



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

VIRGINIA ELECTRIC AND POWER COMPANY

SURRY, UNITS 1 AND 2 AND NORTH ANNA UNITS 1 AND 2

DOCKET NOS. 50-280, 50-281, 50-338, AND 50-339

1.0 Introduction

By letter dated April 9, 1984, the NRC approved an increase in the batch average burnup restriction from 37,000 to 45,000 MWD/MTU (megawatt days per metric ton of uranium) for both the Surry and North Anna Power Stations. Subsequently, by letter dated November 25, 1992, the Virginia Electric and Power Company (the licensee) requested relaxation of the batch average burnup restriction of 45,000 MWD/MTU, as presently specified in NRC letter dated April 9, 1984, for both the Surry and North Anna facilities, and proposed instead to limit the burnup to limits consistent with the NRC safety evaluation report (SER) on a Westinghouse topical report WCAP-10125, entitled "Extended Burnup Evaluation of Westinghouse Fuel," which was transmitted to the Westinghouse Electric Corporation by NRC letter dated October 11, 1985.

The staff concludes that it is acceptable to raise the limit to 50,000 MWD/MTU, or above, as long as the maximum rod average burnup of any fuel rod is no greater than 60 MWD/MTU pursuant to the limits specified in the Federal Register (53 FR 6040).

2.0 Evaluation

The WCAP-10125 report described the models and methodology used in the safety analysis of Westinghouse fuel at extended burnup and discusses the experimental data used to support those models. As stated in the above-cited NRC letter dated October 11, 1985, we found the topical report to be acceptable for referencing in license applications to the extent specified and under the limitations delineated in the topical report and the associated NRC SER. The staff review of the topical report found that:

1. WCAP-10125 not only discussed models, methodology and data, but also applied these models to show that existing limits continue to be met over a burnup range exceeding that requested by the licensee.
2. The models used have been previously reviewed and approved by the NRC without explicit burnup limits. The analysis simply applied these unchanged models over a burnup range not previously considered, but did not address radiological aspects, which are discussed below.
3. Westinghouse examined the application of the existing methodology at extended burnup and identified no burnup-dependent phenomena which would invalidate the analyses performed.

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4. Results of Westinghouse extended burnup Lead Assembly programs at a number of Westinghouse plants (including Surry and North Anna) support the Westinghouse conclusion (excluding radiological aspects discussed below).

The licensee has reviewed the Westinghouse report (WCAP-10125) and has determined that the results are applicable.

The NRC staff performed an independent analysis of the radiological consequences of extended fuel burnup and concluded that, while there would be an increased thyroid dose resulting from the fuel handling accident, the calculated increase was not significant. The increased thyroid dose meets the acceptance criteria of the Standard Review Plan Section 15.7.4 and the dose guidelines set forth in 10 CFR Part 100. Subsequent to the issuance of the NRC SER, NUREG/CR-5009, entitled "Assessment of the Use of Extended Burnup Fuel in Light Water Power Reactors," was published in February 1988 to document a study conducted by Pacific Northwest Laboratory for the NRC. This report concluded that there are no significant adverse environmental effects associated with increases in the burnup level to a maximum rod average burnup of 60,000 MWD/MTU.

3.0 Environmental Considerations

The staff prepared and published an environmental assessment and finding of no significant impact from the use of extended burnup fuel in commercial light water reactors in the Federal Register (53 FR 6040), which concluded that there are no significant adverse radiological or non-radiological impacts associated with the use of extended burnup fuel and that its use will not significantly affect the quality of the human environment. Therefore, pursuant to 10 CFR 51.31, the Commission has determined that an environmental impact statement need not be prepared for this action.

4.0 Conclusion

We have concluded that increasing of the batch average burnup restriction to 50,000 MWD/MTU, or above, as long as the maximum rod average burnup of any fuel rod is no greater than 60 MWD/MTU for the Surry and North Anna facilities, is acceptable. Implicit in this evaluation is that the fuel management scheme will continue to provide the limiting location of fuel during subsequent cycles of operation.

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Date: December 14, 1993