

NRC/NRO/DSRA/Balance of Plant lessons learned

July 13, 2012

APR 1400

The NRC evaluates the design, performance and testing of safety-related cooling water systems, including the essential service water system (SRP 9.2.1), the component cooling water system (SRP 9.2.2), the chilled water system (SRP 9.2.2), and the ultimate heat sink (SRP 9.2.5).

For several design certification (DC) application reviews, the NRC staff identified that information that are specified in the Standard Review Plan (NUREG-0800) and Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants," to demonstrate compliance with the relevant General Design Criteria (GDC) in Appendix A to 10 CFR Part 50, were not sufficiently addressed in the initial DC applications.

The examples below demonstrate some of the challenges of not following the guidance: .

- Operating experiences (OpE), such as water hammer and bio-fouling were not considered and designed for.
- Flow to the RCP thermal barrier was originally isolated for containment isolation without explaining the impact on the seals.
- Cross tie valves between trains did not adequately address single failure
- System/component margins, such as flow, system head, heat removal capacity were not sufficiently addressed
- System interactions, such as pump and valve automatic alignments during accident conditions, were not sufficiently addressed
- Failure modes and effects analysis were not sufficiently addressed for all SR components
- Safety related instrumentation/controls (I&C) and alarms were missing and not sufficiently addressed
- Conceptual design information was not sufficiently addressed. Clear boundary needs to be defined between DC and COLS.
- Tier 1 interface requirements were not sufficiently addressed for conceptual design
- Inspection, testing, analysis, acceptance criteria (ITAAC) were not sufficiently addressed such as testing the UHS for accident loads
- UHS cooling tower environmental parameters such as bounding wet bulb temperature were not sufficiently addressed
- Chapter 14 preoperational testing were not sufficiently addressed such as testing for water hammer

Having a complete design that is sufficiently documented in the DC application should help avoid a large number of RAIs and a long staff review time.