

Discussion on RCP Issues

1. Introduction
2. Issues necessary for Clarifications
3. KHNP's Proposed Plan

1. Introduction

- Total number of Comments : 3
- Number of Comments necessary for Clarifications : 3
- Other Issues : None

2. Issues Necessary for Clarifications

- ❖ Sections 3.6.2, 3.9.3, and 3.12. As listed in Enclosure 3 to KHNP's submittal letter dated September 30, 2013, **design acceptance criteria (DAC) are being proposed for the reactor coolant pump**, as well as for some piping systems (as well as pipe rupture hazards analysis, not described in this enclosure). DCD Tier 1, Table 2.3-1 provides additional summary information on the piping DAC that are included in system inspections, tests, analyses, and acceptance criteria (ITAAC) (e.g., DCD Tier 1, Table 2.4.2-4 for the reactor coolant system). The **reactor coolant pump DAC is less clear**. The **stress analysis for the reactor coolant pump flywheel is listed in DCD Tier 1, Table 2.4.2-4, but not noted as DAC**. As described in RG 1.206, Section C.III.5, DAC have been accepted in a limited number of design areas on a case-by-case basis when technology is changing rapidly or as-built or as-procured information is unavailable. The DCD should include a clarification of these piping and component DAC and justify the need for this approach.

2. Issues Necessary for Clarifications



2. Issues Necessary for Clarifications

- ❖ Section 5.4.1.1. This section discusses how the integrity of the APR1400 reactor coolant pump flywheel will be maintained over the operating life of the plant. However, **the flywheel analysis was not provided**. This analysis forms the basis and validates all of the information in the DCD in order to meet the requirements of 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 4. Therefore, the staff cannot start its review of Section 5.4.1.1 of the APR1400 DCD until this analysis is provided as specified in Regulatory Guide 1.14, “Flywheel Integrity.” KEPCO/KHNP **has proposed that this flywheel analysis would be submitted by December 31, 2014**, which would be the date the U.S. Nuclear Regulatory Commission staff could start its review of Section 5.4.1.1.

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2. Issues Necessary for Clarifications

APR1400 DCD TIER 1

Enclosure 1.

Table 2.4.2-4 (6 of 7)

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
9.b Each RCP motor has a flywheel which retains its integrity at a design overspeed condition.	<p>9.b.i Shop testing of each RCP flywheel will be performed at the vendor facility at overspeed condition.</p> <p>9.b.ii The stress analysis for RCP flywheel will be performed.</p>	<p>9.b.i Each RCP flywheel has passed an overspeed test of no less than 125 % of operating speed.</p> <p>9.b.ii The analysis shows that the flywheel is properly designed to withstand normal conditions, anticipated transients, the design basis loss of coolant accident, and the safe shutdown earthquake without loss of structural integrity.</p>
9.c Each RCP has rotating inertia to slow the pump flow coastdown when electrical power is disconnected.	9.c Analysis of RCP rotating inertia will be performed.	9.c The rotating inertia of each RCP and motor assembly is no less than 6,717 kg-m ² (159,400 lb-ft ²)
9.d The RCPs circulate coolant at a rate which removes heat generated in the reactor core.	9.d Testing to measure RCS flow with four RCPs operating at normal zero power pressure and temperature conditions will be performed.	9.d Pre-core total measured RCS flow rate is between 1,953,000 L/min (516,000 gpm) and 2,058,000 L/min (544,000 gpm)
9.e The RCS provides rated pressurizer backup heaters to control system pressure.	9.e Inspections will be performed to verify the rated capacity of the as-built pressurizer backup heater groups No.1 and No.2.	9.e Each as-built pressurizer backup heater group (No.1 and No.2) has a rated capacity of at least 300 kW.
10. The RV is equipped with holders for at least six capsules for accommodating material surveillance specimens.	10. Inspection of the RV for presence of capsules will be performed.	10. At least six capsules are in the reactor vessel.

2. Issues Necessary for Clarifications

- ❖ Fukushima. The mitigation strategies intended to address the effects of extended loss of ac power (ELAP), such as occurred during the Fukushima-Daiichi event, should be addressed, e.g., reactor coolant pump seal leakage tests under ELAP conditions.



3. KHNP's Proposed Plan



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