



FRAMATOME ANP

An AREVA and Siemens Company

FRAMATOME ANP, Inc.

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EXEM BWR-2000 Sample Problems

Ref.: 1. EMF-2361(P)(A) Revision 0, "EXEM BWR-2000 ECCS Evaluation Model,"
Framatome ANP, Inc., May 2001.

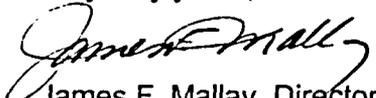
The EXEM BWR-2000 ECCS LOCA methodology is described in Reference 1. This report includes results for eight example problems analyzed using input developed for a BWR/3 reactor. Subsequent to issuing this report, two changes to the RELAX computer code that is part of the EXEM BWR-2000 methodology have been made. Also, some inconsistencies have been identified between the approved methodology and the input used in the BWR/3 example problems presented in Reference 1. The impact of the two code changes on PCT is estimated to be 11°F. These code changes and their PCT impact have been provided to the affected licensees.

This letter describes the inconsistencies that have been identified in the input used in the Reference 1 example problems and provides revised results for the example problems.

This letter is provided for information only and no response is requested.

Framatome ANP considers some of the information contained in the attachment to be proprietary. An affidavit is enclosed to satisfy the requirements of 10 CFR 2.790(b) to support withholding of this information from public disclosure.

Very truly yours,


James F. Mally, Director
Regulatory Affairs

Enclosures

cc: F. Akstulewicz
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Project 728

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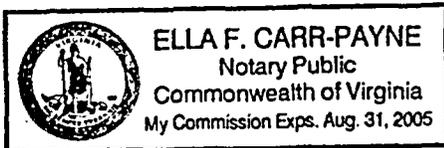
9. The foregoing statements are true and correct to the best of my knowledge, information, and belief.

James Mally

SUBSCRIBED before me this 30th
day of January, 2004.

Ella F. Carr-Payne

Ella F. Carr-Payne
NOTARY PUBLIC, STATE OF VIRGINIA
MY COMMISSION EXPIRES: 8/31/05



Attachment A--EXEM BWR-2000 Sample Problem Changes

The BWR/3 example problems in Reference 1 were based upon models developed for the EXEM BWR-1997 methodology with updates to reflect changes for the EXEM BWR-2000 methodology. Subsequent to the topical report submittal and approval, automation tools were developed to prepare input decks for EXEM BWR-2000 analyses. The automation tools generate the computer code input using plant and fuel data obtained from a database.

A plant and fuel database was constructed using the BWR/3 data and the automation tools were used to generate the input for the BWR/3 example problems. This input was compared to the input used in Reference 1 for the BWR/3 example problems and several differences were identified.

Example Problems Inconsistencies

Based on the comparison described above, several inconsistencies were found between the approved methodology input (as implemented by automation) and the input used in the Reference 1 example problems. The approved methodology is considered to be defined by the input used in the benchmarks provided in the topical report to demonstrate the adequacy of the model. These inconsistencies are:

1. The BWR/3 example problems in Reference 1 are inconsistent with the BWR-2000 methodology because they used the []
2. The BWR/3 example problems in Reference 1 are inconsistent with the BWR-2000 methodology because they did not use []
3. The BWR/3 example problems in Reference 1 are inconsistent with the BWR-2000 methodology because the []
4. The automated deck builder now generates input decks which have slightly different geometric values than used in the Reference 1 example problems. The differences are comparable to the variation between manual calculations by two independent analysts.

Break Spectrum

All of the example problems that were analyzed for the BWR/3 (References 1) were re-analyzed using the updated model. The limiting break location changed from the 0.8 DEG/PS to the 1.0 DEG/PS.

The revised and original Reference 1 results for the example problems are shown in Table 1. The maximum PCT from the EXEM/BWR-2000 methodology corrected for the above inconsistencies is []. The PCT for the same BWR/3 plant example problem from the 1997 NRC approved EXEM/BWR methodology (Reference 3) was []. The maximum PCT from the EXEM/BWR-2000 methodology with the inconsistencies not corrected was [].

Table 1 EXEM BWR-2000 Methodology BWR/3 LOCA Results		
Case	Revised PCT (°F)	Original PCT* (°F)
1.0 DEG / PS SF-LPCI	[
0.8 DEG / PS SF-LPCI		
1.0 DEG / PD SF-LPCI		
2.78 ft ² / PD SF-LPCI		
1.0 ft ² / PD SF-LPCI		
0.5 ft ² / PD SF-LPCI		
1.0 DEG / PS SF-DG		
1.0 ft ² / PD SF-HPCI]
* Values from page 4-6, Reference 1.		
<p><i>Nomenclature:</i></p> <p>DEG double-ended guillotine</p> <p>ft² split break area</p> <p>PS pump suction</p> <p>PD pump discharge</p> <p>SF-LPCI single failure of a low-pressure coolant injection valve</p> <p>SF-DG single failure of a diesel generator</p> <p>SF-HPCI single failure of high-pressure coolant injection</p>		

Ref.: 1. EMF-2361(P)(A) Revision 0, "EXEM BWR-2000 ECCS Evaluation Model," Framatome ANP, Inc., May 2001.