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

September 22, 2015

Mr. Richard M. Glover
H. B. Robinson Steam Electric Plant
Site Vice President
Duke Energy Progress, Inc.
3581 West Entrance Road
Hartsville, SC 29550

SUBJECT: H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2 – ISSUANCE OF AMENDMENT REGARDING TECHNICAL SPECIFICATION 3.3.1, REACTOR PROTECTION SYSTEM INSTRUMENTATION TURBINE TRIP (TAC NO. MF3463)

Dear Mr. Glover:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No. 243 to Renewed Facility Operating License No. DPR-23 for the H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP). This amendment changes the HBRSEP Technical Specifications (TSs) in response to your application dated February 10, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14052A065), as supplemented by letters dated April 4, 2014 (ADAMS Accession No. ML14107A339), August 28, 2014 (ADAMS Accession No. ML14254A406) and September 4, 2015 (ADAMS Accession No. ML15251A024). The supplement provided additional information that clarified the application, did not expand the scope of the application as originally noticed, and did not change the NRC staff's original proposed no significant hazards consideration determination as published in the *Federal Register* on July 22, 2014.

The licensee is upgrading the turbine control system by replacing the auto stop oil system with a high pressure auto stop trip system. The amendment revises the TS Table 3.3.1-1, Reactor Protection System Instrumentation, Function 15a, Turbine Trip, from Low Auto Stop Oil Pressure to a Turbine Trip function on Low Fluid Oil Pressure. The TS Nominal Trip Setpoint will change and the Allowable Value will also change. The amendment also revises the TS by adding requirements to assess channel performance during testing that verify instrument channel setting values established by the plant-specific setpoint methodology. The amendment requests TS changes consistent with Technical Specification Task Force Traveler (TSTF)-493, Revision 4, Option A, "Clarify Application of Setpoint Methodology for LSSS [Limiting Safety System Setting] Functions."

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

Sincerely,

Martha Barillas, 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. 243 to DPR-23
2. Safety Evaluation

cc w/enclosures: Distribution via Listserv

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

DUKE ENERGY PROGRESS, INC.

DOCKET NO. 50-261

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

AMENDMENT TO RENEWED FACILITY OPERATING LICENSE

Amendment No. 243
Renewed License No. DPR-23

1. The Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Duke Energy Progress, Inc. (the licensee), dated February 10, 2014, as supplemented by letters dated April 4, 2014, August 28, 2014, and September 4, 2015, 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. 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. 243, 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 completion of the modification during Refueling Outage 31 in Fall of 2018.

FOR THE NUCLEAR REGULATORY COMMISSION

Shana R. Helton

Shana R. Helton, Chief
Plant Licensing Branch II-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment:
Changes to Renewed Facility
Operating License No. DPR-23
and the Technical Specifications

Date of Issuance: September 22, 2015

ATTACHMENT TO LICENSE AMENDMENT NO. 243

RENEWED FACILITY OPERATING LICENSE NO. DPR-23

DOCKET NO. 50-261

Replace page 3 of Renewed Facility Operating License No. DPR-23 with the attached 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 Page | Insert Page |
|---|---|
| 3.3-16 | 3.3-16 |

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. 243 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.

Table 3.3.1-1 (page 4 of 7)
Reactor Protection System Instrumentation

| FUNCTION | APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS | REQUIRED CHANNELS | CONDITIONS | SURVEILLANCE REQUIREMENTS | ALLOWABLE VALUE | NOMINAL TRIP SETPOINT (1) |
|---|---|---|---|---|---|---|
| 14. DELETED | | | | | | |
| 15. Turbine Trip | | | | | | |
| a. Low EH Fluid Oil Pressure | 1(f) | 3 | P | SR 3.3.1.10(4)(5)<br>SR 3.3.1.15 | ≥769 psig | 800 psig |
| b. Turbine Stop Valve Closure | 1(f) | 2 | P | SR 3.3.1.15 | NA | NA |
| 16. Safety Injection (SI) Input from Engineered Safety Feature Actuation System (ESFAS) | 1,2 | 2 trains | Q | SR 3.3.1.14 | NA | NA |

(continued)

(1) A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. This Note is not applicable to Table 3.3.1-1, item 15a.

(f) Above the P-8 (Power Range Neutron Flux) interlock.

(4) If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.

(5) The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the surveillance procedures (field setting) to confirm channel performance. The methodologies used to determine the as-found and as-left tolerances are specified in the Engineering Instrument Setpoints procedure.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 243 TO

RENEWED FACILITY OPERATING LICENSE NO. DPR-23

DUKE ENERGY PROGRESS, INC.

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

DOCKET NO. 50-261

## 1.0 INTRODUCTION

By letter dated February 10, 2014 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML14052A065), as supplemented by letters dated April 4, 2014 (ADAMS Accession No. ML 14107A339), August 28, 2014 (ADAMS Accession No. ML14254A406) and September 4, 2015 (ADAMS Accession No. ML15251A024), Duke Energy Progress, Inc., the licensee, proposed changes to the Technical Specifications (TSs) for H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP). The proposed changes will revise HBRSEP TSs and Operating License to reflect the upgrade of the turbine control system, which replaces the auto stop oil system with a high pressure oil system. The upgrade will affect the Turbine Trip on Low Auto Stop Oil Pressure function in the Reactor Protection System Instrumentation TS. The proposed amendment requests TS changes in accordance with Technical Specification Task Force Traveler (TSTF)-493, Revision 4, "Clarify Application of Setpoint Methodology for LSSS [Limiting Safety System Setting] Functions," Option A. This Safety Evaluation (SE) addresses the proposed addition of surveillance notes in accordance with Option A of TSTF-493, Revision 4, to address instrumentation limiting condition for operation issues that could occur during periodic testing and calibration of instrumentation.

The proposed change will resolve operability determination issues associated with potentially nonconservative TSs Allowable Values (AVs)[1] calculated using some methods in the Industry Standard Instrument Society of America (ISA)-RP67.04.02-2000, "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation." The concern is that when these values are used to assess instrument channel performance during testing, nonconservative decisions about the equipment operability may result. In addition, the

[1] The instrument setting "Allowable Value" is a limiting value of an instrument's as-found trip setting used during surveillances. The AV is more conservative than the Analytical Limit (AL) to account for applicable instrument measurement errors consistent with the plant-specific setpoint methodology. If during testing, the actual instrumentation setting is less conservative than the AV, the channel is declared inoperable and actions must be taken consistent with the TS requirements.

proposed change will resolve operability determination issues related to relying on AVs associated with TSs LSSSs[2] to ensure that TS requirements, not plant procedures, will be used for assessing instrument channel operability. TSTF-493, Attachment A, contains functions related to those variables that have a significant safety function as defined in Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36(c)(1)(ii)(A).

The proposed change will revise the HBRSEP TSs to be consistent with the Nuclear Regulatory Commission (NRC)-approved TSTF-493, Revision 4, Option A. Under Option A, two surveillance notes will be added to Surveillance Requirements (SRs) in the SRs Column of the TSs Instrumentation Function Tables. Surveillance Notes will be added to SRs that require verifying trip setpoint setting values (i.e., channel calibration, channel operational test, and trip actuating device operational test SRs). The affected instrument function is listed in the License Amendment Request (LAR) and is in the Limiting Conditions for Operations (LCOs) for the Reactor Protection System Instrumentation, TS 3.3.1.

A change to the TS is required to increase the associated allowable low hydraulic oil pressure Nominal Trip Setpoint (NTSP) from 45 pounds per square inch gauge (psig) to 800 psig. The AV will also be changed from greater than or equal to 40.87 psig to 769 psig.

On September 15, 2006, Donald C. Cook Nuclear Plant, Unit No. 2, proposed a change to its TS 3.3.1, Table 3.3.1-1, Function 16.a, "Low Fluid Oil Pressure," to reflect a modification to the Unit No. 2 turbine control system, increasing the nominal control fluid oil operating pressure from 114 psig to 1600 psig. The NRC issued an SE on September 21, 2007 (ADAMS Accession No. ML072180639), approving the amendment request. The staff acknowledges the similarity in the Donald C. Cook request and the HBRSEP request. The staff referred to the previous evaluation in their review of this amendment.

## 2.0 REGULATORY EVALUATION

HBRSEP received its construction permit in 1967 and was licensed for operation in July 1970. On July 11, 1967, the Atomic Energy Commission published for public comment in the *Federal Register* (32 FR 10213), a revised and expanded set of 70 draft General Design Criterion (GDC) (hereinafter referred to as the "draft GDC"). On February 20, 1971, the Atomic Energy Commission published in the *Federal Register* (36 FR 3255) a final rule that added Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants" (hereinafter referred to as the "final GDC"). Differences between the draft GDC and final GDC included a consolidation from 70 to 64 criteria. As discussed in the NRC Staff Requirements Memorandum for SECY-92-223, dated September 18, 1992 (ADAMS Accession No. ML003763736), the Commission decided not to apply the final GDC to plants with construction permits issued prior to May 21, 1971. At the time of promulgation of Appendix A to 10 CFR Part 50, the Commission stressed that the final GDC were not new requirements and were promulgated to more clearly articulate the licensing requirements and practice in effect at that time. Each plant licensed before the final GDC were formally adopted was evaluated on a plant-specific basis, determined to be safe, and licensed by the Commission.

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[2] 10 CFR 50.36(c)(1)(ii)(A) states: "Limiting safety system settings for nuclear reactors are settings for automatic protective devices related to those variables having significant safety functions."

The HBRSEP UFSAR, Section 3.1.1.2.3, "Nuclear and Radiation Controls (GDC 11 - GDC 18)," states:

> The plant is equipped with a control room which contains the controls and instrumentation necessary for operation of the reactor and turbine generator under normal and accident conditions.
>
> Instrumentation and controls essential to avoid undue risk to the health and safety of the public are provided to monitor and maintain neutron flux, primary coolant pressure, flow rate, temperature, and control rod positions within prescribed operating ranges. Other instrumentation and control systems are provided to monitor and maintain within prescribed operating ranges the temperatures, pressure, flow, and levels in the RCS [Reactor Coolant System], Steam Systems, Containment, and other Auxiliary Systems. The quantity and types of instrumentation provided are adequate for safe and orderly operation of all systems and processes over the full operating range of the plant.

In addition, HBRSEP UFSAR Section 3.1.2.14, "Core Protection Systems," and Section 3.1.2.15, "ESF [Engineered Safety Feature] Protection Systems," states:

> If the reactor protection system (RPS) receives signals which are indicative of an approach to unsafe operating conditions, the system actuates alarms, prevents control rod motion, initiates load cutback, and/or opens the reactor trip breakers.
>
> Instrumentation and controls provided for the protective systems are designed to trip the reactor, when necessary, to prevent or limit fission product release from the core, and to limit energy release: to signal containment isolation: and to control the operation of ESF equipment.

Based on a review of the UFSAR; NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Chapter 10; and the licensee's submittal dated February 10, 2014, the staff identified the following GDC as being applicable to the proposed amendment:

> In the HBRSEP UFSAR Section 3.1.2.12, Instrumentation and Control Systems (GDC12), HBRSEP states that instrumentation and controls are provided to monitor and maintain (including temperatures, pressure, flow and levels) within prescribed operating ranges. The quantity and types of instrumentation provided are adequate for safe and orderly operation of all systems and processes over the full operating range of the plant.
>
> In the HBRSEP UFSAR Section 3.1.1.2.4, Reliability and Testability of Protection Systems, HBRSEP states that protection channels are designed with redundancy and independence. The components are designed and installed so that the mechanical and thermal environment do not interfere with their function.
>
> In the HBRSEP UFSAR Section 3.1.2.20, Protection Systems Redundancy and Independence (GDC20), HBRSEP states redundancy and independence designed into protection systems shall be sufficient to assure that no single failure on removal from

service of any component or channel of such a system will result in loss of the protection function. The redundancy provided shall include, as a minimum, two channels of protection for each protection function to be served.

In the HBRSEP UFSAR, Section 3.1.2.23, Protection Against Multiple Disability of Protection Systems (GDC 23), HBRSEP states the effects of adverse conditions to which redundant channels or protection systems might be exposed in common, either under normal conditions or those of an accident, shall not result in loss of the protection function or shall be tolerable on some other basis.

The Commission's regulatory requirements related to the content of the TSs are contained in 10 CFR 50.36. The regulation at 10 CFR 50.36 requires applicants for nuclear power plant operating licenses to include TSs as part of the license. The regulation requires, in part, that the TSs include items in the following categories: (1) safety limits, limiting safety systems settings, and limiting control settings; (2) limiting conditions for operation; (3) SRs; (4) design features; and (5) administrative controls. However, the regulation does not specify the particular requirements to be included in TSs.

Instrumentation required by the TSs has been designed to assure that the applicable safety analysis limits will not be exceeded during accidents and anticipated operational occurrences. This is achieved by specifying NTSPs, including testing requirements, to assure the necessary quality of systems in terms of parameters directly monitored by the applicable instrumentation systems for LSSSs, as well as specifying LCOs on other plant parameters and equipment in accordance with 10 CFR 50.36(c)(2).

- Section 50.36(c)(1)(i)(A) states in part:

  Safety limits for nuclear reactors are limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain of the physical barriers that guard against the uncontrolled release of radioactivity.

- Section 50.36(c)(1)(ii)(A) states in part:

  Limiting safety system settings for nuclear reactors are settings for automatic protective devices related to those variables having significant safety functions. Where a limiting safety system setting is specified for a variable on which a safety limit has been placed, the setting must be so chosen that automatic protective action will correct the abnormal situation before a safety limit is exceeded. If, during operation, it is determined that the automatic safety system does not function as required, the licensee shall take appropriate action, which may include shutting down the reactor.

- Section 50.36(c)(2) states in part:

  Limiting conditions for operation. Limiting conditions for operation are the lowest functional capability or performance levels of equipment required for safe operation of the facility. When a limiting condition for operation of a nuclear

reactor is not met, the licensee shall shut down the reactor or follow any remedial action permitted by the technical specifications until the condition can be met.

- Section 50.36(c)(3) states in part:

  Surveillance requirements are requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the limiting conditions for operation will be met.

- Section 50.36(c)(5) states in part:

  Administrative controls are the provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure the operation of the facility in a safe manner.

Regulatory Guide (RG) 1.105, Revision 3, "Setpoints for Safety-Related Instrumentation," describes a method acceptable to the NRC staff for complying with the NRC regulations for assuring that setpoints for safety-related instrumentation are initially within and remain within the TS limits.

Regulatory Issue Summary (RIS) 2006-17, "NRC Staff Position on the Requirements of 10 CFR 50.36, Technical Specifications," addresses limiting safety system settings during periodic testing and calibration of instrument channels.

In addition to the regulatory requirements stated above, the NRC staff also considered the previously approved guidance in NUREG-1431, Revision 4, "Standard Technical Specifications, Westinghouse Plants," dated April 2012, and RG 1.105, Revision 3, for determining the acceptability of revising instrumentation TS requirements. RG 1.105, Revision 3, describes a method acceptable to the NRC staff for complying with NRC regulations for ensuring that setpoints for safety-related instrumentation are initially within and remains within the TS limits. The RG endorses Part I of ISA-RP67.04.02-2000, "Methodologies for the Determination of Setpoints for Nuclear Safety-Related Instrumentation," subject to NRC staff clarifications. The ISA standard provides a basis for establishing setpoints for nuclear instrumentation for safety systems and addresses known contributing errors in the channel. Part 1 establishes a framework for ensuring that setpoints for nuclear safety-related instrumentation are established and maintained within specified limits.

## 3.0 TECHNICAL EVALUATION

### 3.1 Background

The licensee proposed to replace the present turbine control system with a new electronically controlled programmable logic control system. The plant modification will require changes to the TS for the turbine trip function described in Table 3.3.1-1, Function 15a, Turbine Trip Low Auto-Stop Oil Pressure. Currently, Function 15a has an NTSP of 45 psig and an AV of greater than or equal to 40.87 psig. The new low electro-hydraulic (EH) fluid oil pressure limit would be an NTSP of 800 psig and an AV of greater than or equal to 769 psig. The staff performed a detailed evaluation of the licensee's proposed change, as discussed below.

3.2 Turbine Control and Protection System

Under TS 3.3.1 for the RPS Instrumentation, the LCO requires three channels of Turbine Trip - Low EH Fluid Oil Pressure to be operable in MODE 1 above permissive "P-8." The licensee does not propose changing the intent of this LCO. Three channels will still be required to be operable above "P-8." Therefore, the licensee's proposed design change will not impact its compliance with Section 50.36 of 10 CFR Part 50, for having a TS provision for a reactor trip upon a turbine trip.

However, the licensee is proposing to make changes to the notes associated with this TS provision. The licensee proposes changing the wording from "Auto-Stop" to "EH Fluid" to accommodate the nomenclature of the new system. The changed wording will add clarity to the function description. Therefore, the staff finds no issue with changing the wording to match the nomenclature of the new system. The licensee is also adding the following statement to Note 1: "This Note is not applicable to Table 3.3.1-1, item 15a." Note 1 will now state as follows:

> A channel is OPERABLE with an actual Trip Setpoint value found outside its calibration tolerance band provided the Trip Setpoint value is conservative with respect to its associated Allowable Value and the channel is re-adjusted to within the established calibration tolerance band of the Nominal Trip Setpoint. This Note is not applicable to Table 3.3.1-1, item 15a

Note 1 is defining channel operability. The use of Notes 4 and 5 in the HBRSEP TSs for Table 3.3.1-1 are providing an alternate definition of determining OPERABILITY for the turbine trip detection instrumentation of item 15a. Therefore, the NRC staff finds the addition of this sentence, "This Note is not applicable to Table 3.3.1-1, item 15a," to Note 1 acceptable, because, while the addition to Note 1 exempts item 15a, Notes 4 and 5, as discussed below, are providing an alternate operability determination in compliance with TSTF-493, Option A.

The licensee is also proposing to add the following Note 4 and Note 5, which will be applicable to Table 3.3.1-1, Function 15a:

> Note (4): If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service.
>
> Note (5): The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the surveillance procedures (field setting) to confirm channel performance. The methodologies used to determine the as-found and as-left tolerances are specified in the Engineering Instrument Setpoints procedure.

The licensee plans on installing a new low EH system for the main turbine controls. The EH system supplies EH fluid to the turbine stop, governor, intercept, and reheat valves. The new EH system will operate at a nominal pressure of 2000 psig. The system pressure is maintained

constant by accumulators and regulating valves to prevent any significant pressure transients associated with turbine valve operations. The new system will have a protection system that will operate independent of the turbine control system. The high pressure Electro-Hydraulic Control (EHC) system contains three pressure switches. Upon a turbine trip, drain valves open in the EHC high pressure header, allowing the oil to drain. When two of the three pressure switches sense a low pressure (800 psig), the circuitry will provide input to the RPS that a turbine trip occurred. The turbine control and protection systems are separate, nonsafety-related systems. However, the protection system does provide an input into the RPS to generate a reactor trip upon a main turbine trip. The low pressure signal from the EHC high pressure header is redundant to a signal from the limit switches on the turbine stop valve position indicators. Together they provide defense-in-depth protection to signal the RPS that loss of load transient is occurring. Hence, the staff finds HBRSEP's GDC 20 and GDC 23 criteria, as described in Section 2.0 of this safety evaluation, are met.

The licensee states that the design basis for a reactor trip on low EHC oil pressure is only an anticipatory trip, and it is not credited in any design-basis accident to prevent any safety limit from being exceeded. The low EHC oil pressure actuates an RPS signal shortly after a turbine trip, in order to minimize the reactor coolant pressure and temperature transient for a loss of load transient. The design-basis safety limits are assured from a reactor trip signal sensed by a high pressure in the pressurizer. Hence, a reactor trip upon a turbine trip is only an anticipatory trip, which helps mitigate the effects of the transient that follows a turbine trip. The analysis in the UFSAR shows, for a loss of external load, that no safety limits are exceeded with a delayed reactor trip upon high pressurizer pressure, with no credit taken for a reactor trip upon turbine trip.

The EHC pressure switches are designed to provide an additional defense-in-depth against an undesired pressure increase in the RCS following a loss of load. In the UFSAR, the licensee provides a safety evaluation of a turbine trip and loss of external load. A turbine trip is bounded by the loss of external load because it takes no credit for a reactor trip from a turbine trip signal. The safety limits are assured from a reactor trip upon high pressurizer pressure. The modifications proposed by the licensee in this amendment will not adversely affect H. B. Robinson Steam Electric Plant's ability to comply with the requirements of HBRSEP's UFSAR GDC 20 and GDC 23 to protect the fuel from exceeding safety limits. Therefore, the staff finds that the licensee's proposal is acceptable, because the new proposed TS AVs have been selected to ensure proper actuation of the anticipatory reactor trip function, and results in no change to the design-basis accident analysis. The licensee will still maintain an adequate protection system to automatically initiate the RPS to assure that specified acceptable fuel design limits are not exceeded as a result of anticipated operational occurrences in accordance with HBRSEP's UFSAR GDC 20 and GDC 23.

HBRSEP's GDC 12 requires that instrumentation be provided to monitor variables and systems and that controls be provided to maintain these variables and systems within prescribed operating ranges. The licensee's proposed design of the high pressure EHC oil system allows time and warning signals for operators to initiate recovery actions prior to an automatic turbine trip. The system will have a "Low Pressure Alarm" in the main control room that occurs at 1400 psig. At 1350 psig, the backup EHC fluid pump will automatically start. If operator and plant actions are not sufficient to stop EHC fluid pressure from decreasing, at 800 psig the main turbine will trip, and pressure switches will signal RPS that a turbine trip occurred. The staff

finds that the licensee will have sufficient means to monitor the high pressure EHC system to ensure proper operation.

The licensee reviewed possible failures associated with this new high pressure system. The licensee determined that a failure of the new switches will not result in any different outcome than a failure of the pressure switches in the existing design. The pressure switches are designed to fail conservatively, resulting in a turbine trip signal sent to the RPS system for the failed channel. The licensee states that the turbine control system is independent of the turbine protection system. Hence, a failure in the turbine control system will not adversely affect the ability of the new pressure switches from performing their function. The licensee evaluated the piping in the new high pressure EHC fluid and determined no safety-related components would be adversely impacted, and the pressure switches will actuate on a low pressure as designed to provide a signal to the RPS. Therefore, the staff finds that the licensee's proposed TS change to accommodate the higher setpoint for the high pressure EHC system provides adequate protection against failures, allowing the pressure switches to perform their intended function.

The proposed design change will still maintain three channels of high pressure instrumentation. Two of the three channels are required to initiate a reactor trip signal. This configuration allows one channel to be out of service to allow the instrumentation that performs this trip function to be tested and verified operable. In addition, the licensee's setpoint calibration procedures will maintain the trip setpoint within the established setting tolerance to ensure that the instrument is capable of performing its specified safety function. Therefore, the staff finds the licensee meets the regulatory guidance to provide sufficient instrumentation to allow periodic testing and calibration of instrument channels.

Based on the above review, the NRC staff finds that the low pressure sensed on the EHC high pressure header following a turbine trip initiates an anticipatory reactor trip. The licensee does not credit this anticipatory reactor trip for protection of fission product barriers. On the basis of this review, the NRC staff concludes that the proposed amendment meets all the regulatory requirements and guidance set forth in Section 2 and is acceptable.

3.3.1 Nominal Trip Setpoints

The licensee added the term Nominal Trip Setpoint (NTSP) as terminology for the setpoint value calculated by means of the plant-specific setpoint methodology documented in the Engineering Instrument Setpoints procedure.

The licensee stated that the NTSP is more conservative than the AV and is the least conservative value to which the instrument channel is adjusted following surveillance testing. The NTSP is the limiting setting for the channel trip setpoint, considering all credible instrument errors associated with the instrument channel. The NTSP is the least conservative value (with an As-Left Tolerance (ALT)) to which the channel must be reset at the conclusion of periodic testing to ensure that the analytical limit (AL) will not be exceeded during an anticipated operational occurrence or accident before the next periodic surveillance or calibration. The licensee stated it is impossible to set a physical instrument channel to an exact value, so a calibration tolerance is established around the NTSP. Therefore, the NTSP adjustment is considered successful if the as-left instrument setting is within the ALT (i.e., a range of values around the NTSP). The field setting is within the ALT (i.e., a range of values around the NTSP).

The field setting is the NTSP with margin added. The field setting is equal to or more conservative than the NTSP.

The AV may still be the only value included in the TSs to indicate the least conservative value that the as-found trip point may have during testing for the channel to be operable. In this case, the NTSP values in the facility UFSAR, or any document incorporated into the UFSAR by reference, and the title of this document (EGR-NGGC-0153) is "Engineering Instrument Setpoints." It is identified in surveillance Note 2 (Note 5 in HBRSEP TSs) in order to satisfy the 10 CFR 50.36 requirements that the LSSS be in the TSs. Additionally, to ensure proper use of the AV, NTSP, and field setting, the methodology for calculating the as-left and as-found tolerances must also be included in a document incorporated by reference in the UFSAR and listed in surveillance Note 2 (Note 5 in HBRSEP TSs) as discussed in Section 3.3.2 below.

3.3.2 Addition of Surveillance Notes to TS Functions

Setpoint calculations calculate an NTSP based on the analytical limit of the safety analysis to ensure that trips or protective actions will occur prior to exceeding the process parameter value assumed by the safety analysis calculations. These setpoint calculations may also calculate an allowable limit of change to be expected (i.e., the As-Found Tolerance (AFT) between performance of the surveillance tests for assessing the value of the setpoint setting. The least conservative as-found instrument setting value that a channel can have during calibration without requiring performance of a TS remedial action is the setpoint AV. Discovering an instrument setting to be less conservative than the setting AV indicates that there may not be sufficient margin between the NTSP setting and the AL. The TSs trip unit calibrations, channel operational tests, and trip actuating device operational tests (with setpoint verification) are performed to verify channels are operating within the assumptions of the setpoint methodology used to calculate the NTSP and that channel settings have not exceeded the TS AVs. When the measured as-found setpoint is nonconservative with respect to the AV, the channel is inoperable and the actions identified in the TSs must be taken.

Surveillance Note 1 (HBRSEP TS Table 3.3.1-1, Note 4)

Surveillance Note 1 (HBRSEP TS Table 3.3.1-1, Note 4) states, "If the as-found channel setpoint is outside its predefined as-found tolerance, then the channel shall be evaluated to verify that it is functioning as required before returning the channel to service."

The note requires evaluation of channel performance for the condition where the as-found setting for the channel setpoint is outside its AFT but is conservative with respect to the AV. Evaluation of channel performance will verify that the channel will continue to function in accordance with the channel performance assumptions in the HBRSEP setpoint methodology, and establish a high confidence of acceptable channel performance in the future. Because the AFT allows for both conservative and nonconservative deviation from the NTSP, changes in channel performance that are conservative with respect to the NTSP will also be detected and evaluated for possible effects on expected performance. The purpose of the assessment is to ensure confidence in the channel performance prior to returning the channel to service. For channels determined to be OPERABLE but degraded, after returning the channel to service, the channels will be evaluated under the HBRSEP Corrective Action Program (CAP). Entry into the CAP will ensure required review and documentation of the condition to establish a reasonable expectation for continued operability.

Verifying that a trip setting is conservative with respect to the AV when a surveillance is performed does not by itself verify the instrument channel will operate properly in the future because setpoint drift is a concern. Although the channel was operable during the previous surveillance interval, if it is discovered that channel performance is outside the performance predicted by the plant setpoint calculations for the test interval, then the design basis for the channel may not be met, and proper operation of the channel for a future demand cannot be assured. Surveillance Note 1(HBRSEP TS Table 3.3.1-1, Note 4) formalizes the establishment of the appropriate AFT for each channel. This AFT is applied to the NTSP or to any other more conservative field setting. The as-found setting tolerance ensures that channel operation is consistent with the assumptions or design inputs used in the setpoint calculations and establishes a high confidence of acceptable channel performance in the future. Because the setting tolerance allows for both conservative and nonconservative deviation from the NTSP, changes in channel performance that are conservative with respect to the NTSP will also be detected and evaluated for possible effects on expected performance.

Implementation of surveillance Note 1 (HBRSEP TS Table 3.3.1-1, Note 4) requires the licensee to calculate an AFT. The licensee calculated the AFT using the specific calculation of RNP-I/INST-1150, "Turbine Low Hydraulic Pressure Trip Setpoint and Uncertainty Calculation," Revision 1, based on the setpoint methodology procedure EGR-NGGC-0153, Revision 12, that applies to Duke Energy Progress, Inc.

Surveillance Note 2 (HBRSEP TS Table 3.3.1-1, Note 5)

Surveillance Note 2 (HBRSEP TS Table 3.3.1-1, Note 5) states:

> The instrument channel setpoint shall be reset to a value that is within the as-left tolerance around the Nominal Trip Setpoint (NTSP) at the completion of the surveillance; otherwise, the channel shall be declared inoperable. Setpoints more conservative than the NTSP are acceptable provided that the as-found and as-left tolerances apply to the actual setpoint implemented in the Surveillance procedures (field setting) to confirm channel performance. The methodologies used to determine the as-found and the as-left tolerances are specified in the Engineering Instrument Setpoints procedure.

The second surveillance note requires that the as-left setting for the channel be returned to within the ALT of the NTSP. Where a setpoint more conservative than the NTSP is used in the plant surveillance procedures, the ALT and AFT, as applicable, will be applied to the surveillance procedure setpoint as an anticipatory trip function. This will ensure that sufficient margin to the Safety Limit and AL is maintained. If the as-left channel setting cannot be returned to a setting within the ALT of the NTSP, then the channel would be declared inoperable. The second surveillance note also requires that the methodologies for calculating the ALT and the AFT be included in the Engineering Instrument Setpoints procedure.

To implement surveillance Note 2 (HBRSEP TS Table 3.3.1-1, Note 5), the ALT for some instrumentation function channels is established to ensure that realistic values are used that do not mask instrument performance. The licensee stated that setpoint calculations assume that the instrument setpoint is left at the NTSP within a specific ALT (e.g., 25 psig + 2 psig). A tolerance is necessary, because it is not possible to read and adjust a setting to an absolute

value due to the readability and/or accuracy of the test instruments or the ability to adjust potentiometers. The licensee stated that the ALT is normally as small as possible, considering the tools and the objective to meet an as low as reasonably achievable calibration setting of the instruments. The ALT is considered in the setpoint calculation. Failure to set the actual plant trip setpoint to the NTSP and within the ALT would invalidate the assumptions in the setpoint calculation, because any subsequent instrument drift would not start from the expected as-left setpoint.

3.3.3 Evaluation of Surveillance Notes to TS Functions

The licensee proposed changes to the Turbine Trip Low EH Fluid Oil Pressure Function setting limits. The licensee demonstrated the calculation basis for the NTSP, field setting, AV, AFT band, and ALT band for Turbine Trip Low EH Fluid Oil Pressure Function.

As indicated under Section 3.3.2 above, the licensee calculated the uncertainties and setpoints using the specific calculation, RNP-I/INST-1150, Revision 1, based on the setpoint methodology procedure EGR-NGGC-0153. A copy of EGR-NGGC-0153 is included in the LAR as Attachment 4. EGR-NGGC-0153 also establishes criteria to support implementation of TSTF-493 for those TS functions for which TSTF-493 applies. The staff found this acceptable because it meets the guidance as described in RG 1.105, Revision 3, and RIS 2006-17. This RNP-I/INST-1150 calculation used Revision 1 that was created to change a title in Reference 4.7.4 to "ASO Turbine Trip Setpoint Change" and correct Mercoid Pressure Switch model number from DAW-7021-153-13S to DAW-7023-153-13S.

The objective of this calculation is to determine the uncertainties, setpoints, and AFT for the three Turbine Stop Emergency Trip Fluid Pressure Reactor Protection System inputs (PS-63AST-1, 2, and 3, respectively) and provide the setpoint basis for these devices. These setpoints are part of the HBRSEP LSSS setpoints.

Section 5 of RNP-I/INST-1150 identifies the assumptions the AFT is based on. The Standard Westinghouse TSs list the AV for "Turbine Trip on Low EH Fluid Oil Pressure" as greater than or equal to 750 psig and the NTSP as 800 psig. This is the basis for using an NTSP of 800 psig in the calculation. The licensee stated that the use of normal conditions in determining uncertainties is acceptable, because the equipment is nonsafety, Quality Class D, nonseismic, and performs its function based on a turbine trip, not on an accident condition such as a Loss-of-Coolant Accident or a Main Steam Line Break. No group or loop analysis was performed because only one device (the pressure switch) contributes to the total loop uncertainty.

Section 6 of RNP-I/INST-1150 identified uncertainty contributors in the calculation. The NRC staff found the basis for disregarding an uncertainty contribution from the effects of accident, seismic, static pressure, and power supply, was found to be acceptable. The staff evaluated the licensee's explanation of its basis for not including an uncertainty error contribution from insulation resistance, process measurement, the primary element, and readability error as contained in the license amendment request. The staff found the licensee's explanation to be acceptable because of the physical arrangement, environment, and application of the instrumentation and associated components.

The vendor of the Mercoid pressure switches states that the only reference accuracy (RA) value provided is a value for repeatability of ± 1.0% of full operating range (300 to 2500 psig or a range of 2200 psig). This corresponds to an RA of ± 22 psig. The NRC staff found this acceptable because when no RA is provided by the vendor, but only a repeatability value, EGR-NGGC-0153, Section 9.4.1, allows some devices to use the repeatability value as the RA. RNP-I/INST-1150 applied a calibration tolerance (CAL) set equal to the RA of ± 1.0% of full operating range, again a value of ± 22 psig for CAL. The NRC staff found this acceptable, because per EGR-NGGC-0153, Section 9.5.1, the calibration error is typically equal to the RA for a device or loop, plus any additional calibration tolerance deemed necessary to aid in the calibration of the device or loop. In a similar manner, a drift (DR) error of ± 1.0% of full operating range gave a value of 22 psig for DR. The NRC staff found this acceptable, because per EGR-NGGC-0153, Section 9.5.2, typical values that may be assumed for drift are ± 1.0% of full operating range (again ± 22 psig for DR) for 18 months nominal maintenance interval for a sensor when no drift value can be obtained from the vendor.

The specific HBRSEP Instrumentation & Controls maintenance and test equipment (MTE) used for calibrating the pressure switch devices discussed in this LAR has an overall rated accuracy of ± 0.05% of full scale (0 to 2000 psig span), but as a conservative means the licensee uses a value of ± 0.1% of full scale to give an MTE accuracy equal to ± 2 psig. The pressure switches are subject to various temperatures due to operation of the EHC system and changes in the outdoor temperature where they are located. A temperature effect (TE) tolerance of ± 0.5% of full operating range (300 to 2500 psig or 2200 psig range) gives a value for TE of ± 11 psig. The NRC staff found this acceptable because the temperature in the location of the pressure switches is within the rated outdoor functional temperature of these pressure switches, the calculation states the effects of fluid density changes are negligible compared to the pressures being monitored, and per EGR-NGGC-0153, Section 9.4.3, a typical value of TE for devices located outside containment is ± 0.5% of full operating range when no TE value can be obtained from the vendor.

RNP-I/INST-1150 used the standard equation for total device uncertainty (TDU): the square root of the sum of the squares of the uncertainty terms (CAL, MTE, DR, RA, and TE). First, CAL and MTE were combined as additive effects. The calculated value for TDU was ± 1.86% of the span (300 - 2500 psig, or a span of 2200) or ± 40.92 psig rounded to ± 41 psig.

For the calculation of the AFT, RNP-I/INST-1150, it used the square root of the sum of the squares of the appropriate uncertainty terms (CAL, DR, and MTE). This provided a value of AFT of ± 1.42% of span (300 – 2500 psig or a span of 2200) or ± 31.24 psig rounded to ± 31 psig. This was found acceptable to the staff based on the pressure switch device uncertainties described above and the use of standard statistical methodology described in EGR NGGC-0153 and in compliance with 10 CFR 50.36.

RNP-I/INST-1150, Section 9.7.4, states the ALT to be the value of the RA based on EGR-NGGC-0153, Section 9.7.4. Thus, the value of ALT is also ± 22 psig.

The NTSP of 800 psig is used to derive the associated TSs AV. This is acceptable because it is the Standard Westinghouse TSs NTSP for the Turbine Trip on Low EH Fluid Oil Pressure. The existing operating conditions confirm that this value is relevant and appropriate for use at HBRSEP with no adverse effect to the alarms and backup mechanisms. The staff noted that this High Pressure EHC Fluid System operates with a range of 1950 to 2050 psig with "low

pressure alarm" for the system on decreasing pressure at 1400 psig and the main EHC fluid pump and the backup EH fluid pump set to automatically start on decreasing pressure at 1350 psig to maintain the proper operating pressure. The reset setpoint for the pressure switches is set to 1200 psig. Thus, pressure decreasing to the 800 psig range is clearly an indication of a turbine trip with sufficient margin for deadband to avoid relay chatter and spurious actuations. In addition, the use of three redundant pressure switches using two-out-of-three logic in a fail-to-a-safe-state manner also helps prevent spurious actuations.

While the Standard Westinghouse TSs specify an AV of 750 psig, RNP-I/INST-1150 states this value provides unnecessary margin. Thus, the AV is computed as NTSP minus AFT (800 psig – 31 psig), or 769 psig. This is acceptable because 769 psig is more conservative than the Westinghouse standard value of 750, and EGR-NGGC-0153, Section 9.10, states no additional margin should be used.

Using an NTSP value of 800 psig with the calculated AFT and ALT values (± 31 psig and ± 22 psig, respectively), the AFT band is 800 psig ± 31 psig (769 to 831 psig), and the ALT band is 800 ± 22 psig (778 to 822 psig).

Setpoints for alarms and automatic start functions should have sufficient margin from system trip setpoints, or safety limits, to allow an operator time to take conservative action or the actuated equipment to restore or maintain system parameters in the operating range. Alarm and plant trip setpoints should not be set so close to normal plant operating ranges that nuisance alarms and spurious actuations or trips occur. RNP-I/INST-1150 indicates this is also the instruction from EGR-NGGC-0153. With a pressure operating range of 1950 to 2050 psig, an alarm on decreasing pressure at 1400 psig, an automatic EH fluid pump start on decreasing pressure at 1350 psig, and the new pressure NTSP of 800 psig, the staff finds the AFT and ALT bands meet this guidance, because the margin on decreasing EH fluid pressure with either the AFT band or the ALT band applied (1350 – 831 = 519 psig and 1350 – 822 = 528 psig, respectively) is greater than the minimum pressure switch deadband of 390 psig and will provide the opportunity to recover the fluid pressure. If decreasing fluid pressure is not recovered before reaching these bands, the new auto stop trip header pressure switch contacts will close and send indication of an actual turbine trip.

Based on the above, the staff concludes the licensee's setpoint methodology meets the methods acceptable to the staff for complying with the regulations for ensuring that setpoints for safety-related instrumentation are initially within and remain within the TS limits provided in RIS 2006-17 and RG 1.105, Revision 3. The licensee has revised the affected TSs Table 3.3.1-1 (page 4 of 7) where these settings are listed. Since these settings are calculated using the calculation of RNP-I/INST-1150, based on an acceptable methodology procedure in EGR-NGGC-0153, they are acceptable to the NRC staff.

The licensee has added surveillance notes to the Turbine Trip Low EH Fluid Oil Pressure function 15.a in TS 3.3.1. The licensee stated that the determination to include surveillance notes for the specific function in this TSs Table is based on this function being an automatic protective device related to variables having significant safety functions as delineated by 10 CFR 50.36(c)(1)(ii)(A). Furthermore, the licensee stated that, if during calibration testing the setpoint is found to be conservative with respect to the AV but outside its predefined AFT band, then the channel shall be brought back to within its predefined calibration tolerance before

returning the channel to service. The calibration tolerances are specified in the Engineering Instrument Setpoints procedure. Changes to the values will be controlled by 10 CFR 50.59.

The proposed surveillance notes will add the requirement to address operability of the subject functions in the TSs as discussed in TSTF-493, Revision 4, Option A. The NRC staff reviewed the affected TSs function and the staff finds the licensee's proposed change acceptable.

Based on the review of the licensee's application, the NRC staff concludes that the licensee setpoint calculations are consistent with RG 1.105, Revision 3, methodology for the proposed TSs changes and are, therefore, acceptable. The proposed surveillance notes will ensure instrument operability will be maintained and that uncertainties will be included in the AFT calculations in an acceptable manner. By establishing the TSs requirements in the surveillance notes, the licensee will ensure that there will be a reasonable expectation that these instruments will perform their safety function if required. Therefore, the NRC staff finds the addition of the notes to be acceptable. The NRC staff further concludes that the proposed TSs changes are acceptable. They meet the requirements of 10 CFR 50.36(c)(3) in that the surveillance requirements will ensure that the necessary quality of systems are maintained, that the facility will be maintained within safety limits, and that the LCOs will continue to be met.

## 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. 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 and changes the surveillance requirements. 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 (79 FR 42542). 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 Contributors: Stanley Gardocki
Kristy Bucholtz
Eugene Eagle

Date: September 22, 2015

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

Sincerely,

***/RA/***

Martha Barillas, 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. 243 to DPR-23
2. Safety Evaluation

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