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Washington, DC 20555-0001

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/RENEWED LICENSE NO. DPR-23

TRANSMITTAL OF SETPOINT CALCULATION

Dear Sir or Madam:

By letter dated February 10, 2014, Duke Energy Progress, Inc. submitted a License Amendment Request to revise the Technical Specification (TS) for the Reactor Protection System Instrumentation Turbine Trip function on Low Auto Stop Oil Pressure to a Turbine Trip function on Low Electro-Hydraulic Fluid Oil Pressure. By e-mail from Mr. Siva Lingam, NRC, to Mr. Richard Hightower, dated March 20, 2014, NRC requested a copy of the setpoint calculation that supported the license amendment request. The calculation, RNP-I/INST-1150, Turbine Low Hydraulic Pressure Trip Setpoint and Uncertainty Calculation is enclosed.

In a follow up e-mail dated March 24, 2014, the NRC noted that they will need detailed information on the revised system configuration to ensure that the high pressure and low pressure systems do not have different failure modes.

The existing Electro-Hydraulic Controller (EHC) and existing mechanical and electrical trip devices, described in H. B. Robinson Steam Electric Plant, Unit No. 2 UFSAR section 10.2.2 consists of the original components installed in the unit which are of older design. This planned change will include upgrades to input sensors and output actuators (to the extent practical) to provide an EHC design such that no single failure will result in a turbine trip and will not result in the loss of ability to trip the turbine. The application of an improved fault-tolerant design is consistent with more recent design philosophies presented in EPRI TR-016780-V2, "Advanced Light Water Reactor Utility Requirements Document" and EPRI TR-1013461, "Turbine Overspeed Trip Modernization" (Chapter 4).

The modification will remove the Autostop Oil System, including the oil pressure sensors, and replace it with an Emergency Trip System (ETS) with three new sensors capable of functioning at a higher pressure. The basic function of the three pressure switches is not changed and therefore the basic function of the Reactor Protection System is also not changed. The three new ETS header pressure switches will sense high pressure hydraulic fluid in the ETS header. The ETS header pressure is the pressure in the line between the turbine valves and the ETS Trip Block Assembly. The three ETS header pressure switch contacts will close and energize the RPS circuit when the pressure switches sense ETS header pressure below 800 psig, indicating the turbine has tripped.

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The piping connecting the switches to the ETS header is capable of withstanding the system pressure. Postulated pipe breaks in the ETS header do not need to be considered in the design as no safety-related equipment would be adversely impacted. A break would result in closure of the associated turbine valves and actuation of the pressure switches.

The modification ensures that the new system will continue to meet pertinent 10 CFR 50 Appendix A General Design Criteria, 1967 version, that apply to the Robinson plant.

1967 GDC-20 Protection Systems Redundancy and Independence

– "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."

Criterion 20 is applicable to this modification because the input into the protection system (e.g., the RPS) must be fail safe to ensure the RPS is notified even if the input component fails. The existing ASO pressure switch contacts to the RPS are normally closed contacts that open when the ASO pressure rises above the setpoint and close when the ASO pressure drops below the setpoint. The normally closed contacts on the ASO pressure switches indicate that they are designed such that if the pressure switch fails, the contacts would close and therefore provide input to the RPS.

The new ETS header pressure switches are configured in the same manner as the existing ASO pressure switches utilizing normally closed contacts that open when the ETS pressure rises above the setpoint and close when the ETS pressure drops below the setpoint. The normally closed contacts on the ETS header pressure switches indicate that they are designed such that if the pressure switch fails, the contacts would close and therefore provide input to the RPS.

Criterion 20 is met because the new ETS header pressure switches are designed to fail into a safe state.

1967 GDC-23 Protection Against Multiple Disability for Protection Systems

"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."

Criterion 23 is applicable to this modification because the inputs to the RPS are affected. Per the RNP Technical Specification, the existing ASO pressure switches do not provide any input into the existing control system. Therefore, the protection system (RPS) and control system (TCS) are separated such that no failure of the control system would affect the input to the protection system.

The protection system is not modified as a result of this modification, only the inputs to the protection system. The TCS upgrade project will remove the ASO system and consequently the ASO pressure switches that actuate a reactor trip above P-8 on low ASO pressure.

A reactor trip will now be actuated on low ETS header pressure as sensed by the three (3) new ETS header pressure switches. The new ETS header pressure switches are a direct replacement for the ASO pressure switches and will not affect the downstream RPS circuit. The new ETS header pressure switches do not provide any input into the turbine control system. The ETS header pressure switches utilize the existing auxiliary relays to communicate with the RPS. The connection to the RPS from the auxiliary relays is not being modified.

Also, the existing Main Steam Stop Valve limit switches that provide input to the RPS will remain unchanged with the TCS upgrade. The stop valve limit switches currently send a signal to the RPS that the stop valves have closed. This ensures a diverse method is available to signal the RPS that the turbine has been tripped.

Criterion 23 is met because the new ETS header pressure switches are independent of the protection system and do not provide any input into the control system.

This document contains no new Regulatory Commitments.

In accordance with 10 CFR 50.91(b), a copy of this document is being provided to the State of South Carolina. If you have any questions regarding this submittal, please contact Mr. Richard Hightower, Manager – Nuclear Regulatory Affairs at (843) 857-1329.

I declare under penalty of perjury that the foregoing is true and correct.

Executed On: April 4, 2014

Sincerely,

R. Michael Glover / for

William R. Gideon
Site Vice President

WRG/jk

Enclosure

cc: Ms. S. E. Jenkins, Manager, Infectious and Radioactive Waste Management Section (SC)
Mr. V. McCree, NRC Region II
Mr. S. P. Lingam, NRC Project Manager, NRR NRC Resident Inspectors, HBRSEP
Mr. A. Wilson, Attorney General (SC)