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Nuclear Regulatory Commission
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DOCKET 50-255 - LICENSE DPR-20 - PALISADES PLANT - NOTIFICATION OF SIGNIFICANT ERROR IN CORE COOLING CALCULATION

This letter provides the 30 day notification as required by 10 CFR 50.46 of the discovery of a significant error in the Palisades plant large break loss of coolant accident (LOCA) evaluation. The error was significant because it resulted in an increase in the peak cladding temperature greater than 50°F; however, the calculated peak cladding temperature criteria of 2200°F defined in 10 CFR 50.46(b)(1) continues to be satisfied.

Identification of the Error

The error occurred in the Palisades large break LOCA analysis used to demonstrate compliance with 10 CFR 50.46 as reported in the EMF-92-177, "Palisades Large Break LOCA/ECCS Analysis With Increased Peaking and Reduced ECCS Flow." This analysis was performed for Consumers Power Company by the Siemens Power Corporation (SPC) in 1991 in support of the Palisades cycle 10 reload analysis and used the NRC approved large break ECCS evaluation model EXEM/PWR. Information supporting the cycle 10 core reload was submitted to the NRC in our November 1, 1991 letter. SPC initially notified Consumers Power Company of the error and the impact of the error by telephone on April 29, 1993 which was then followed by a letter of the same date.

Description of the Error

The EXEM/PWR evaluation model consists of the following computer codes:

    1)   RODEX2 for computation of initial fuel stored energy, fission release and gap conductance;
    2)   RELAP4-EM for the system and hot channel calculations;
    3)   CONTEMPT/LT-22 as modified in accordance with NRC Branch Technical Position CSB 6-1 for computation of containment back pressure;
    4)   REFLEX for computation of system re-flood; and
    5)   TOODEE2 for the calculation of the fuel rod heat-up during the refill and re-flood portions of the LOCA transient.
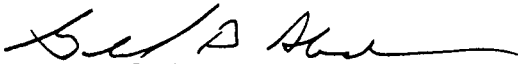
The error in the Palisades large break LOCA analysis was in the input to the TOODEE2 computer code. TOODEE2 is used to calculate the peak cladding temperature (PCT) using the boundary conditions supplied from the system blowdown and hot channel calculations. The TOODEE2 input error was the use of too large a time step to allow satisfactory convergence of the PCT calculation. Because the rate of temperature increase for the analysis was rapid, the exothermal metal-water reaction was not coupled closely enough when using the relatively large time step. Therefore, the PCT at the end of each time step was slightly underpredicted. The integrated effect of this underprediction was an increase in the calculated PCT of +81°F to 2192°F. The requirements of 10 CFR 50.46 continue to be satisfied.

Consumers Power Company and Siemens Power Corporation have initiated corrective action to prevent recurrence of this event.

Gerald B.Slade
General Manager

CC: Administrator, Region III
    Resident Inspector, Palisades