Entergy

Entergy Operations, Inc.
River Bend Station
5485 U. S. Highway 61
P.O. Box 220
St. Francisville, LA 70775
Tel 504 336 6225
Fax 504 635 5068

Rick J. King
Director
Nuclear Safety & Regulatory Affairs

August 28, 1997

U. S. Nuclear Regulatory Commission
Document Control Desk, OP1-17
Washington, DC 20555

Subject: River Bend Station - Unit 1
Docket No. 50-458
License No. NPF-47
10 CFR 50.46 (a)(3)(i) Report

File Nos. G9.5

RBG-44185
RBF1-97-0312

Ladies and Gentlemen:

In accordance with 10 CFR 50.46 (a)(3)(i), enclosed is the subject report.

Sincerely,

RJK/BMB/mbp
attachment

A001

040064

cc: U. S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011

NRC Sr. Resident Inspector
P. O. Box 1050
St. Francisville, LA 70775

INPO Records Center
700 Galleria Parkway
Atlanta, GA 30339-3064

Mr. G. Dishong
Public Utility Commission of Texas
1701 N. Congress Avenue
Austin, TX 78711-3326

Louisiana Department of Environmental Quality
Radiation Protection Division
P. O. Box 82135
Baton Rouge, LA 70884-2135
ATTN.: Administrator

In accordance with 10 CFR 50.46 (a)(3)(i) River Bend Station (RBS) is required to report changes to or errors discovered in acceptable ECCS evaluation models on an annual basis. RBS is obligated to report the nature of the change or error and its estimated effect on calculated Peak Clad Temperature (PCT). If the change is >50°F difference in PCT then it is to be reported within 30 days and include a proposed schedule for providing a reanalysis or taking other action as may be needed to show compliance with 50.46.

Prior to this submittal, individual changes and errors affecting the RBS ECCS evaluation model have been reported to the NRC by General Electric (GE). This report is being issued to the NRC based on the discussion provided in NRC Information Notice (IN) 97-15. The following table lists changes or errors discovered in the SAFE/REFLOOD ECCS evaluation methodology which affected PCT at RBS. The related GE correspondence which discusses these changes and/or errors in detail is included as an attachment for information.

Date	Estimated Impact	Nature of Error	Action
3/12/91	±40°F [1, 2]	Changes to the SAFE methodology due to ECCS re-verification.	These changes were incorporated into the current calculated PCT for RBS (cycle 7)
6/26/92	+10°F to -25°F [1, 2]	Changes resulting from ECCS analysis performed on the new computer system at GE.	The current calculated PCT for RBS was performed on the most recent computer system at GE. Therefore, these changes have been incorporated into the current calculated PCT for RBS (cycle 7).
12/15/95	< +10°F [1]	Error. Omission of the bottom head drain break flow path from the ECCS LOCA analysis.	This error is currently accounted for in the calculated PCT for RBS by assuming the PCT in increased by 10°F.
12/12/96	-27°F	Error. Wrong value used for pellet densification and theoretical densification.	Reanalysis of this error was performed for RBS. The net result was a drop in calculated PCT of 27°F

[1] These estimates are provided by GE and include the maximum effect for all BWRs analyzed by GE.

[2] Changes in the analysis methodology were included in the next evaluation performed by GE for RBS.

The necessary reanalysis associated with these effects is complete and the resulting cycle 7 calculated PCT using the SAFE/REFLOOD methodology for all cases is less than 2200°F. With the outstanding errors of + 10 and -27 and the changes applicable to RBS incorporated, the PCT for RBS is still less than or equal to 2189°F and remains below the 10CFR50.46 acceptance criteria of 2200°F.

Applicable Changes and Errors

LER 97-1137
PAGE 3 OF

GE Nuclear Energy

Richard E. Kingston
Nuclear Fuel - Americas
General Electric Company
Castle Hayne Road P.O. Box 780 M/C A33
Wilmington, NC 28401-0780
910 675 6192
Dial Comm. 8*292 6192
Fax 910 675 5684

December 12, 1996
REK 96-406
GFP-1115

cc: C. W. Bridges
J. L. Embley
H. A. Goodman
P. A. Sicard
R. M. Wilkins
RBS-PPF

Entergy Operations, Inc.
Attn: Mr. Gary W. Scronce
Coordinator, Fuel Fabrication
River Bend Station
P. O. Box 220
St. Francisville, LA 70775

Subject: River Bend Peak Clad Temperature Reconfirmation

Reference: 1. Letter, GFP-1109, REK 96-399, "Input Error in GEGAP Gap Conductance Model - Closure of Potentially Reportable Condition", dated 12/5/96
2. Letter, GFP-1102, REK 96-359, "Reporting of Errors and Changes in Approved ECCS Models, 10CRF50.46 dated 11/4/96

File No. G25.4.3

Dear Mr. Scronce:

Based on internal discussions following the issuance of the reference 1 letter, GE decided to perform additional calculations to confirm the generic conclusions with respect to the GEGAP error correction were valid for RBS Cycle 7.

The GEGAP/CHASTE model was run with the correct densification factor and pellet density as discussed in the reference 1 letter. The results from the analysis showed a peak clad temperature (PCT) of 2162°F. This analysis did not include the effect of the bottom head drain flow path model error (reference 2) that resulted in a less than 10°F increase in PCT. The combined effect of the RBS Cycle 7-specific GEGAP/CHASTE calculation and the bottom head drain flow path model error (exclusive of any other errors or plant configuration changes which may impact PCT) is a PCT of less than 2172°F. Thus there is no net increase in the 2189°F PCT reported in the SRLR and the conclusions in the reference 1 letter are confirmed.

Very truly yours,

Rob Kingston

R. E. Kingston
Senior Fuel Project Manager
M/C A33, (910) 675-6192

rk

GE Nuclear Energy

General Electric Company
P. O. Box 780 Wilmington NC 28402

CR 97-1137
PAGE 15 OF

December 15, 1995

RJR-95-118
MFN-278-95

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: R. C. Jones, Jr.

Subject: **Reporting of Changes and Errors in ECCS Evaluation Models**

Reference: 1. Letter, J. F. Klapproth to the Document Control Desk (R. C. Jones, Jr., *Reporting of Changes and Errors in ECCS Evaluation Models*, dated June 24, 1995 (MFN-087-95).

2. Letter, R. C. Mitchell to the Office of Nuclear Reactor Regulation, *Reporting of Changes and Errors in ECCS Evaluation Models*, dated July 1, 1994 (MFN No. 088-94).

GE is submitting this letter which revises the Reference 1 letter. Revisions are marked by change bars in the margin.

The purpose of this letter is to report, in accordance with 10 CFR 50.46 (a) (3) (ii), the impact of changes and errors in the Emergency Core Cooling Systems (ECCS) evaluation methodology used by GE. This report covers the period from the last report (Reference 2) to the present. It is noted that Peak Cladding Temperature (PCT) variations resulting from plant specific system or fuel changes are not addressed in this letter. These should be treated, as appropriate, on a plant specific basis in accordance with other sections of 10 CFR 50.

There have been no changes or errors identified for the SAFE/REFLOOD model described in NEDE 20566-P-A, *Analytical Model for Loss-of-Coolant Analysis in Accordance with 10 CFR 50 Appendix K*.

There have been no changes or errors identified for the SAFER/GESTR model described in NEDE 23785-1-P-A, *The GESTR-LOCA and SAFER Models for Evaluation of Loss-of-Coolant Accidents*, and NEDE 30996-P-A, *SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-Jet Pump Plants*.

CR 97-1137
PAGE 16 OF ___

In March 1995, a domestic utility requested that GENE review a concern regarding the RPV bottom head drain (BHD) impact on the LOCA analysis. The concern was that because the bottom head drain line is directly connected to the reactor recirculation loops, that a recirculation line break LOCA would also break the BHD, and the vessel would depressurize to the drywell faster than assumed in current models. Also, upon such an event occurring, some water required to keep the core covered to the 2/3 core height would exit the core due to either gravity or core pressure via the interconnected recirculation and bottom head RWCU suction lines.

A GENE evaluation concluded that while no analysis had been performed to precisely evaluate the PCT impact of the recirculation line break LOCA including the BHD, it is believed that the impact is less than 10°F based on engineering judgment and extrapolation of previous LOCA analyses. Since an event is considered by the NRC to be significant if the PCT is increased more than 50°F (10CFR50.46 (a)(3)(i)), this amount of increase can be considered insignificant and well within the margins of the safety analysis.

The impact of the BHD exiting flow on maintaining RPV level inside the shroud is similarly insignificant. It was determined that a slightly higher minimum makeup flow will be required, however, the increased makeup is well within the margins of available ECCS systems. The minimum makeup flow corresponds to that necessary to makeup for decay heat and the drain rate from the BHD.

By copy of this letter, Licensees utilizing the GE ECCS methodology in their plant licensing are informed of the status of changes in the evaluation methodology. Since no re-analysis or technical specification modifications are required, this submittal is believed to satisfy 10 CFR 50.46 (a) (3) (ii) for evaluation model changes without further reporting on the part of individual utilities.

If you have any questions, please call me or J. L. Embley at (910) 675-5774.

Sincerely,

R. J. Reda, Manager
Fuels and Facilities Licensing
(910) 675-5889, MC J26

cc: W. J. Sependa
[redacted]

CR 97-1137
PAGE 17

bcc: J. G. Andersen MC F21
R. A. Hanvelt* MC A32
P. C. Hecht MC 781 (for MFN)
P. D. Knecht MC 747
L. E. Miller MC A16
J. C. Snaug MC 196
G. L. Sozzi MC 706
M. R. Stepp MC A17
P. Wei MC A13

* Please provide a copy of this letter to each utility utilizing the SAFE or SAFER methodology.

GE Nuclear Energy

CR 97-1137
PAGE 27 OF ___

June 26, 1992
MFN 058-92
PWM 92-051

Office of Nuclear Reactor Regulation
US Nuclear Regulator Commission
Mail Station P1-137
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: REPORTING OF CHANGES AND ERRORS IN ECCS EVALUATION MODELS

REFERENCE: 1. Letter, PW Marriott to the Director of Nuclear Reactor Regulation, "Reporting of Changes and Errors in ECCS Evaluation Models", March 12, 1991.

The purpose of this letter is to report, in accordance with 10CFR50.46(a)(3)(ii), the impact of changes and errors in the Emergency Core Cooling System (ECCS) evaluation methodology used by GE. This report covers the period from the last report (Reference 1) to the present. It is noted that peak cladding temperature (PCT) variations resulting from plant specific system or fuel changes are not addressed in this letter. These should be treated, as appropriate, on a plant specific basis in accordance with other sections of 10CFR50.

There has been no changes or errors identified for the SAFE/REFLOOD model described in NEDE 20566-P-A, "Analytical Model for Loss-of-Coolant Analysis in Accordance with 10CFR50 Appendix K" or the SAFER/GESTR methodology described in NEDE 23785-1-P-A, "The GESTRA-LOCA and SAFER Models for the Evaluation of Loss-of-Coolant Accidents", and NEDE 30996-P-A, "SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-Jet Pump Plants".

It has been observed that ECCS evaluation model results can be sensitive to changes in the computer operating system or small changes in input parameters. Test cases have been run for a change in the operating system and procedure for defining jet-pump loss coefficients for SAFER/GESTR. The range of impact of these changes on the predicted PCT was found for the cases analyzed to be less than ± 50° F. Similarly, a change in the computer system for part of the SAFE/REFLOOD package (CHASTE) resulted in an estimated range of impact on predicted PCT of + 10° F and -25° F. Potential PCT variations of this magnitude should be anticipated when future ECCS analyses are performed on the new computer system; however, existing PCT predictions are valid and no change to any plant specific evaluation is required.

By copy of this letter, licensees utilizing the GE ECCS methodology in their plant licensing are informed of the status of changes in the evaluation methodology. Since no reanalyzes or technical specification modifications are required, this submittal is believed to satisfy 10CFR50.46(a)(3)(ii) for evaluation model changes without further reporting on the part of individual utilities.

If you have any questions or comments, please call me or HC Pfefferlen at (408)925-3392.

Sincerely,

S. J. Stark

CR 97-1137
PAGE 28 OF ____

S.J. Stark, Acting Manager
Regulatory & Analysis Services
Mail Code 482 Phone (408)925-6948

PWM:jz

bcc: DG Albertson
RA Hanvelt*
JF Klapproth
LE Miller
RC Mitchell
LD Noble
HC Pfefferlen
DC Serrell
BS Shiralkar
GL Sozzi
JE Wood

CR 97-1137
PAGE 29

* Please provide a copy of this letter to each [illegible]lizing the SAFE or SAFER methodology.

GE Nuclear Energy

March 12, 1991
MFN 025-91

CR 97-1137
PAGE 30 OF ___

Office of Nuclear Reactor Regulation
U S Nuclear Regulatory Commission
Mail Station P1-137
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: **REPORTING OF CHANGES AND ERRORS IN ECCS EVALUATION MODELS**

REFERENCE:

1. Letter, RC Mitchell to the Director of Nuclear Reactor Regulation, "Reporting of Changes and Errors in ECCS Evaluation Models", June 13, 1990.
2. Letter, RH Buchholz to PS Check "Description of Coding Changes to the GE Appendix K LOCA Evaluation Model" November 5, 1980.
3. Letter, HC Pfefferlen to HN Berkow "SAFER Model for Application to Both Jet Pump and Non-Jet Pump Boiling Water Reactors", September 23, 1986
4. Letter, HC Pfefferlen to JA Norberg, "ECCS Evaluation Model Improvements", July 14, 1988
5. Letter, JS Charnley to MW Hodges, "Application of Approved Methods to a New GE Fuel Design", August 7, 1989

The purpose of this letter is to report, in accordance with 10CFR50.46(a)(3)(ii), the impact of changes and errors in the Emergency Core Cooling System (ECCS) evaluation methodology used by GE. This report covers the period from the last report (Reference 1) to the present. It is noted that peak cladding temperature (PCT) variations resulting from plant specific system or fuel changes are not addressed in this letter. These should be treated, as appropriate, on a plant specific basis in accordance with other sections of 10CFR50.

There have been no changes or errors identified for the SAFE/REFLOOD model described in NEDE 20566-P-A, "Analytical Model for Loss-of-Coolant Analysis in Accordance with 10CFR50 Appendix K" during this reporting period. However, in the past, as part of the ECCS verification program, some changes had been made to the SAFE methodology. These changes were discussed with the NRC and documented in Reference 2. At that time the impact of these changes was estimated to be less than $\pm 40^{\circ}F$. The updated code version was to be incorporated into the plant analysis when a complete ECCS reanalysis is required. Until that time, the plant ECCS analysis is updated to account for the heatup characteristics of the reload fuel but the system response is based on the previous code version. While most ECCS analyses are now based on the updated code version, from time to time additional reanalysis and updating does occur. Since the NRC has accepted the updated model, we do not believe such changes in model application requires reporting under 10CFR50.46(a)(3)(ii) and such conversions will not be included in future reports

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There have been no changes or errors identified in the SAFER/GESTR methodology described in NEDE 23785-1-P-A, "The GESTR-LOCA and SAFER Models for the Evaluation of Loss-of-Coolant Accidents", and NEDE 30996-P-A, "SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-Jet Pump Plants". As discussed in Reference 3, the models described in NEDE-23785-1-P-A and NEDE-30996-P-A (as supplemented by Reference 4) represent the two controlled versions of the SAFER/GESTR code. The difference in these code versions (reference 3) is estimated to be less than $\pm$ 50° in the limiting PCT and both have been accepted by the NRC. Because of this, a change in the code versions used on a given plant application is not believed to require reporting under 50.56(a)(3)(ii) and will not be included in future reports.

It should be noted that GE is adapting the models of the SAFE/REFLOOD methodology and the SAFER/GESTR methodology to accomodate the geometric configuration of the GE 11 fuel design as described in Reference 5. A summary description of these modifications will be included in the information report describing GE 11 compliance with Amendment 22 of NEDE-24011-P-A (GESTAR II) and are not considered reportable under 10 CFR 50.46 (a) (3) (ii).

By copy of this letter, licensees utilizing the GE ECCS methodology in their plant licensing are informed of the status of changes in the evaluation methodology. Since no reanalysis or technical specification modifications are required, this submittal is believed to satisfy 10CFR50.46(a)(3)(ii) for evaluation model changes without further reporting on the part of individual utilities.

If you have any questions or comments, please call me or HC Pfefferlen at (408) 925-3392.

Sincerely,

P W Marriott, Manager
Regulatory & Analysis Services
Mail Code 382 Phone (408) 925-6948

cc PWMNRC

bcc: D. G. Albertson
J. S. Charnley
R. A. Hanvelt*
L. E. Miller
R. C. Mitchell
L. D. Noble
H. C. Pfefferlen
D. C. Serell
B. S. Shiralkar
G. L. Sozzi
J. E. Wood

CR 97-1137
PAGE 32

*Please provide a copy of this letter to each utility customer utilizing the SAFE or SAFER methodology.