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Progress Energy

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United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

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

TRANSMITTAL OF TECHNICAL SPECIFICATIONS BASES REVISIONS

Ladies and Gentlemen:

In accordance with Technical Specifications 5.5.14.d, Carolina Power and Light Company, now doing business as Progress Energy Carolinas, Inc., is transmitting revisions to the H. B. Robinson Steam Electric Plant (HBRSEP), Unit No. 2, Technical Specifications Bases. The attachment to this letter provides Technical Specifications Bases pages for Revisions Number 43 through 49.

If you have any questions concerning this matter, please contact me at (843) 857-1329.

Sincerely,

W. Richard Hightower

W. Richard Hightower
Supervisor – Licensing/Regulatory Programs

WRH/rjr

Attachment

c: V. McCree, NRC, Region II
NRC Resident Inspector, HBRSEP
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A001
NRR

United States Nuclear Regulatory Commission
Attachment to Serial: RNP-RA/12-0066
23 Pages (including cover page)

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

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ACTIONS

C.1, C.2.1, and C.2.2 (continued)

from full power conditions in an orderly manner and without challenging unit systems.

D.1, D.2.1, and D.2.2

Condition D applies to:

- Pressurizer Pressure - Low;
- Steam Line Differential Pressure - High;
- High Steam Flow in Two Steam Lines Coincident With T_{avg}-Low or Coincident With Steam Line Pressure - Low; and
- Steam Line Isolation Containment Pressure - High High.

If one channel is inoperable, 6 hours are allowed to restore the channel to OPERABLE status or to place it in the tripped condition. Generally this Condition applies to functions that operate on two-out-of-three logic. Therefore, failure of one channel places the Function in a two-out-of-two configuration. One channel must be tripped to place the Function in a one-out-of-two configuration that satisfies redundancy requirements.

Failure to restore the inoperable channel to OPERABLE status or place it in the tripped condition within 6 hours requires the unit be placed in MODE 3 within the following 6 hours and MODE 4 within the next 6 hours.

The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems. In MODE 4, these Functions are no longer required OPERABLE.

The Action for Condition D is modified by a Note that allows a channel for Function 4.c, Steam Line Isolation – Containment Pressure – High High , to be taken out of the trip condition for 6 hours for maintenance purposes. The channel may be taken out of the trip condition multiple times provided the total time out of trip does not exceed 6 hours (not including the initial 6 hour action time). The Containment Pressure - High High channels are uniquely designed in that they are required to be

(continued)

BASES

ACTIONS

energized to be in the trip condition. Maintenance activities that interrupt power to the channel, such as, replacement of the comparator module, cause the channel to be taken out of the trip condition. Therefore, the note allows conducting these activities without being required to implement extraordinary measures to maintain the channel in the tripped condition. The 6-hour allowance is considered acceptable based on the low probability of an accident during this time, another channel of Containment Pressure - High High must fail to prevent the isolation of the steam line from Containment Pressure - High High, and other ESFAS functions provide an automatic steam line isolation function.

E.1, E.2.1, and E.2.2

Condition E applies to:

- Safety Injection Containment Pressure - High; and
- Containment Spray Containment Pressure -High High.

None of these signals has input to a control function. Thus, two-out-of-three logic is necessary to meet acceptable protective requirements. However, a two-out-of-three design would require tripping a failed channel. This is undesirable because a single failure would then cause spurious containment spray initiation. Spurious spray actuation is undesirable because of the cleanup problems presented. Therefore, these channels are designed with two-out-of-three on two sets of three logic. One channel per set may be placed in trip and still maintain adequate margin to spurious spray actuation.

To avoid the inadvertent actuation of containment spray and Phase B containment isolation, no more than one channel per set may be placed in trip. Restoring the channel to OPERABLE status, or placing the inoperable channel in trip within 6 hours, is sufficient to assure that the Function remains OPERABLE and minimizes the time that the Function may be in a partial trip condition (assuming the inoperable channel has failed high). The Completion Time is further justified based on the low probability of an event occurring during this interval. Failure to restore the inoperable channel to OPERABLE status, or place it in trip within 6 hours, requires the unit be placed in MODE 3 within the following 6 hours, MODE 4 within the next 6 hours, and MODE 5 within the next 24 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power

(continued)

BASES

ACTIONS

conditions in an orderly manner and without challenging unit systems. In MODE 5, these Functions are no longer required OPERABLE.

The Action for Condition E is modified by a Note that allows a channel for Function 2.c, Containment Spray – Containment Pressure - High High, and Function 3.b.(3), Containment Phase B Isolation - Containment Pressure - High High, to be taken out of the trip condition for 6 hours for maintenance purposes. The channel may be taken out of the trip condition multiple times provided the total time out of trip does not exceed 6 hours (not including the initial 6 hour action time). The Containment Pressure - High High channels are uniquely designed in that they are required to be energized to be in the trip condition. Maintenance activities that interrupt power to the channel, such as, replacement of the comparator module, cause the channel to be taken out of the trip condition. Therefore, the note allows conducting these activities without being required to implement extraordinary measures to maintain the channel in the tripped condition. The 6-hour allowance is considered acceptable based on the low probability of an accident during this time, another channel of Containment Pressure - High High must fail to prevent the initiation of containment spray or containment Phase B isolation from Containment Pressure - High High, and containment spray or containment Phase B isolation can be initiated manually.

F.1, F.2.1, and F.2.2

Condition F applies to:

- Manual Initiation of Steam Line Isolation.

For the Manual Initiation Function, this action addresses the train orientation of the relay logic. If a train or channel is inoperable, 48 hours are allowed to return it to OPERABLE status. The specified Completion Time is

(continued)

BASES

APPLICABLE SAFETY ANALYSES

Heat Input Type Transients (continued)

on mass and heat input described above are assumed. In addition, analyses demonstrate that the depressurized RCS and RCS vent ≥ 4.4 square inches (equivalent to two blocked open PORVs) can maintain RCS pressure below limits when only the restrictions on mass and heat input regarding accumulator injection capability and RCP starts described above are assumed. Thus, the LCO provides restrictions consistent with the mass and heat input assumptions of this analysis during the LTOP MODES. Since neither one RCS relief valve nor the RCS vent can handle the pressure transient need from accumulator injection, when RCS temperature is low, the LCO also requires the accumulators be isolated when accumulator pressure is greater than or equal to the maximum RCS pressure for the existing RCS cold leg temperature allowed in the LTOP analyses.

The analyses did not consider the accumulators as a credible mass input mechanism because there are multiple administrative controls to ensure isolation, including de-energizing valve control circuits (Ref. 7). Therefore, the accumulators must have their discharge valves closed and the valve power supply breakers in their open positions.

The consequences of a small break loss of coolant accident (LOCA) in LTOP MODE 4 conform to 10 CFR 50.46 and 10 CFR 50, Appendix K (Refs. 8 and 9), requirements by having a maximum of one SI pump OPERABLE and SI actuation enabled.

PORV Performance

The fracture mechanics analyses show that the vessel is protected when the PORVs are set to open at or below 400 psig. The setpoints are derived by analyses that model the performance of the LTOP System, assuming the limiting LTOP

(continued)

BASES

BACKGROUND (continued)

Makeup water to the RCS is provided by the CVCS from the following sources:

a. The primary water storage tank, in combination with boric acid storage tanks provides water for makeup and RCS boron concentration adjustments, and

b The Refueling Water Storage Tank (RWST) which, via one of two pathways, supplies borated water for emergency makeup.

Three positive displacement charging pumps with variable speed drives are used to supply charging flow to the RCS. The speed of each pump can be controlled manually or automatically. During normal operation, one or more charging pumps are operating and the speed of the automatically controlled pump is modulated in accordance with pressurizer level.

APPLICABLE SAFETY ANALYSES

The LCO helps to ensure that sufficient seal water injection is provided to the RCPs.The HBRSEP, Unit No. 2 Individual Plant Examination (IPE), submitted to the NRC by letter dated August 31, 1992 (Ref. 2), found that the RCP seal injection function was a significant contributor to the overall core damage frequency. The plant event sequences of interest are a loss of all component cooling water which results in a loss of all charging capability and a loss of backup cooling to the RCP seals. The loss of all component cooling water is initiated by a loss of all AC power (station blackout), a multiple failure of component cooling, or a multiple failure resulting in loss of all service water cooling capability. Without either component cooling capability or charging flow to the RCP seals, the RCP seals fail resulting in a small break Loss-of-Coolant Accident (LOCA). The loss of component cooling also results in a loss of cooling to the containment spray pumps and safety injection pumps. Hence, while the loss of seal injection capability is not the initiating event for the risk significant event sequences, the charging pumps perform a key function, which if lost, enables continuation of the risk significant event sequence to a state result of core damage.

(continued)

B 3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

B 3.5.3 ECCS — Shutdown

BASES

BACKGROUND

The Background section for Bases 3.5.2, "ECCS — Operating," is applicable to these Bases, with the following modifications.

In MODE 4, the required ECCS train consists of one high head safety injection (SI) subsystem and one residual heat removal (RHR) (low head) subsystem.

The ECCS flow paths consist of piping, valves, heat exchangers, and pumps such that water from the refueling water storage tank (RWST) can be injected into the Reactor Coolant System (RCS) following the accidents described in Bases 3.5.2.

WCAP-12476, Revision 1, "Evaluation of LOCA during Mode 3 and Mode 4 Operation for Westinghouse NSSS," November 2000, provides a shutdown LOCA analysis; however, it has not been approved by the NRC and shall not be used to provide the basis for making changes under 10 CFR 50.59.

APPLICABLE SAFETY ANALYSES

The Applicable Safety Analyses section of Bases 3.5.2 also applies to this Bases section.

Due to the stable conditions associated with operation in MODE 4 and the reduced probability of occurrence of a Design Basis Accident (DBA), the ECCS operational requirements are reduced. It is understood in these reductions that certain automatic safety injection (SI) actuation signals are not available. In this MODE, sufficient time exists for restoration and manual actuation of the required ECCS components to mitigate the consequences of a DBA.

Only one train of ECCS is required for MODE 4. This requirement dictates that single failures are not considered during this MODE of operation. The ECCS trains satisfy Criterion 3 of the NRC Policy Statement.

LCO

In MODE 4, one of the two redundant ECCS trains is required to be OPERABLE to ensure that sufficient ECCS flow is available to the core following a DBA.

BASES (continued)

LCO (continued)

In MODE 4, an ECCS train consists of a safety injection subsystem and an RHR subsystem aligned either for shutdown cooling or for ECCS mode. The two subsystems are not required to be from the same train (e.g., Train 'A' of SI and Train 'B' of RHR is acceptable). An ECCS train is OPERABLE when the train consists of the necessary piping, instruments and controls, valves, pumps, and heat exchangers to ensure a flow path capable of taking suction from the RWST to the SI and RHR pumps and injecting to the three RCS cold legs. The capability to transfer suction to the containment sump is also required.

While the RHR subsystem is aligned for shutdown cooling, manual alignment of the RHR subsystem would be necessary for the ECCS mode. In the long term, this flow path may be switched to hot leg injection, however; the hot leg injection paths are not subject to the requirements of this specification.

APPLICABILITY

In MODES 1, 2, and 3, the OPERABILITY requirements for ECCS are covered by LCO 3.5.2.

In MODE 4 with RCS temperature below 350°F, one OPERABLE ECCS train is acceptable without single failure consideration, on the basis of the stable reactivity of the reactor and the limited core cooling requirements.

In MODES 5 and 6, plant conditions are such that the probability of an event requiring ECCS injection is extremely low. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops — MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops — MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Residual Heat Removal (RHR) and Coolant Circulation — High Water Level," and LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation — Low Water Level."

A Note prohibits the application of LCO 3.0.4.b to an inoperable ECCS high head subsystem when entering MODE 4. There is an increased risk associated with entering MODE 4 from MODE 5 with an inoperable ECCS high head subsystem and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after

(continued)

BASES

LCO (continued)

the core in the event of a LOCA, to maintain the reactor subcritical following a DBA, and to ensure adequate level in the containment sump to support ECCS and Containment Spray System pump operation in the recirculation mode.

To be considered OPERABLE, the RWST must meet the water volume, boron concentration, and temperature limits established in the SRs.

Aligning the Spent Fuel Pool Purification System to the RWST renders the RWST inoperable. This is due to a seismic to non-seismic interface between these systems.

APPLICABILITY

In MODES 1, 2, 3, and 4, RWST OPERABILITY requirements are dictated by ECCS and Containment Spray System OPERABILITY requirements. Since both the ECCS and the Containment Spray System must be OPERABLE in MODES 1, 2, 3, and 4, the RWST must also be OPERABLE to support their operation. Core cooling requirements in MODE 5 are addressed by LCO 3.4.7, "RCS Loops — MODE 5, Loops Filled," and LCO 3.4.8, "RCS Loops — MODE 5, Loops Not Filled." MODE 6 core cooling requirements are addressed by LCO 3.9.4, "Residual Heat Removal (RHR) and Coolant Circulation — High Water Level," and LCO 3.9.5, "Residual Heat Removal (RHR) and Coolant Circulation — Low Water Level."

ACTIONS

A.1

With RWST boron concentration or borated water temperature not within limits, they must be returned to within limits within 8 hours. Under these conditions neither the ECCS nor the Containment Spray System can perform its design function. Therefore, prompt action must be taken to restore the tank to OPERABLE condition. The 8 hour limit to restore the RWST temperature or boron concentration to within limits was developed considering the time required to change either the boron concentration or temperature and the fact that the contents of the tank are still available for injection.

B.1

With the RWST inoperable for reasons other than Condition A (e.g., water volume), it must be restored to OPERABLE status within 1 hour.

(continued)

BASES (continued)

LCO

Containment isolation valves form a part of the containment boundary. The containment isolation valves' safety function is related to minimizing the loss of reactor coolant inventory and establishing the containment boundary during a DBA.

The automatic power operated isolation valves are required to have isolation times within limits and to actuate on an automatic isolation signal. The inboard 42 inch purge valves must have blocks installed to prevent full opening and actuate closed on an automatic signal. The valves covered by this LCO are listed along with their associated stroke times in the Inservice Testing Program.

The normally closed isolation valves are considered OPERABLE when manual valves are closed, automatic valves are de-activated and secured in their closed position, or blind flanges are in place.

This LCO provides assurance that the containment isolation valves and purge valves will perform their designed safety functions to minimize the loss of reactor coolant inventory and establish the containment boundary during accidents.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment. In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Therefore, the containment isolation valves are not required to be OPERABLE in MODE 5. The requirements for containment isolation valves during MODE 6 are addressed in LCO 3.9.3, "Containment Penetrations."

ACTIONS

The ACTIONS are modified by a Note allowing penetration flow paths to be unisolated intermittently under administrative controls. These administrative controls consist of stationing a dedicated operator at the valve controls, who is in continuous communication with the control room. In this way, the penetration can be rapidly isolated when a need for containment isolation is indicated.

(continued)

B 3.7 PLANT SYSTEMS

B 3.7.3 Main Feedwater Isolation Valves (MFIVs), Main Feedwater Regulation Valves (MFRVs), and Bypass Valves

BASES

BACKGROUND

The MFIVs isolate main feedwater (MFW) flow to the secondary side of the steam generators following a high energy line break (HELB). The safety related function of the MFRVs is to provide the second isolation of MFW flow to the secondary side of the steam generators following an HELB. Closure of the MFIVs or MFRVs, and bypass valves terminates flow to the steam generators, terminating the event for feedwater line breaks (FWLBs) occurring upstream of the MFIVs or MFRVs. The consequences of events occurring in the main steam lines or in the MFW lines downstream from the MFIVs will be mitigated by their closure. Closure of the MFIVs or MFRVs, and bypass valves, effectively terminates the addition of feedwater to an affected steam generator, limiting the mass and energy release for steam line breaks (SLBs) or FWLBs inside containment, and reducing the cooldown effects for SLBs.

The MFIVs or MFRVs, and bypass valves, isolate the nonsafety related portions from the safety related portions of the system. In the event of a secondary side pipe rupture inside containment, the valves limit the quantity of high energy fluid that enters containment through the break, and provide a pressure boundary for the controlled addition of auxiliary feedwater (AFW) to the intact loops.

One MFIV, one MFRV, and one bypass valve are located on each MFW line, outside but close to containment. The single bypass valve bypasses both the MFIV and the MFRV. The MFIVs, MFRVs, and bypass valves are located upstream of the AFW injection point so that AFW may be supplied to the steam generators following MFIV or MFRV closure. The piping volume from these valves to the steam generators must be accounted for in calculating mass and energy releases, and refilled prior to AFW reaching the steam generator following either an SLB or FWLB.

The MFIVs, MFRVs, and bypass valves close on receipt of a safety injection signal. They may also be actuated manually. The MFRV and bypass valve for a specific steam generator will also close on a steam generator water level – high signal. In addition to

(continued)

BASES

ACTIONS (continued)

F.1 and F.2

In MODE 1, 2, 3, or 4, if both inoperable (for reasons other than an inoperable CRE boundary) CREFS trains cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE that minimizes accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

G.1, G.2, and G.3

If the CRE boundary is inoperable as defined in the CRE Habitability Program, then actions must be taken to restore an OPERABLE CRE boundary within 90 days.

During the period that the CRE boundary is considered inoperable, action must be initiated to implement mitigating actions to lessen the effect on CRE occupants from the potential hazards of a radiological or chemical event or a challenge from smoke. Actions must be taken within 24 hours to verify that in the event of a DBA, the mitigating actions will ensure that CRE occupant radiological exposures will not exceed the calculated dose of the licensing basis analyses of DBA consequences, and that CRE occupants are protected from hazardous chemicals and smoke. These mitigating actions (i.e., actions that are taken to offset the consequences of the inoperable CRE boundary) should be preplanned for implementation upon entry into the condition, regardless of whether entry is intentional or unintentional. The 24 hour Completion Time is reasonable based on the low probability of a DBA occurring during this time period, and the use of mitigating actions. The 90 day Completion Time is reasonable based on the determination that the mitigating actions will ensure protection of CRE occupants within analyzed limits while limiting the probability that CRE occupants will have to implement protective measures that may adversely affect their ability to control the reactor and maintain it in a safe shutdown condition in the event of a DBA. In addition, the 90 day Completion Time is a reasonable time to diagnose, plan and possibly repair, and test most problems with the CRE boundary. Note that entry into Condition G does not preclude entry into

(continued)

BASES

ACTIONS (continued)

Conditions A or E for other reasons which may make one or more CREFS trains inoperable. Similarly, entry into Conditions A or E for reasons other than Condition G, does not preclude entry into Condition G at the same or later time.

H.1

In MODE 1, 2, 3, or 4, if the inoperable CRE boundary cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE that minimizes accident risk. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours, and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.9.1

Standby systems should be checked periodically to ensure that they function properly. As the environment and normal operating conditions on this system are not too severe, testing each train once every month provides an adequate check of this system. Operation for 15 minutes is adequate to demonstrate the function of the system. The 31 day Frequency is based on the reliability of the equipment and the two train redundancy availability.

SR 3.7.9.2

This SR verifies that the required CREFS testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The VFTP includes testing the performance of the HEPA filter, charcoal adsorber efficiency, minimum flow rate, and the physical properties of the activated charcoal. Specific test Frequencies and additional information are discussed in detail in the VFTP.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.9.3

This SR verifies that each CREFS train starts and operates on an actual or simulated actuation signal. The Frequency of 18 months is consistent with Position C.5 of Regulatory Guide 1.52 (Ref. 4). The 18 month Frequency is based on the refueling cycle. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency.

SR 3.7.9.4

This SR verifies the integrity of the CRE boundary. The CRE Habitability Program specifies administrative controls for temporary breaches to the boundary, preventative maintenance requirements to ensure the boundary is maintained, and leak test surveillance requirements. The details and frequencies for these requirements are specified in the CRE Habitability Program.

REFERENCES

1. UFSAR, Section 6.4.
2. UFSAR Section 6.4.2.3.
3. UFSAR, Chapter 15.
4. Regulatory Guide 1.52, Rev. 2, March 1978.

BASES

ACTIONS

C.1 (continued)

may involve feed and bleed procedures, filtering, or combinations of these procedures. Even if a DG start and load was required during this time interval and the fuel oil properties were outside limits, there is a high likelihood that the DG would still be capable of performing its intended function.

D.1

With starting air receiver pressure < 210 psig, sufficient capacity for eight successive DG start attempts does not exist. However, as long as the receiver pressure is > 150 psig, there is adequate capacity for at least one start attempt, and the DG can be considered OPERABLE while the air receiver pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most DG starts are accomplished on the first attempt, and the low probability of an event during this brief period.

E.1

With a Required Action and associated Completion Time not met, or one or more DG's fuel oil, or starting air subsystem not within limits for reasons other than addressed by Conditions A through D, the associated DGs may be incapable of performing its intended function and must be immediately declared inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks to support one DG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

(continued)