framatome

January 30, 2025
NRC:25:003

U.S. Nuclear Regulatory Commission
Document Control Desk
11555 Rockville Pike
Rockville, MD 20852

2024 - Annual Reporting of Changes and Errors in Emergency Core Cooling Systems (ECCS) Evaluation Models

Ref. 1: Letter, Gayle Elliott (Framatome Inc.) to Document Control Desk (NRC), "2023 - Annual Reporting of Changes and Errors in Emergency Core Cooling Systems (ECCS) Evaluation Models," NRC:24:004, February 9, 2024.

Attached is a summary report of changes and error corrections implemented in the Framatome Inc. (Framatome) Emergency Core Cooling Systems (ECCS) evaluation models for the period of January 1, 2024 to December 31, 2024. Reference 1 provided reporting for the previous year.

Changes to inputs that result from fuel or plant changes, and that are treated according to the methodology, are not considered model changes and, therefore, are not reported in the attachment. Changes in peak cladding temperatures (PCTs) due to loss of coolant accident (LOCA) evaluation model changes and errors are reported on a plant specific basis by Framatome to the affected licensees. The licensees have the obligation under 10 CFR 50.46 to report the nature of changes and errors affecting PCT. The report in this letter is provided for information only.

If you have any questions related to this information, please contact Mr. Alan Meginnis, Licensing Manager, by telephone at (509) 375-8266, or by e-mail at Alan.Meginnis@framatome.com.

Sincerely,

ELLIOTT Gayle
Digitally signed by ELLIOTT Gayle
Date: 2025.01.30 13:50:06 -05'00'

Gayle Elliott, Director
Licensing & Regulatory Affairs
Framatome Inc.

cc: N. Otto
Project 728

Attachments:

1. Attachment A - Listing of Framatome LOCA Evaluation Models
2. Attachment B - Annual Reporting of Framatome LOCA Evaluation Model Changes and Error Corrections (January 1, 2024 - December 31, 2024)

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Attachment A

Listing of Framatome LOCA Evaluation Models

EXEM BWR-2000 Large and Small Break LOCA Evaluation Model

This model is applicable to jet-pump boiling water reactors for both large and small break LOCA analyses. The NRC approved topical report for this evaluation model is EMF-2361PA, Revision 0.

AURORA-B Large and Small Break LOCA Evaluation Model

This model is applicable to jet-pump boiling water reactors for both large and small break LOCA analyses. The NRC approved topical report for this evaluation model is ANP-10332P-A, Revision 0.

RELAP5/MOD2-B&W Once Through Steam Generator Large and Small Break LOCA Evaluation Model

This model is applicable to all B&W designed pressurized water reactors for large and small break LOCA analyses of zircaloy or M5® clad fuel. The NRC approved topical report for this evaluation model is BAW-10192PA, Revision 0 as modified to address fuel thermal-conductivity degradation (TCD) with burnup as described in BAW-10192PA, Revision 0, Supplement 1 PA, Revision 0. The NRC has approved this evaluation model for M5® clad fuel in BAW-10227PA, Revision 0.

NRC-approved fuel codes are used to supply the fuel rod steady-state conditions at the beginning of the small or large break LOCA transient. These codes are approved for use with M5® cladding via the safety evaluation report on BAW-10227PA. The NRC has approved BAW-10192PA, Revision 0 evaluation model for M5® clad fuel in BAW-10227PA, Revision 0. Note that the NRC has approved Revision 1 of the M5® topical report, but it is not applicable to the evaluation model.

SEM/PWR-98 PWR Large Break LOCA Evaluation Model

This model is applicable to Westinghouse designed 3 and 4 loop pressurized water reactors and Combustion Engineering designed pressurized water reactors for large break LOCA analyses. The NRC approved topical report for this evaluation model is EMF-2087PA, Revision 0.

S-RELAP5 PWR Small Break LOCA Evaluation Model

This model is applicable to Westinghouse designed 2, 3, and 4 loop pressurized water reactors and Combustion Engineering designed pressurized water reactors for small break LOCA analyses. The NRC approved topical report for this evaluation model is EMF-2328PA, Revision 0 and Supplement 1 PA, Revision 0. The evaluation model was supplemented to implement the GALILEO fuel performance code in ANP-10349P-A, Revision 0.

Realistic PWR Large Break LOCA Model

This model is applicable to Westinghouse designed 3 and 4 loop pressurized water reactors and Combustion Engineering 2x4 designed pressurized water reactors for large break LOCA analyses. The NRC approved topical reports for this evaluation model are EMF-2103PA, Revision 0 and EMF-2103PA, Revision 3. EMF-2103PA, Revision 3 was supplemented to implement the GALILEO fuel performance code in ANP-10349P-A, Revision 0.

Attachment B

Annual Reporting of Framatome LOCA Evaluation Model Changes and Error Corrections

(January 1, 2024 - December 31, 2024)

EXEM BWR-2000 Large and Small Break LOCA Evaluation Model

There were no evaluation model changes or errors associated with the EXEM BWR-2000 methodology during the reporting period.

AURORA-B Large and Small Break LOCA Evaluation Model

There was one evaluation model change or error correction made during the reporting period.

1. A potential error condition can occur in the RODEX4 code which can result in incorrect assessments for stored energy, gap geometry, and oxide layer thickness calculations. Evaluations of this error produce no significant differences in licensing calculations. Therefore, the PCT impact for this issue was 0° F.

RELAP5/MOD2-B&W Once Through Steam Generator Large and Small Break LOCA Evaluation Model

There were no evaluation model changes or error corrections made during the reporting period.

SEM/PWR-98 PWR Large Break LOCA Evaluation Model

There were no evaluation model changes or error corrections made during the reporting period.

S-RELAP5 PWR Small Break LOCA Evaluation Model

There were no evaluation model changes or error corrections made during the reporting period.

Realistic PWR Large Break LOCA Model (EMF-2103PA, Revision 3)

There was one evaluation model change or error correction made during the reporting period.

1. An error was found in the packing factor model that is used to capture the effect of fuel relocation. The documented model is correct, but a typographical error was made when implementing the model in S-RELAP5. The PCT impact of this issue was 0° F.

Realistic PWR Large Break LOCA Model (EMF-2103PA, Revision 0)

There were no evaluation model changes or error corrections made during the reporting period.