ADAMS Accession No.: ML100620222

REQUESTS FOR ADDITIONAL INFORMATION

Prairie Island Nuclear Generating Plant, Units 1 and 2

Alternative Source Term (AST) License Amendment Request (LAR) dated October 27, 2009

The following requests for additional information are associated with the NRC staff review of the steam generator tube rupture (SGTR) overfill analysis in support of the AST LAR application, as discussed in the Enclosure to Reference 1, Pages 106 and 107.

Please provide the following information for the NRC staff to continue its review:

1. Discuss the methods used for the SGTR overfill analysis. If the methods were previously approved by NRC, list the NRC safety evaluation reports approving the methods. If the methods were not reviewed and approved by NRC, address acceptability of the methods. The information should include a description and justification of reactor coolant system (RCS) models with safety injection simulation, models for determination of the primary-to-secondary break and steam relief flow rates, and steam generator (SG) water level model accounting for the effects of bubble formation during depressurization on the SG water level for a SGTR event.

2. Provide a list the nominal values with measurement uncertainties and the corresponding values used in the SGTR overfill analysis for the following applicable plant parameters:

    - Initial RCS pressure
    - Initial SG water inventory
    - Safety injection actuation pressure setpoint
    - Safety injection flow versus RCS pressure
    - Safety injection system pump delay time
    - SG relief valve pressure setpoint
    - Auxiliary feedwater actuation setpoint and delay time
    - Auxiliary feedwater flow rate per SG
    - Auxiliary feedwater temperature
    - Time of loss of offsite power
    - Delay times for reactor trip and turbine trip
    - Decay heat model and initial value in percentage of the rated power level

    Discuss the effects of an increase or decrease in the value for each of the above plant parameters on the SG water level calculations during a SGTR and address the adequacy of the values used in the SGTR overfill analysis in minimizing the margin to SG overfill.

3. List operator action times for the following applicable operator actions as determined by the plant simulator in accordance with the Emergency Operating Procedure E-3 for a SGTR:

    - Identify and isolate the rupture SG
    - Initiate RCS cooldown
    - Initiate RCS depressurization
    - Terminate safety injection flow
    - Establish charging flow

- Establish RCS letdown
- Reopen pressurizer PORV

Discuss the operator actions credited in the SGTR overfill analysis and provide a sequence of events for the SGTR including the above operator action times, and calculated times for the RCS cooldown, RCS depressurization and equalization of RCS and ruptured SG pressure. The information should show that the operator actions and their associated times assumed in the analysis were identical with that determined by the plant simulator.

4. List the single failure events considered in the SGTR overfill analysis and identify the worst single failure used in the analysis that resulted in a minimum margin to the SG overfill.

5. Provide the results of the SGTR overfill analysis for the following applicable plant parameters:

   - Pressurizer pressure versus time
   - Secondary pressures and SG water volumes versus time for both intact and rupture SGs
   - Total primary to secondary break flow and total integrate primary to secondary break flow versus time
   - SG relief flow and integrated SG relief flow versus time for both intact and rupture SGs

   The results indicate the following: the calculated RCS break and SG relief flowrates are consistent with the primary and secondary pressures; there is no unexplainable thermal-hydraulic phenomenon; the RCS pressure and the rupture SG secondary pressure are equal; and, the SG does not overfill with water.

Reference 1: Letter from Mark Schimmel, Xcel Energy, to the U.S. Nuclear Regulatory Commission Document Control Desk, re: Prairie Island Nuclear Generating Plant, Units 1 and 2, Dockets 50-282 and 50-306, License Nos. DPR-42 and DPR-60, “License Amendment Request (LAR) to Adopt Alternative Source Term Methodology,” dated October 27, 2009 (ADAMS Accession No. ML093160583).