
- A. Maximum Power Level

The licensee is authorized to operate the facility at a steady state reactor core power level not in excess of 2339 megawatts thermal.
  - B. Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 271 are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

    - (1) For Surveillance Requirements (SRs) that are new in Amendment 176 to Final Operating License DPR-23, the first performance is due at the end of the first surveillance interval that begins at implementation of Amendment 176. For SRs that existed prior to Amendment 176, including SRs with modified acceptance criteria and SRs whose frequency of performance is being extended, the first performance is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment 176.

MATERIALS PROPERTIES BASE  
Controlling Material: Upper Shell Plate W10201-1 & Girth Weld 10-273  
Limiting ART Values at 50 EFPY: 1/4T, 172°F & 283°F  
3/4T, 153°F & 191°F

Curves applicable for cooldown rates up to 100° F/Hr for the service period up to 46.3 EFPY.  
Curves include +20°F and -80 PSIG Allowance for Instrumentation error.

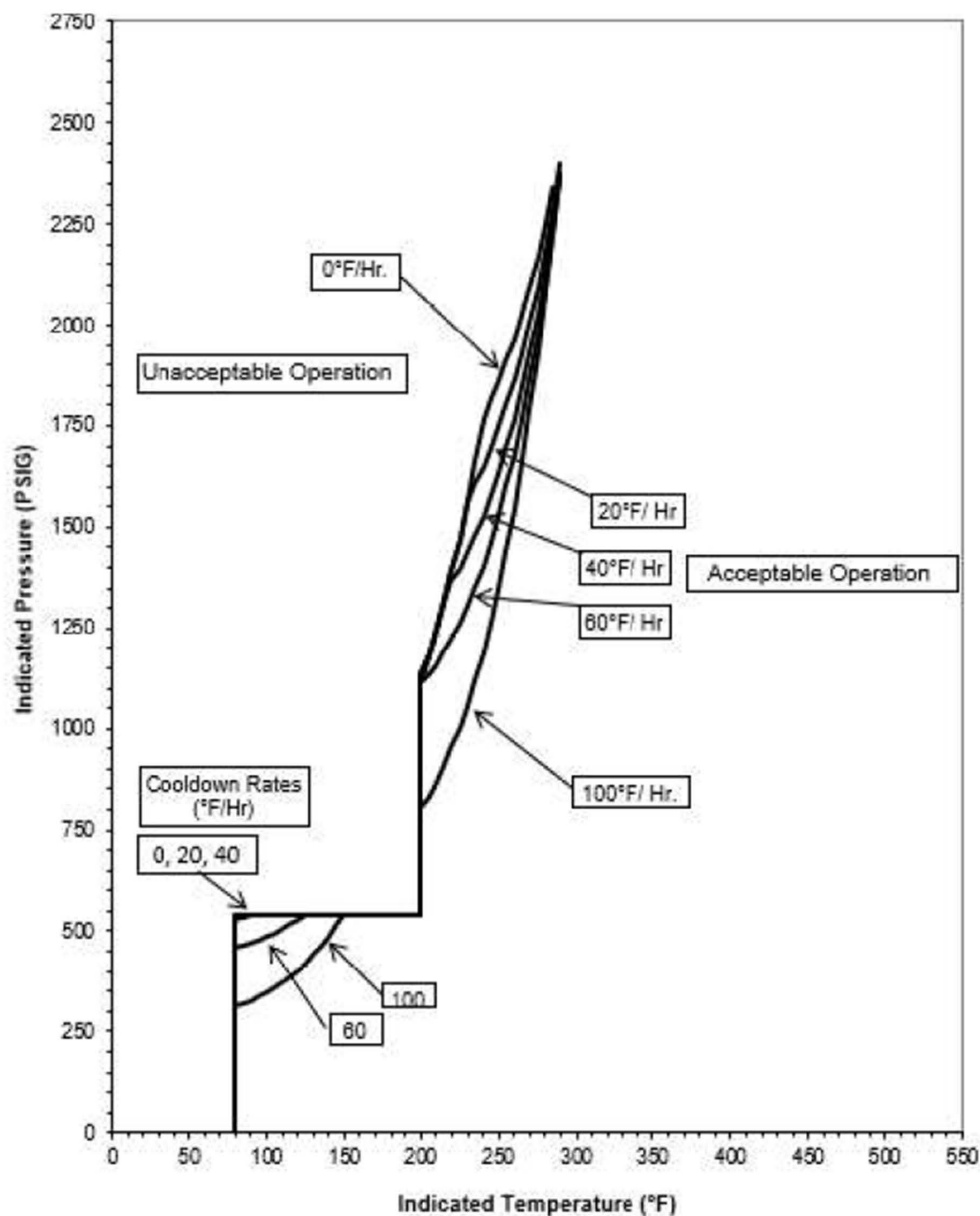


Figure 3.4.3-2  
Reactor Coolant System Cooldown Limitations  
Applicable Up to 46.3 EFPY



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 271

TO RENEWED FACILITY OPERATING LICENSE NO. DPR-23

DUKE ENERGY PROGRESS, LLC

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2

DOCKET NO. 50-261

1.0 INTRODUCTION

By letter dated December 9, 2021,<sup>1</sup> Duke Energy Progress, LLC (licensee) submitted a license amendment request (LAR) for changes to the H. B. Robinson Steam Electric Plant, Unit No. 2 (Robinson), Technical Specifications (TSs). The proposed change would correct a non-conservative TS related to TS 3.4.3, "RCS [Reactor Coolant System] Pressure and Temperature (P/T) Limits." Specifically, a portion of TS Figure 3.4.3-2, "Pressure/Temperature Limit Cooldown Curves," is being corrected because it does not reflect the data approved in Amendment No. 248, dated November 22, 2016.<sup>2</sup> The licensee stated that Table 28 of Westinghouse Commercial Atomic Power (WCAP) report, WCAP-15827, "H. B. Robinson Unit 2 Heatup and Cooldown Limit Curves for Normal Operation," Revision 0, included in Amendment No. 260, dated August 16, 2018,<sup>3</sup> provides the technical basis for the proposed change to TS Figure 3.4.3-2.

2.0 REGULATORY EVALUATION

The regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50 establish requirements to protect the reactor coolant pressure boundary in nuclear power plants. The NRC staff evaluated the acceptability of a facility's proposed P/T limits based on the following NRC regulations and guidance.

In 10 CFR 50.36, "Technical specifications," the NRC establishes the regulatory requirements related to the content of TSs. Pursuant to 10 CFR 50.36, TSs are required to include items in the following categories related to station operation: (1) safety limits, limiting safety system settings, and limiting control settings; (2) limiting conditions for operation; (3) surveillance requirements; (4) design features; and (5) administrative controls.

Section 50.60 of 10 CFR, "Acceptance criteria for fracture prevention measures for lightwater nuclear power reactors for normal operation," imposes fracture toughness and material

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<sup>1</sup> Agencywide Documents and Access Management System Accession No. ML21343A087

<sup>2</sup> ML16285A404

<sup>3</sup> ML18200A042

surveillance program requirements, which are set forth in 10 CFR Part 50, Appendix G, "Fracture Toughness Requirements," and Appendix H, "Reactor Vessel Material Surveillance Program Requirements."

Appendix G to 10 CFR Part 50 requires, in part, that facility P/T limits for the Reactor Pressure Vessel (RPV) be at least as conservative as those obtained by applying the linear elastic fracture mechanics methodology of Appendix G, "Fracture Toughness Criteria for Protection Against Failure," to Section XI of the American Society for Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code).

Appendix G to 10 CFR Part 50, paragraph IV.A, states, in part: "For the reactor vessel beltline materials, including welds, plates and forgings, the values of  $RT_{NDT}$  [Reference Temperature Nil Ductility] and Charpy upper-shelf energy must account for the effects of neutron radiation, including the results of the surveillance program of Appendix H of this part." The effects of neutron radiation are determined, in part, by estimating the neutron fluence on the RPV.

Appendix H to 10 CFR Part 50 establishes requirements for each facility related to monitoring of effects of neutron radiation on RPV material through a surveillance capsule program.

Regulatory Guide (RG) 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," dated March 2001,<sup>4</sup> describes methods and assumptions acceptable to the NRC staff for determining the RPV neutron fluence.

RG 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," dated May 1988,<sup>5</sup> contains guidance on methodologies the NRC staff considers acceptable for determining the shift in RPV material transition temperature due to neutron radiation.

Regulatory Issue Summary (RIS) 2014-11, "Information on Licensing Applications for Fracture Toughness Requirements for Ferritic Reactor Coolant Pressure Boundary Components," dated October 14, 2014,<sup>6</sup> clarifies that P/T limit calculations for ferritic RPV materials other than those materials with the highest reference temperature may result in more limiting P/T curves because of higher stresses due to structural discontinuities, such as those in RPV inlet and outlet nozzles.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Scope of Review

The NRC staff noted that WCAP-15827 includes information not pertinent to the request submitted by application dated December 9, 2021. The scope of this safety evaluation is to review only the information pertinent to the P/T limit applicability previously approved in Amendments No. 248 and No. 260, and to confirm that the revised TS Figure 3.4.3-2 accurately reflects this previously approved data.

#### 3.2 Licensee Evaluation

The licensee identified that a portion of TS Figure 3.4.3-2 is non-conservative and does not

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<sup>4</sup> ML010890301

<sup>5</sup> ML003740284

<sup>6</sup> ML14149A165



reflect the P/T limit data approved in Amendment No. 248. The licensee explained that a portion of TS Figure 3.4.3-2 is being corrected to match the approved P/T limit data. Specifically, the portion of TS Figure 3.4.3-2 being corrected is the 60°F/hr and 100°F/hr cooldown curves at temperatures below 150°. The licensee stated that data from historical plant cooldowns since implementation of the incorrect P/T limit curve figure was reviewed and it was determined that the approved P/T limits in Amendment No. 248 were not violated.

The licensee stated that the technical basis for Amendment No. 248 was WCAP-15827, which was also included in Amendment No. 260. Specifically, Table 28, "50 EFPY [Effective Full Power Years] Cooldown Curve Data Points Using 1996 App. G," of WCAP-15827 provides the appropriate cooldown curve data that was approved in Amendment No. 248 and subsequently in Amendment No. 260.

The following example illustrates the correction needed to Figure 3.4.3-2. The NRC staff noted that the stated values include the +20°F and -80 pounds per square inch gauge (PSIG) adjustment for instrumentation error on top of the data in Table 28 of WCAP-15827. It can be seen from Table 28 of WCAP-15827 that the 100°F/hr curve should start its downward trajectory from 541 PSIG at 150°F, but the current TS Figure 3.4.3-2 shows it starting at approximately 145°F. Similarly, the 60°F/hr curve should start its downward trajectory from 541 PSIG at 125°F, but the current TS Figure 3.4.3-2 shows it starting at approximately 115°F.

The licensee proposed change in the current submittal revises the 60°F/hr and 100°F/hr curves in TS Figure 3.4.3-2 to reflect the data in Table 28 of WCAP-15827.

### 3.3 NRC Staff Evaluation

The NRC staff verified that its approval of the licensee's RCS P/T limits applicable for 50 EFPY in Amendment No. 248 relied on the technical basis and data in WCAP-15827. Specifically, the NRC staff's review and approval of the cooldown curves for 50 EFPY focused on the adequacy of Table 28 of WCAP-15827 and compliance with temperature and maximum RPV pressure requirements in Appendix G to Section XI of the ASME Code.

In Amendment No. 260, the NRC staff approved the licensee's request to reduce the applicability of the 50-EFPY RCS P/T limits to only be applicable for 46.3 EFPY. In its approval, the NRC staff verified the following to ensure the 50 EFPY RCS cooldown curves remained appropriate and applicable for 46.3 EFPY:

- Fluence Calculations
- Confirmation of Materials with Limiting Adjusted Reference Temperature
- Surveillance Data Set for Chemistry Factor Calculation
- Scatter in Surveillance Capsule  $\Delta RT_{NDT}$
- Chemistry Factor and Adjusted Reference Temperature Calculations and Change in Pressure and Temperature Limit Applicability
- Pressure and Temperature Limits for Reactor Pressure Vessel Inlet and Outlet Nozzles

As part of its review for the current submittal provided by letter dated December 9, 2021, the NRC staff confirmed that the verifications that supported revision of the RCS cooldown curves from 50 EFPY to 46.3 EFPY continue to remain appropriate and applicable for the revised TS Figure 3.4.3-2 submitted in letter dated December 9, 2021. Specifically, the staff determined that Table 28 of WCAP-15827 is still acceptable for use in the development of the P/T limit

Cooldown Curves for Robinson. Further, the NRC staff confirmed that TS Figure 3.4.3-2, as proposed in the LAR, accurately reflects the data in Table 28 of WCAP-15827, the use of which the NRC previously approved in Amendment No. 248 and Amendment No. 260. Accordingly, the NRC staff concludes that proposed TS Figure 3.4.3-2 is acceptable.

### 3.4 Technical Evaluation Conclusion

The NRC staff reviewed the licensee's LAR to revise Robinson's TS Figure 3.4.3-2. Based on the evaluation in Section 3.3 of this SE, the NRC staff concludes that the licensee's proposed change meets the fracture toughness requirements of Appendix G to 10 CFR Part 50. The NRC staff also concludes that the licensee's proposed change complies with the acceptance criteria in Section 2.0 above. Therefore, the NRC staff finds the incorporation of the licensee's proposed change to the TS Figure 3.4.3-2 acceptable.

## 4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the State of South Carolina official was notified of the proposed issuance of the amendment on June 15, 2022. The State official had no comments.

## 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. The NRC staff has determined that 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 Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (87 FR 9651; February 22, 2022). 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 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) there is reasonable assurance that such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

Principal Contributor: S. Smith  
O. Yee

Date: August 3, 2022

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 - ISSUANCE OF AMENDMENT NO. 271 REGARDING CORRECTION TO NON-CONSERVATIVE TECHNICAL SPECIFICATIONS FIGURE 3.4.3-2, PRESSURE/TEMPERATURE LIMIT COOLDOWN CURVES (EPID L-2021-LLA-0223) DATED AUGUST 3, 2022

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