

Safety Evaluation Report
Point Beach, Units 1 and 2
Docket Nos. 50-266/301

Introduction

By letter dated March 20, 1979 (Reference 1) Wisconsin Electric Power Company (the licensee) submitted the Emergency Core Cooling System (ECCS) reanalysis for the Point Beach Nuclear Plant, Units 1 and 2. This reanalysis was performed in response to the Order for Modification of License issued on April 28, 1978 (Reference 2) for Units 1 and 2 as a result of the discovery of an error in the Zr-water reaction model in the evaluation model computer codes used in the LOCA analysis (Reference 3). The February 1978 version of the ECCS evaluation model (Reference 4) was used in the reanalysis. It included the correction of the error and other approved model changes. The reanalysis also included input assumption of 10 percent of steam generator tubes plugged and was performed with the total peaking factor, F_q , of 2.32.

Evaluation

On March 21, 1978 an error was discovered in the Westinghouse ECCS evaluation model. The error involved the calculated heat generation resulting from the Zr-water reaction and affected the calculated cladding temperatures after a LOCA. Following discovery of this error we promptly determined that no immediate operating change was required to assure safe operation of the plants affected, but that reanalysis and reevaluation were needed. After the subsequent discussions with Westinghouse and with the licensee we issued an Order for Modification of License for the Point Beach Nuclear Plant, Units 1 and 2 (Reference 5). The Order directed that the licensee submit as soon as possible a re-evaluation of ECCS performance calculated in accordance with a revised and approved Westinghouse ECCS evaluation model. In response to this request the licensee submitted the present analysis. The analysis was performed with the NRC approved February 1978 version of the Westinghouse Evaluation Model (Reference 4) which, in addition to including the correction of the Zr-water reaction error and several code maintenance and analytical improvements, contained the following changes: modification of the input to the containment code, modified accumulator model, steam dynamic cooling and an improved 15x15 FLECHT heat transfer correlation. The submitted analyses was performed with the total peaking factor, F_q , of 2.32 and assuming 10 percent of steam generator tubes plugged. Although the submitted analysis was limited to a single break, the DECLG break with $C_p=0.4$, the licensee referenced a generic two-loop LOCA spectrum of DECLG breaks with a range of discharge coefficients of from 0.4 to 1.0 (Reference 1). These analyses demonstrated that the limiting break was independent of the version of the Westinghouse ECCS evaluation model used.

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The consideration of upper plenum injection (UPI) effect was not included in the present analysis. However, it was previously demonstrated (Reference 6) that this effect would cause a 60°F increase in peak clad temperature (PCT). In order to use the present ECCS evaluation model to analyze a postulated LOCA in the Point Beach plant and remain in compliance with 10 CFR 50.46, a limit of 2140°F on calculated peak clad temperature must be observed.

The results of the analysis are provided below:

Limiting Break: DECLG with $C_D=0.4$
Steam generator Tubes Plugged: 10 percent
Peak Clad Temperature: 2007°F
Local Zr-Water Reaction: 3.6%
Total Zr-Water Reaction: <0.3%

All the values reported are below the limits of 10 CFR 50.46.

Conclusions

Based on the review of the submitted documents we conclude from the results of the ECCS reanalysis performed with the previously approved February 1978 version of the Westinghouse evaluation model, that operation of Point Beach Units 1 and 2 at a peaking factor limit of 2.32 will be in conformance with the 10 CFR 50.46 criteria. We consider the ECCS analysis acceptable for allowing the plant to be operated with up to a maximum of 10 percent of steam generator tubes plugged.