



Commonwealth Edison

One First National Plaza, Chicago, Illinois
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October 22, 1979

Dr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Zion Station Units 1 and 2
Proposed Change to Facility Operating
License Nos. DPR-39 and DPR-48
NRC Docket Nos. 50-295 and 50-304

References (a): "Safety Evaluation Report on
Westinghouse Electric Company
ECCS Evaluation Model for Plants
Equipped with Upper Head Injection"
published by U.S. Nuclear Regulatory
Commission in April, 1978

(b): March 22, 1979 letter from Cordell
Reed to H. R. Denton

(c): February 16, 1979 letter from
A. Schwencer to Cordell Reed

Dear Dr. Denton:

Pursuant to 10 CFR 50.59, Commonwealth Edison Company hereby requests a change to Operating License Nos. DPR-39 and DPR-48, Appendix A, Technical Specifications. The purpose of this amendment is to revise the Zion Technical Specifications to increase the allowable LOCA peaking factor limit from the current value of 1.86 to a value of 2.20 based on an ECCS reanalysis performed using the Westinghouse ECCS Evaluation Model approved by the NRC Staff in August 1978. This reanalysis which is consistent with the requirements of 10 CFR 50, Appendix K, incorporates a drift flux calculation and related changes approved by the NRC Staff in Reference (a) for use on Upper Head Injection (UHI) Systems. The proposed changes to the Zion Station Technical Specifications are enclosed in Attachment 1. Attachment 2, which has three appendices, contains the LOCA reanalysis for Zion Units 1 and 2. Appendices A and B of Attachment 2 contain details of the drift flux calculation and related changes. Appendix C of Attachment 2 contains details of an accumulator water volume sensitivity analysis.

The LOCA analyses of Attachment 2 were performed for accumulator tank volumes from 818.65 cubic feet to 868.14 cubic feet per accumulator. With this volume range, the peak clad

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ATTACHMENT

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temperatures calculated for the limiting break (DECLG, $C_D = 0.6$) is 2048.4°F with a total core peaking factor, F_Q , of 2.20. This clad temperature shows considerable excess margin to the 2200°F limit.

Reference (b) previously requested a revision to the LOCA peaking factor limit from the current value of 1.86 to a value of 1.93. The ECCS reanalysis for this previous request involved two differences from the " $F_Q = 1.86$ " analysis approved by the NRC in Reference (c). These differences are:

- (1) Average fuel pellet temperature was lowered 20°F based on Zion generic fuel temperature data; and
- (2) Average fuel pellet temperature was lowered an additional 65°F to remove a "modeling conservatism" that was previously added to the average fuel temperatures calculated by the PAD computer code.

The first of these two items, the Zion generic fuel temperature, has not been utilized in this new reanalysis. The second item, deletion of the 65°F "modeling conservatism," has been retained in this new reanalysis.

Consistent with Reference (a), the other specific differences between the reanalysis contained herein and the ECCS analyses previously approved by the NRC for Zion Station are discussed in detail in Appendices A and B of Attachment 2 and include the following:

- (1) The "UHI" drift flux model for both vertical and horizontal flow which calculates the void fraction for flowing two-phase fluid and predicts various flow regimes as a function of the flowing void function;
- (2) An improved "pseudo viscosity" which involves a better mathematical treatment, from both a physical and logical standpoint, of pressure waves passing through the system of control volumes;

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- (3) An improved pressure stability by smoothing the "equation of state" at the subcooled two-phase boundary;
- (4) A split downcomer model for a more realistic calculation of the later part of the LOCA and the distribution of injection water;
- (5) An improved treatment of elevation pressure changes in adjacent elements, such as the downcomers, with more than one azimuthal node, in order to account for the mass redistribution resulting from fluid columns of unequal densities;
- (6) An additional element designated as the "break receiver" to facilitate the automatic transfer of break flow data from the SATAN coolant loop code to the containment code COCO and to permit a more exact calculation of the break flow; and
- (7) The splitting of the intact loop at the pump suction node in order to properly distribute flow to the split downcomer volumes (this is consistent with but an improvement over the UHI modeling approach to distribution of pumped flow).

In addition, based on the Westinghouse "Eighteen Case" analyses, a total peaking factor (F_Q) of 2.13 for Zion Unit 1 Cycle 5 (expected to commence in late November, 1979) and 2.17 for the current Cycle 4 of Zion Unit 2 could occur for the full range of power distributions, including load follow maneuvers, allowable under Constant Axial Offset Control (CAOC). Therefore, NRC approval of the increase in the F_Q peaking factor limit from 1.86 to 2.20 would eliminate the need for axial power distribution monitoring type surveillance for these and future cycles of both Zion units. In conjunction with the revised peaking factor limit of 2.20, the normalized $F_Q(Z)$ envelope, $K_1(Z)$ has also been modified and is included in Attachment 1.

The above considerations, proposed technical specification changes (Attachment 1), ECCS LOCA Reanalysis (Attachment 2), details of the drift flux calculation (Appendices A and B of Attachment 2), and details of the accumulator sensitivity analysis (Appendix C of Attachment 2) have been reviewed and approved by Commonwealth Edison On-Site and Off-Site Review with the conclusion that there are no unreviewed safety questions.

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Commonwealth Edison requests the NRC Staff to expeditiously review and approve the license change contained herein. The basis for this request follows. With the current F_Q peaking factor limit of 1.86, Zion Unit 2 Cycle 4 operation is presently restricted to about 96% of rated power under Constant Axial Offset Control (CAOC). Although a Base Load mode of operation can eliminate this restriction, this type of operation significantly restricts the operational flexibility of the unit. In addition, when Zion Unit 1 resumes operation for Cycle 5 in late November 1979, the unit will be restricted to 88% of rated power under normal operation and to less than 98% of rated power under the Base Load mode of operation. Therefore, an expeditious approval of an increase in the F_Q peaking factor limit to a value of 2.20 would eliminate these costly power restrictions and improve the operational flexibility of both plants.

Pursuant to 10 CFR 170, Commonwealth Edison has determined that this proposed amendment is a combined Class III and Class I Amendment. As such, Commonwealth Edison has enclosed a fee remittance in the amount of \$4,400.00 for this proposed amendment. Commonwealth Edison has concluded that the proposed amendment change does not involve a significant hazards consideration since the calculations made in support of this amendment are consistent with well defined and established analysis methods that have received previous NRC Staff approval.

Attachment 2 to this letter contains information proprietary to Westinghouse Electric Corporation. As such, it is accompanied by an affidavit signed by Westinghouse, the owner of the information. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in Paragraph (b)(4) of Section 2.790 of the Commission's regulations.

Accordingly, it is respectfully requested that the information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.790 of the Commission's regulations. Correspondence with respect to the proprietary aspects of this application for withholding or the supporting Westinghouse affidavit should reference CAW 79-28 and should be addressed to R. A. Wiesemann, Manager, Regulatory and Legislative Affairs, Westinghouse Electric Corporation, P. O. Box 355, Pittsburgh, Pennsylvania 15230.

Please address any questions that you might have to this office.

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Three (3) signed originals and thirty-seven (37) copies of this letter and the non-proprietary version of Attachment 2 are provided for your use. In addition, six (6) copies of this letter and the proprietary version of Attachment 2 are being transmitted under separate cover.

Very truly yours,

D. L. Peoples

D. L. Peoples
Director of Nuclear Licensing

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attachments (2)

SUBSCRIBED and SWORN to
before me this 26th day
of October, 1979.

Mary A. Evans
Notary Public