AMENDMENT 3 TO RESAR-SP/90 PDA MODULE 1
PRIMARY SIDE SAFEGUARDS SYSTEM

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INSTRUCTION SHEET

Replace current page 5.4-2 with revised page 5.4-2.

Replace current page 5.4-3 with revised page 5.4-3.

Replace current page 5.4-5 with revised page 5.4-5.

5.4.7.1 Design Basis

Design parameters for the RHR components are provided in Table 6.3-2. Table 6.3-1 provides a list of parameters which interface with other systems of the WAPWR Nuclear Power Block.

The RHR subsystem (RHRS) of the ISS is designed to operate in conjunction with other plant systems to reduce the temperature of the RCS during the second phase of normal plant cooldown.

The RHRS is placed in operation approximately 4 hours after reactor shutdown when the temperature and pressure of the RCS are approximately 350°F and 400 psig, respectively. Assuming that four heat exchangers and four pumps are in service, and that each heat exchanger is supplied with component cooling water at design flow and temperature, the RHRS is designed to reduce the temperature of the reactor coolant from 350 to 150°F within 16 hours. The heat load handled by the RHRS during the cooldown transient includes residual decay heat from the core, RCS sensible heat, and reactor coolant pump heat. The design heat load is based on the decay heat fraction that exists at [illegible] hours following reactor shutdown from an extended run at full power.

The RHRS is also designed to operate in conjunction with the other systems of the cold shutdown design in order to address the functional requirements proposed by Regulatory Guide 1.139, "Guidance for Residual Heat Removal to Achieve and Maintain Cold Shutdown". The cold shutdown design enables the nuclear steam supply system to be taken from hot standby to cold shutdown conditions using only safety-related systems, with or without offsite power, and with the most limiting single failure within 36 hours.

The RHRS is designed to be isolated from the RCS whenever the RCS pressure exceeds the normal RHRS cut in pressure. The RHRS is isolated from the RCS on the suction side by two motor-operated valves in series on each suction line. Each of the normally closed motor-operated valves is interlocked to prevent its opening if RCS pressure is greater than approximately [ ] psig. (a,c) | 3

(These interlocks are discussed in more detail in Section 5.4.7.2.1). The RHRS is isolated from the RCS on the discharge side by two check valves in each return line and a normally closed power removed MOV located outside containment. 3

Each inlet line to the RHRS is equipped with a pressure relief valve designed to relieve the combined flow of the charging pumps at the relief valve set pressure. Two of these relief valves also provide sufficient relief rate to protect the system from inadvertent overpressurization due to any postulated mass or heat inputs during plant cooldown or startup. 3

Each discharge line from the RHRS to the RCS is equipped with a pressure relief valve designed to relieve the possible backleakage through the valves isolating the RHRS from the RCS.

The RHRS is designed for a single nuclear power unit and is not shared among nuclear power units.

The RHRS is designed to be fully operable from the control room. Manual actions required of the operator are discussed in Section 5.4.7.2.6.

By nature of its redundant four train design, the RHRS is designed to accept all major component single failures with the only effect being an extension in the required cooldown time. There are no motor-operated valves in the RHRS that are subject to flooding. Provisions to protect equipment from flooding are discussed in Section 3.4 of the "Structural/Equipment Design" module. Although Westinghouse considers it to be of low probability, spurious operation of a single motor-operated valve can be accepted without loss of function as a result of the redundant four train design.

Provisions incorporated in the design to ensure that the system will operate when needed are discussed further in subparagraph 5.4.7.2.

Missile protection, protection against dynamic effects associated with the postulated rupture of piping, and seismic design are discussed in Section 3.5, 3.6, and 3.7, respectively of the "Structural/Equipment Design" module.

This interlock prevents the RHR subsystems from being over pressurized by preventing the subsystems from being aligned to the RCS at an RCS pressure above [ ] psig. The valves may be closed by operator action from the main control board at any time. (a,c) 3

The wide-range RCS pressure interlock for both the prevent open and the autoclosure features on the inner isolation valves is independent and diverse from that provided to the outer isolation valves.

b. EWST Suction Isolation Valves (9007A, B, C, D)

Interlocks are provided for the normally open EWST suction isolation valves to prevent their opening unless one of the two corresponding RHR normal cooldown suction isolation valves is closed.

These interlocks ensure that the valve cannot be reopened by operator action after the initiation of a normal cooldown operation, which provides a positive backup to the EWST/pump suction header check valves (9008A, B, C, D) against RHR subsystem leakage into the EWST. The valves may be closed by operator action from the main control board at any time.

c. Containment Spray Header Isolation Valves (9009A, B, C, D and 9011A, B, C, D)

Interlocks are provided for the series containment spray header isolation valves to prevent their opening unless one of the two corresponding RHR normal cooldown suction isolation valves is closed.