

Draft

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U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 07.06 - Interlock Systems Important to Safety

Application Section: 07.06 - Interlock Systems Important to Safety

ICE1 Branch

QUESTIONS

07.06-1

Demonstrate why using the pressurizer safety relief valves (PSRVs) operating in their low temperature overpressure protection (LTOP) mode and the spring-loaded safety valves on the residual heat removal (RHR) suction lines is an acceptable method to address Item 2 of Standard Review Plan, Branch Technical Position (BTP) 7-1, to prevent over pressurization of the RHR system. Demonstrate how this approach addresses DC FSAR, Tier 2 Section 15.8.1.1, "US EPR Design Features," which requires implementation of interlocks and preventive actions that cope with deviations from normal operation to prevent an event from resulting in the actuation of a safety system.

10 CFR Part 50, Appendix A, General Design Criterion 15, "Reactor Coolant System Design," requires, in part, that the reactor coolant system and associated auxiliary, control, and protection systems shall be designed with sufficient margin to ensure that the design conditions of the reactor coolant system pressure boundary are not exceeded during any condition of normal operation, including anticipated operational occurrences. BTP 7-1 provides acceptance criteria for partially meeting the above criterion. Specifically, Item 2 of BTP 7-1 states that valve operators should receive a signal to close automatically whenever the primary system pressure exceeds the subsystem design pressure.

DC FSAR, Tier 2 Section 7.1.2.5.1 states that the applicable I&C systems listed in Table 7.1-2 are designed to meet the guidance of BTP 7-1, with the exception that the applicable RHR valves are not automatically shut upon re-pressurization of the reactor coolant system. The RHR suction valve interlocks and a justification for this approach are described in Section 7.6.1.2.1. DC FSAR, Tier 2 Section 7.6.1.2.1 states that when RHR is connected, an inadvertent increase in reactor coolant system pressure does not result in an automatic signal to close the RHR reactor coolant pressure boundary isolation valves. However, the PSRVs operating in their LTOP mode and the spring loaded safety valves on the RHR suction lines prevent the increasing pressure from exceeding the RHR system design pressure.

During an intentional increase in pressure, when either RCS temperature or pressure exceed the P14 permissive setpoint, the operator is prompted to acknowledge the P14 permissive and allowed to close the RHR reactor coolant pressure boundary isolation

valves. Pressure protection now requires P17 permissive for LTOP to be active. DC FSAR, Tier 2 Section 7.1.3.12 states "Cold leg temperature (WR) measurements are compared to a Setpoint (248 °F). When three out of four measurements are less than the setpoint, the operator is prompted to manually validate the permissive."

07.06-2

Demonstrate how the U.S. EPR design addresses the acceptance criteria in Branch Technical Position (BTP) 7-2 of the Standard Review Plan. Specifically, what is the position of isolation valve between the P12 permissive and >1000 psi. What impact does a SI signal have on the system between the P12 permissive and >1000 psi.

Clause 6.6 of IEEE Std. 603-1991 states, in part, that whenever the applicable permissive conditions are not met, a safety system shall automatically prevent the activation of an operating bypass or initiate the appropriate safety functions. BTP 7-2, specifically Item 4, states that the following feature should be incorporated into the design of the motor-operated isolation valve systems for safety injection tanks: Utilization of a safety injection signal to remove automatically (override) any bypass feature that may be provided to allow an isolation valve to be closed for short periods of time when the reactor coolant system is at pressure (in accordance with provisions of the technical specifications).

DC FSAR, TIER 2, Section 16.0 - Tech Spec B3.05, Accumulators B 3.5-1, states for an accumulator to be considered OPERABLE, the isolation valve must be fully open, power removed above 2000 psig, APPLICABILITY In MODES 1 and 2, and in MODE 3 with RCS pressure > 1000 psig, the accumulator OPERABILITY requirements are based on full power operation.

Although cooling requirements decrease as power decreases, the accumulators are still required to provide core cooling as long as elevated RCS pressures and temperatures exist. This LCO is only applicable at pressures > 1000 psig. DCD TIER 2, Section 7.6.1.2 states that during a normal decrease in pressure, power is restored to the valves at a point in time determined by the operating procedures. Then, after RCS pressure decreases below the P12 threshold, the operator is prompted to manually acknowledge P12 which allows the isolation valves to be closed.

Address how the isolation valve will behave upon receipt of a safety injection signal, to automatically override the bypass feature that allows the valve to closed for short periods of time, when the accumulators are required to be operable.