

SIEMENS

March 6, 1998

NRC:98:010

U.S. Nuclear Regulatory Commission
ATTN: Dr. Shih-Liang Wu (NRR/DSSA/SRXB)
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EMF-85-74(P), Revision 0, Supplements 1 and 2, "RODEX2A (BWR) Fuel Rod Thermal-Mechanical Evaluation Model"

- Ref.: 1. Work Practice P104,107, Revision 1, "10 CFR 50 Interactions with the U.S. Nuclear Regulatory Commission and Licensees," January 1998.
- Ref.: 2. Letter, T. H. Essig (NRC) to H. D. Curet (SPC), "Acceptance for Reference of SPC Topical Report EMF-85-74(P), Revision 0, Supplements 1 and 2: RODEX2A (BWR) Fuel Rod Thermal-Mechanical Evaluation Model" (TAC No. M96726)," February 1998.
- Ref.: 3. ANF-89-98(P)(A), Revision 1, Supplement 1, "Generic Mechanical Design Criteria for BWR Fuel Designs," May 1995.

In compliance to the Siemens Power Corporation (SPC) work practice in Reference 1, concurrence is to be requested of the NRC regarding clarification of findings or conditions included in a topical report safety evaluation report (SER) prior to the publishing of the accepted version of the topical report. In Reference 2 the request is made that an accepted version of the subject topical report be published within three months of receipt of the SER. Prior to publishing the subject topical report, SPC requests the NRC's concurrence with the following points of clarification and understanding.

- The January 1993 technical evaluation report (TER) and the SER, which is an enclosure to Reference 2, both conclude that (1) the RODEX2A code is acceptable for licensing applications to 62,000 MWd/MTU rod-average burnup and (2) the fuel rod growth, fuel assembly growth, and fuel channel growth models and analytical methods are acceptable for ATRIUM™-9 and -10 fuel designs up to 54,000 MWd/MTU assembly-average burnup.
- Additionally, SPC agrees to comply with all conditions stated in Reference 4 of the TER which include, in summary, the following conditions: SPC is to account for the full effect of oxidation in fuel rod thermal-mechanical analyses with an enhancement in the RODEX2A calculations for the corrosion analysis and fuel temperature analysis.

The maximum wall thinning from oxidation will also be taken into account in the steady state stress analysis for end of life conditions.

* ATRIUM is a trademark of Siemens.

Siemens Power Corporation

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No additional corrosion enhancement will be necessary for rod internal gas pressure analyses performed to the approved exposure levels.

- The growth correlations reviewed and approved may also be applied, if need be, to previous SPC 9x9 fuel designs.
- In Section 2.1 Cladding Strain of the TER, the transient strain analysis is attributed to the RODEX2A code. This analysis should be attributed to the version of the RODEX2 code mentioned in Section 4.0 "Example Fuel Rod Design Analysis," Pellet-Cladding Interaction of EMF-85-74(P), Supplement 1. That version of RODEX2 is referenced in XN-NF-81-58(P)(A) Revision 2, Supplement 1, Response C.1.(b) to Question 7. The transient strain analysis has the reduced limit of 0.75% after a peak pellet exposure of 60 MWd/kgU. As an additional analysis, the cladding steady state strain is calculated in relation to a 1.0% limit. In the case of fuel melt analyses, SPC uses the RODEX2A code to calculate fuel temperatures under overpower conditions.
- The RODEX2 code, (XN-NF-81-58(P)(A) Revision 2 and Supplements 1 through 4, "RODEX2 Fuel Rod Thermal Mechanical Response Evaluation Model"), the base fuel performance code which interfaces with the SPC LOCA and transient analysis methodologies, may be applied to fuel designs with 62,000 MWd/MTU rod-average burnup and 54,000 MWd/MTU assembly-average burnup.

SPC considers the above bulleted items and the following text quoted from the SER in Reference 3;

"For each application of the mechanical design criteria, SPC must document the design evaluation demonstrating conformance to these criteria and submit a summary of the evaluation to the NRC staff for possible use in an audit to confirm that SPC is in compliance with these criteria"

to mean that SPC may design fuel which must (1) meet the BWR generic mechanical design criteria in the accepted topical report of Reference 3, (2) not exceed the burnup limits of 62,000 MWd/MTU rod-average and 54,000 MWd/MTU assembly-average, which supersede the previous 60,000 MWd/MTU peak pellet limit, and (3) provide the NRC staff, for possible audit, a summary report that confirms that SPC is in compliance with items (1) and (2).

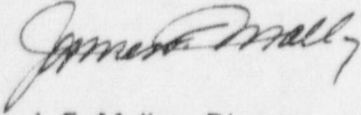
If SPC's understanding of the above reiteration and clarification of the conclusions and the findings in the TER adopted by the NRC staff are correct, SPC requests that the NRC concur by letter. This letter of concurrence will be included in the published accepted version of the topical report.

Dr. Shih-Liang Wu
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If you have any questions, or if i can be of further assistance, please call me at
(509) 375-8757.

Very truly yours,

A handwritten signature in dark ink, appearing to read "J. F. Mallay", with a stylized flourish at the end.

J. F. Mallay, Director
Regulatory Affairs

/arn

cc: Mr. T. E. Collins (USNRC)
Mr. L. E. Phillips (USNRC)
Mr. E. Y. Wang (USNRC)
Project No. 702