



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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 168 TO FACILITY OPERATING LICENSE NO. DPR-19

COMMONWEALTH EDISON COMPANY

DRESDEN NUCLEAR POWER STATION, UNIT 2

DOCKET NO. 50-237

1.0 INTRODUCTION

By letter dated March 19, 1998, as supplemented by letters dated March 28, 1998, and April 3, 1998, Commonwealth Edison Company (ComEd, the licensee) proposed changes to the Technical Specifications (TS) for the Dresden Nuclear Power Station, Unit 2, Cycle 16. The proposed changes include the Minimum Critical Power Ratio (MCPR) safety limits for the Cycle 16 operation which has 548 Siemens Power Corporation (SPC) 9x9-2, and 176 SPC ATRIUM-9B fuel bundles. The use of ATRIUM-9B fuel has been previously reviewed and approved by the staff for full power operation at Dresden, Unit 3, Cycle 15. The March 28, 1998, and April 3, 1998, submittals provided additional clarifying information that did not change the initial proposed no significant hazards consideration determination published March 26, 1998.

During a March 1997 inspection, the NRC staff performed an audit of the application of the SPC Advanced Nuclear Fuel for Boiling Water Reactors (ANFB) critical power ratio (CPR) methodology to ATRIUM-9B fuel. The staff raised concerns associated with the ATRIUM-9B fuel additive constant uncertainty used as an input parameter to the NRC-approved safety analyses methodology that is used for the calculation of the safety limit MCPR. Based on the findings in the March 1997 inspection at SPC, the original value of 0.01 for the additive constant uncertainty (ACU) determined for ATRIUM-9B fuel, was found to be based on an inadequate data base. In response to the inspection findings, SPC submitted a supplement to their generic topical report, ANF-1125(P), Supplement 1, Appendix D, "ANFB Critical Power Correlation Uncertainty for Limited Data Sets," dated April 18, 1997, which is currently under staff review. This appendix proposed a method to estimate the additional uncertainty in the ANFB additive constant when limited experimental critical heat flux data are available for a new fuel lattice type, i.e., 9x9 fuel with an internal water channel. An interim conservative additive constant uncertainty of 0.029 was approved for Dresden, Unit 3, Cycle 15 operation until ANF-1125(P), Supplement 1, Appendix D, could be reviewed and approved.

This request for amendment was submitted under exigent circumstances to support Dresden, Unit 2, Cycle 16, operation which is scheduled to begin on April 13, 1998. ComEd had submitted an application for TS amendments on August 29, 1997, to allow the use of SPC ATRIUM-9B fuel, citing SPC Topical for Revised ANFB Correlation Uncertainty, ANF-1125(P), Supplement 1, Appendix D. Since this SPC topical report is still under staff review, the staff can not complete review of the licensee's August 29, 1997, amendment request at this time. To allow the use of ATRIUM-9B fuel at Unit 2 for Cycle 16, ComEd submitted this one-time cycle-specific amendment request proposing an interim conservative approach to calculating the MCPR Safety Limit.

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2.0 EVALUATION

The licensee requested TS changes to allow a reload batch of ATRIUM-9B fuel to be used in Dresden, Unit 2, Cycle 16. The proposed changes were as follows:

- (1) TS 5.3.A, Fuel Assemblies footnotes - to delete existing footnotes 1 and 3 and modify existing footnote 2, which restricted operation of ATRIUM-9B fuel to lead test assembly quantities, in order to support Dresden, Unit 2, Cycle 16, operation with a full reload batch of ATRIUM-9B fuel, and
- (2) Section 2.1.B - to increase the Dresden, Unit 2, MCPR safety limit from 1.08 to 1.09 to support Unit 2, Cycle 16, operation.

2.1 Reactor Core

TS 5.3.A, Fuel Assemblies, provides a description of the fuel assemblies. In previous amendments, the NRC added footnotes to only allow Dresden, Unit 2, operation in Modes 3, 4, and 5 with ATRIUM-9B fuel, other than lead test assemblies, since this fuel reload had not been analyzed with approved methods. The proposed modification to the footnotes will allow Dresden, Unit 2, Cycle 16, to operate in all modes with ATRIUM-9B fuel. The staff finds this acceptable because the reload batch has been analyzed with NRC-approved methodology, as described below.

2.2 MCPR Safety Limit Calculation

Based on the same interim additive constant uncertainty (ACU) estimate of 0.029, which was accepted for Dresden, Unit 3, Cycle 15, operation, ComEd requested the Dresden, Unit 2, Cycle 16, MCPR safety limit be increased to 1.09. The methodology used is the approved methodology in TS 6.9.A.6.b.(2). To support the requested increase, the licensee stated that 0.0781 percent of the fuel rods in the core are predicted to experience transition boiling (which is less than the allowable value of 0.1 percent). Recent SPC ATRIUM-9B dryout testing results, communicated to the NRC in a meeting on March 11, 1998, and by letter of March 24, 1998, indicate an ACU of 0.027. However, these experimental values only cover fuel rod local peaking factors (LPFs) up to 1.20, while Dresden, Unit 2, Cycle 16, operation may have LPFs as high as 1.30, which could translate into an ACU as high as 0.0292. To address this concern, ComEd re-performed the cycle-specific MCPR safety limit calculation with a higher ACU of 0.030 applied to all ATRIUM-9B rods in the core. The results of these analyses demonstrated that, with this higher uncertainty, 0.0863 percent of the rods in the Dresden, Unit 2, Cycle 16, core are predicted to experience boiling transition, still less than the allowable value of 0.1 percent. The staff finds this margin and the proposed TS 2.1.B acceptable.

3.0 EXIGENT CIRCUMSTANCES

In its March 19, 1998, application, as supplemented March 28, 1998, and April 3, 1998, the licensee requested that this amendment be treated as an exigent amendment. In accordance with 10 CFR 50.91(a)(6), the licensee provided the following information regarding why this exigent situation occurred and how it could not have been avoided.

Dresden, Unit 2, is currently in a refueling outage and is being refueled with SPC ATRIUM-9B fuel. Amendment of the TS allowing operation with SPC ATRIUM-9B fuel is needed before startup, which is scheduled to begin on April 13, 1998. The licensee had made a timely application for TS amendments on August 29, 1997, to allow the use of SPC ATRIUM-9B fuel, citing SPC Topical for Revised ANFB Correlation Uncertainty, ANF-1125(P), Supplement 1, Appendix D. This SPC topical report is still under staff review and, therefore, the staff can not complete review of the licensee's August 29, 1997, amendment request at this time. Also, the final calculation from current test results was not available to ComEd from SPC until March 13, 1998, making the exigent circumstances unavoidable.

The staff concludes that an exigent condition exists in that failure to act in a timely way would result in prevention of resumption of operation of Dresden, Unit 2. In addition, the staff assessed the licensee's reasons for not filing an application sufficiently in advance to preclude the exigent circumstances and concluded that the licensee has not abused the exigent provisions by failing to make timely application for the amendment. Thus, the conditions needed to satisfy 10 CFR 50.91(a)(6) exist, and the amendment is being processed on an exigent basis.

4.0 FINAL NO SIGNIFICANT HAZARDS CONSIDERATION DETERMINATION

The Commission's regulations in 10 CFR 50.92(c) state that the Commission may make a final determination that a license amendment involves no significant hazards consideration if operation of the facility in accordance with the amendment would not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated, or (2) create the possibility of a new or different kind of accident from any previously evaluated, or (3) involve a significant reduction in a margin of safety.

The proposed changes do not involve a significant hazards consideration because operation of Dresden, Unit 2, in accordance with the proposed changes would not:

- (1) Involve a significant increase in the probability or consequences of an accident previously evaluated:

The probability of an evaluated accident is derived from the probabilities of the individual precursors to that accident. The consequences of an evaluated accident are determined by the operability of plant systems designed to mitigate those consequences. Limits have been established consistent with NRC-approved methods to ensure that fuel performance during normal, transient, and accident conditions is acceptable. This change does not affect the operability of plant systems, nor does it compromise any fuel performance limits.

Revision to Cycle Specific Footnotes for Dresden, Unit 2, Cycle 16, Operation with ATRIUM-9B

The revisions to the footnotes in TS Section 5.3 have no implications for accident analysis or plant operations. The purpose of the revisions to the footnotes is to allow operation of Dresden, Unit 2, Cycle 16, with an interim conservative approach to calculating the MCPR Safety Limit. This is the same approach that was NRC-approved for use for Dresden, Unit 3, Cycle 15, and Quad Cities, Unit 2, Cycle 15. The Dresden, Unit 2, Cycle 16, MCPR Safety Limit was calculated using an interim additive constant uncertainty. The MCPR Safety Limit is used in the

determination of the cycle's MCPR Operating Limit. The MCPR Operating Limit ensures that the MCPR Safety Limit is not violated for any anticipated operational occurrence. This revision does not affect any plant equipment or processes; therefore, there is no alteration in the probability or consequences of an accident previously evaluated.

Revision to the MCPR Safety Limit

Changing the MCPR Safety Limit for Dresden, Unit 2, from 1.08 to 1.09 will not increase the probability of an accident previously evaluated. Additionally, operational MCPR limits will be applied that will ensure the MCPR Safety Limit is not violated during all modes of operation and anticipated operational occurrences. Changing the MCPR Safety Limit will not alter any physical systems or operating procedures. The Dresden, Unit 2, MCPR Safety Limit is set to 1.09, which is a critical power ratio value where less than 0.1 percent of the rods in the core are expected to experience transition boiling. This application for amendment does not change the criterion of ensuring that less than 0.1 percent of the rods in the core are calculated to experience transition boiling when the core is at the MCPR Safety Limit. Therefore, the probability or consequences of an accident will not increase.

- (2) Create the possibility of a new or different kind of accident from any accident previously evaluated:

Creation of the possibility of a new or different kind of accident would require the creation of one or more new precursors of that accident. New accident precursors may be created by modifications to the plant configuration or changes in allowable modes of operation. Other than the use of a full reload of ATRIUM-9B fuel in Dresden, Unit 2, Cycle 16, in Modes 1 and 2, this TS submittal does not involve any modifications to the plant configuration or allowable modes of operation. The operation with a full reload of ATRIUM-9B was previously approved for Dresden, Unit 3, Cycle 15. The ATRIUM-9B fuel is compatible with the existing 9x9-2 fuel in the Dresden, Unit 2, core. No new precursors of an accident are created and no new or different kinds of accidents are created. Therefore, the proposed changes do not create the possibility of a new or different kind of accident from any accident previously evaluated.

Revision to Cycle Specific Footnotes for Dresden, Unit 2, Cycle 16, Operation with ATRIUM-9B

The revision to the cycle-specific footnotes in Section 5.3 is necessary to allow operation of Dresden, Unit 2, Cycle 16. This revision will not alter any plant systems, equipment or physical conditions of the site. Revising the footnotes in Section 5.3 allows operation with a reload of ATRIUM-9B in Modes 1 and 2 for Unit 2, Cycle 16, which has previously been approved for Dresden, Unit 3, Cycle 15. This revision is based on the fact that an interim conservative additive constant uncertainty has been used to calculate the Dresden, Unit 2, Cycle 16, MCPR Safety Limit. NRC approval of this interim approach in determining the Dresden, Unit 2, Cycle 16, MCPR Safety Limit will ensure that fuel limits are determined and cycle specific analyses are performed for Dresden, Unit 2, Cycle 16, utilizing NRC approved methods. Therefore, no new or different kinds of accidents are created from this revision.

Revision to the MCPR Safety Limit

Changing the MCPR Safety Limit will not create the possibility of a new accident from an accident previously evaluated. This change will not alter or add any new equipment or change plant modes of operation. The MCPR Safety Limit is established to ensure that 99.9 percent of the rods avoid transition boiling. The new MCPR Safety Limit for Dresden Unit 2 (1.09) is greater than the current value of 1.08 and is consistent with MCPR Safety Limit calculations in support of Dresden, Unit 2, Cycle 16, operation. Therefore, no new accidents are created that are different from those previously evaluated.

- (3) Involve a significant reduction in the margin of safety for the following reasons:

Revision to Cycle Specific Footnotes for Dresden, Unit 2, Cycle 16, Operation with ATRIUM-9B

The results of the analyses for Dresden, Unit 2, Cycle 16, verify that, with an interim additive constant uncertainty, a MCPR Safety Limit of 1.09 is supportable with less than 0.1 percent of the rods predicted to experience transition boiling. Since there is sufficient margin to the amount of rods predicted to experience transition boiling, and a conservative interim approach has been used to calculate the additive constant uncertainty, removing the footnotes to enable Dresden, Unit 2, Cycle 16, to operate with ATRIUM-9B fuel will not reduce the margin of safety.

Revision to the MCPR Safety Limit

Changing the MCPR Safety Limit for Dresden, Unit 2, will not involve any reduction in margin of safety. The MCPR Safety Limit provides a margin of safety by ensuring that less than 0.1 percent of the rods are expected to be in transition boiling if the MCPR Safety Limit is not violated. The proposed TS amendment to change the MCPR Safety Limit to 1.09 supports operation of Dresden, Unit 2, Cycle 16. SPC used the ANFB critical power correlation with an interim ATRIUM-9B additive constant uncertainty to perform the MCPR Safety Limit calculations.

Because a conservative method is used to apply the ATRIUM-9B additive constant uncertainty in the MCPR Safety Limit calculation, a decrease in the margin to safety will not occur due to changing the MCPR Safety Limit. The revised Dresden, Unit 2, MCPR Safety Limit will ensure the appropriate level of fuel protection. Additionally, operational limits will be established based on the proposed Dresden, Unit 2, MCPR Safety Limit to ensure that the MCPR Safety Limit is not violated during all modes of operation including anticipated operational occurrences. This will ensure that the fuel design safety criterion of more than 99.9 percent of the fuel rods avoiding transition boiling during normal operation as well as during any anticipated operational occurrence is met.

Accordingly, the Commission has made a final determination that the amendment involves no significant hazards consideration.

5.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Illinois State official was notified of the proposed issuance of the amendment. The State official had no comments.

6.0 ENVIRONMENTAL CONSIDERATION

The amendment changes 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. The NRC staff has determined that the amendment involves 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 made a final finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (63 FR 14735). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 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 the amendment.

7.0 CONCLUSIONS

The staff has reviewed the exigent request by ComEd to revise the TS of the Dresden Nuclear Power Station, Unit 2, for Cycle 16 operation. Based on our review, we conclude that the proposed changes to these Specifications are acceptable for Dresden, Unit 2, Cycle 16, reload application since the changes are analyzed based on NRC approved methods, with an increased interim additive constant uncertainty of 0.030.

The staff has concluded, based on the consideration 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, and (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety to the public.

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Date: April 10, 1998