Requirements to Consider LOOP in Conjunction with Large LOCA – Rulemaking

Lead Office/Division: NRR/DPR
Supporting Offices/Divisions: TBD

Description

The proposed rule would amend the Commission's regulations to eliminate, based upon appropriate risk considerations, the assumption of a coincident loss of offsite power for postulated large-break (low frequency) loss-of-coolant accidents (LB-LOCA) in General Design Criterion (GDC) 35. The proposed rule would provide a voluntary alternative to existing requirements in situations where specified acceptance criteria are satisfied, and also would address a petition for rulemaking submitted by Bob Christie (Performance Technology) (PRM-50-77).

The staff's approach was to develop the technical basis for a LOOP-LOCA rule by reviewing the Boiling Water Reactor Owners Group (BWROG) topical report, NEDO-33148, "Separation of Loss of Offsite Power from Large Break LOCA" (ML041210900, April 27, 2004). In the March 31, 2003, staff requirements memorandum directing the staff to go forward with a risk-informed rule decoupling LOOP from LOCA (ML030910476), the Commission stated that the rule should consider the risk impacts of a "delayed LOOP and possible double-sequencing of safety functions." During the review of the BWROG topical report, the potential safety impact of a LOCA followed by a delayed LOOP became a major issue. Existing nuclear plants are designed to handle only the simultaneous LOCA and LOOP. The capability of many plants to successfully mitigate upsets causing a delayed LOOP has not been determined.

The BWROG topical report proposed an approach to justify decoupling LOOP from LOCA for LOCAs larger than 10" in diameter. That approach relied on the assumption that a single probability of delayed LOOP could be generically applied to all plants. This assumption conflicts with the resolution of GSI 171, "Engineered Safety Features Failure from LOOP Subsequent to a LOCA," which concluded that the probability of a delayed LOOP will vary significantly for individual plants depending on their design. The staff concluded that the BWROG approach could not be approved without evaluating an individual plant's capability to successfully cope with a delayed LOOP. This staff position resulted in the BWROG concluding that continued development of the topical report was no longer cost effective, and if ultimately approved in the form desired by NRC staff, adoption by licensees would most likely be prohibitively expensive. By letter dated June 12, 2008, the BWROG withdrew the report from further NRC review.

The BWROG's conclusion that the NRC approach to decouple LOOP from LOCA would be prohibitively expensive decreases the likelihood of developing a successful LOOP-LOCA rule. When completed, the final § 50.46a risk-informed ECCS rule would allow licensees to decouple LOOP from LOCA for LOCAs larger that the transition break size (about 11 inches for PWRs and about 21 inches for BWRs). In December 2007, in COMSECY-07-0041, "Status of Staff Activities on Proposed Rule for Risk-Informed Decoupling of Assumed Loss-of-Offsite Power From Loss-of-Coolant Accident Analyses," the staff indicated its plans to reassess the need for a LOOP-LOCA rule after making final decisions on the BWROG topical report and on the § 50.46a risk-informed ECCS rule.

In an SRM related to SECY-07-0082 dated August 10, 2007, the Commission agreed with the staff's recommendation that completing the rulemaking should be assigned a medium priority. In September 2009 SECY-09-0140, "Rulemaking Related to Decoupling an Assumed Loss of Offsite Power from a Loss of Coolant Accident, 10 CFR Part 50, Appendix A, General Design Criterion 35," provided options for completing the rulemaking and recommended the option to

discontinue the rulemaking effort. The staff's recommendation was based on the lack of a fully developed regulatory basis and expenditures of staff time to develop one would not be expected to result in a quantifiable safety improvement. In the SRM related to SECY-09-0140 dated July 12, 2010, the Commission directed the staff to defer the decision on the rulemaking effort until the 10 CFR 50.46a rule is implemented. The staff issued SECY-10-0161, "Final Rule: Risk-Informed Changes to Loss-of-Coolant Accident Technical Requirements (10 CFR 50.46a)," on December 10, 2010. Subsequently, on April 20, 2012 (ML121500380), the staff requested withdrawal of the § 50.46a final rule from Commission consideration. The Commission approved the staff's request in an SRM dated April 26, 2012 (ML12117A121). Because the final § 50.46a rule is delayed pending receipt of Commission direction on NTTF Recommendation 1, the staff's paper recommending whether to pursue a LOOP-LOCA rule is not expected for submission until CY-2015.