



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO TOPICAL REPORT WCAP-10924-P, VOLUME 1,

ADDENDUM 4, REVISION 1 (AUGUST 1990),

"WESTINGHOUSE LARGE BREAK LOCA BEST ESTIMATE METHODOLOGY:

MODEL DESCRIPTION AND VALIDATION, MODEL REVISION"

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND UNITS 1 AND 2

DOCKET NOS. 50-282 AND 50-306

1.0 INTRODUCTION

On September 13, 1990, Northern States Power Company submitted a request to amend the licenses of Prairie Island Units 1 and 2 to include reference to WCAP-10924-P, Volume 1, Addendum 4, Revision 1 (August 1990). This topical report describes changes to the staff approved methodology (WCAP-10924-P-A) which the Prairie Island plants have been referencing for licensing basis LOCA analyses since September 1988. The revisions (August 1990) correct an error in the decay heat calculation and amend certain fuel and core calculational methods.

On February 5, 1991, the licensee submitted information supporting the applicability of WCAP-10924-P, Volume 1, Addendum 4, Revision 1 (August 1990) to Prairie Island and also provided results of the LOCA analyses performed with the revised methodology.

2.0 EVALUATION

The WCAP-10924-P-A methodology was approved on August 29, 1988, and its applicability to Prairie Island was approved on September 16, 1988. In its evaluation of the generic topical report WCAP-10924-P, Volume 1, Addendum 4, Revision 1 (August 1990) which updates the 1988 version, the staff found its methodology acceptable for referencing by Westinghouse designed 2-loop upper plenum injection (UPI) plants. A referencing requirement of the updated methodology (August 1990) is the identification of calculational changes in the application of the revised model from the previous model applications which are not included in WCAP-10924-P, Volume 1, Addendum 4, Revision 1 (August 1990). Despite the plant specific referencing requirements, the August 1990 revision does not change the overall WCAP-10924-P-A methodology.

In its February 5, 1991, submittal the licensee identified input changes other than those addressed in the SE approving the August 1990 revision which could affect calculated peak cladding temperature (PCT). It was identified that there is some possible effect due to the decay power effects of correcting the decay

heat error. This effect was indicated to be small. We find this effect acceptably identified.

Also identified were changes in the method used to match the reference reactor system pressure drop and flow information during steady state. The method used, while different than the original method, was indicated to be consistent with the WCAP-10924-P-A methodology description and the resultant parameter values differences were indicated to be within tolerances of acceptability given in WCAP-10924-P-A. The licensee's submittal also indicated that the method for determining pressure drop and flow parameters is more accurate than that which was previously used because unrecoverable pressure losses are directly compared. We find the pressure drop and flow parameter changes acceptable because of the indicated consistency with the approved WCAP-10924-P methodology. Because WCAP-10924-P, Volume 1, Addendum 4, Revision 1 (August 1990) has been approved for referencing (February 8, 1991), and because NSP has provided acceptable referencing information, we find the Prairie Island Units 1 and 2 reference of WCAP-10924-P, Volume 1, Addendum 4, Revision 1 (August 1990) acceptable.

The February 5, 1991, submittal also provides the results of LOCA analyses performed with the updated methodology. The licensee did not identify any significant changes in assumptions or inputs to the analyses (other than those identified above) from those in the previous licensing basis LOCA analyses (approved in SE dated September 16, 1988). These previous analyses identified the appropriate set of input conditions and a worst break, double-ended, cold-leg guillotine (DECLG) break with a break discharge coefficient (Cd) of 0.4. Using the updated methodology for an assumed DECLG Cd = 0.4 break, the calculated peak cladding temperature is 2109°F, the calculated maximum local metal/water reaction is 6.6 percent, and the calculated total core-wide metal/water reaction is less than 0.3 percent which are below the allowable limits specified in 10 CFR 50.46(b) of 2200°F, 17 percent and 1 percent, respectively. The analyses were performed based on a total peaking factor of 2.4 at 102 percent of the rated NSSS power level of 1650 megawatts thermal.

As discussed above, we find that the LOCA analysis methodology described in WCAP-10924-P, Volume 1, Addendum 4, Revision 1 (August 1990) has been acceptably referenced for analysis of Prairie Island Units 1 and 2, and that the LOCA analyses submitted February 5, 1991 using the August 1990 updated methodology are acceptable.

3.0 ENVIRONMENTAL CONSIDERATION

These amendments involve a change in a requirement with respect to the installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20 or changes in surveillance requirements. The staff has determined that the amendments involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that these amendments involve no significant hazards consideration and there has been no public comment on such finding. Accordingly, these amendments meet the eligibility criteria for categorical exclusion set forth in 10 CFR Section 51.22(c)(9). Pursuant to

10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of these amendments.

4.0 CONCLUSIONS

The staff has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

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Date: February 11, 1991