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10CFR50.46

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5928-05-20127

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

Three Mile Island, Unit 1 (TMI Unit 1)
Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: Annual Report of the Emergency Core Cooling System Evaluation Model Changes and Errors Required by 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors"

In accordance with 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," paragraph (a)(3)(ii), AmerGen Energy Company, LLC (AmerGen), is submitting the annual report of the Emergency Core Cooling System (ECCS) Evaluation Model changes and errors for TMI Unit 1.

Attachment 1, "Peak Cladding Temperature Rack-Up Sheets," provides updated information regarding the peak cladding temperature (PCT) for the limiting small break and large break loss-of-coolant accident (LOCA) analyses evaluations for TMI Unit 1. Attachment 2, "Assessment Notes," contains a detailed description for each change or error reported.

No new regulatory commitments are established in this submittal. If any additional information is needed, please contact David J. Distel at (610) 765-5517.

Respectfully,

P B Cowan

Pamela B. Cowan
Director - Licensing & Regulatory Affairs
AmerGen Energy Company, LLC

Attachments: 1) Peak Cladding Temperature Rack-Up Sheets
2) Assessment Notes

cc: S. J. Collins, USNRC Administrator, Region I
T. G. Colburn, USNRC Senior Project Manager, TMI Unit 1
D. M. Kern, USNRC Senior Resident Inspector, TMI Unit 1
File No. 00068

Attachment 1

TMI Unit 1

Docket No. 50-289
License No. DPR-50

10 CFR 50.46, “Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors”

Report of the Emergency Core Cooling System Evaluation Model Changes and Errors Assessments

Peak Cladding Temperature Rack-Up Sheets

PLANT NAME: Three Mile Island Unit 1
ECCS EVALUATION MODEL: Small Break Loss of Coolant Accident (SBLOCA)
REPORT REVISION DATE: 5/04/05
CURRENT OPERATING CYCLE: 15

ANALYSIS OF RECORD (AOR)

Evaluation Model: BWNT [1]

Calculation: Framatome ANP 86-5011294-00, March 2001
Fuel: Mark-B9, Mark-B12
Limiting Fuel Type: Mark-B12
Limiting Single Failure: Loss of One Train of ECCS
Steam Generator Tube Plugging (SGTP): 20%
Limiting Break Size: 0.05 ft^2 Break in Cold Leg Pump Discharge Piping

Reference Peak Cladding Temperature (PCT) PCT = 1454.0°F

MARGIN ALLOCATION

A. PRIOR LOSS OF COOLANT ACCIDENT (LOCA) MODEL ASSESSMENTS

10 CFR 50.46 report dated June 6, 2002 (see note 3)	ΔPCT = 0°F
10 CFR 50.46 report dated June 19, 2003 (see note 4)	ΔPCT = 0°F
10 CFR 50.46 report dated June 1, 2004 (see note 5)	ΔPCT = 0°F

NET PCT **PCT = 1454.0°F**

B. CURRENT LOCA MODEL ASSESSMENTS

None	ΔPCT = N/A

NET PCT **PCT = 1454.0°F**

[1] The BWNT EM is based on RELAP5/MOD2-B&W.

PLANT NAME: Three Mile Island Unit 1
ECCS EVALUATION MODEL: Large Break Loss of Coolant Accident (LBLOCA)
REPORT REVISION DATE: 05/04/05
CURRENT OPERATING CYCLE: 15

AOR

Evaluation Model: BWNT[2]
Calculation: Framatome ANP 86-5002073-02, July 1999 (Mark-B9)
Framatome ANP 86-5011294-00, March 2001 (Mark-B12)
Limiting Single Failure: Loss of One Train of ECCS
Steam Generator Tube Plugging (SGTP): 20%
Limiting Break Size: Guillotine Break in Cold Leg Pump Discharge Piping

Fuel Type:	Mark-B9	Mark-B12
Limiting Fuel Type:	**Mark-B9**	**Mark-B12**
Reference PCT	2083°F	1989°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

10 CFR 50.46 report dated June 5, 2000 (see note 1)	ΔPCT = 0°F	N/A
10 CFR 50.46 report dated June 11, 2001 (see note 2)	ΔPCT = 0°F	N/A
10 CFR 50.46 report dated June 6, 2002 (see note 3)	ΔPCT = 0°F	ΔPCT = 0°F
10 CFR 50.46 report dated June 19, 2003 (see note 4)	ΔPCT = 0°F	ΔPCT = 0°F
10 CFR 50.46 report dated June 1, 2004 (see note 5)	ΔPCT = -25°F	ΔPCT = -35°F

NET PCT **PCT =** **2058°F** **1954°F**

B. CURRENT LOCA MODEL ASSESSMENTS

LOCA Oxygen/Hydrogen Recombination Evaluation (see note 6)	ΔPCT = 0°F	ΔPCT = 0°F

NET PCT **PCT =** **2058°F** **1954°F**

[2] The BWNT EM is based on RELAP5/MOD2-B&W.

<u>Attachment 2</u>

TMI UNIT 1

Docket No. 50-289
License No. DPR-50

10 CFR 50.46, “Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors”

Report of the Emergency Core Cooling System Evaluation Model Changes and Errors Assessments

Assessment Notes

TMI Unit 1 10 CFR 50.46 Report
Assessment Notes

1. Prior LOCA Model Assessment

   The 10 CFR 50.46 report dated June 5, 2000 reported new LBLOCA and SBLOCA analyses to support operations at 20% steam generator tube plugging conditions for Mark-B9 fuel.

2. Prior LOCA Model Assessment

   The 10 CFR 50.46 report dated June 11, 2001 reported evaluations for LBLOCA and SBLOCA model changes which resulted in 0°F PCT change.

3. Prior LOCA Model Assessment

   The 10 CFR 50.46 report dated June 6, 2002 reported new LBLOCA analyses to support operations with Mark-B12 fuel. For SBLOCA, an increase in SBLOCA PCT of 42°F for Mark-B9 fuel was reported due to increase in emergency feedwater temperature. This analysis is applicable to both Mark-B12 fuel and Mark-B9 fuel.

4. Prior LOCA Model Assessment

   The 10 CFR 50.46 report dated June 19, 2003 reported evaluation for LBLOCA model change which resulted in 0°F PCT change. SBLOCA was not impacted.

5. Prior LOCA Model Assessment

   The 10 CFR 50.46 report dated June 1, 2004 reported evaluation for LBLOCA and SBLOCA model changes which resulted in 0°F PCT change. An error correction in containment pressure input resulted in a reduction in PCT for the LBLOCA analysis.

6. LOCA Oxygen/Hydrogen Recombination Evaluation

   Exelon requested that AREVA evaluate the applicability of GE Notification Letter 2003-5 to the TMI LOCA analyses. The letter postulates that the reactor vessel pressure can be lower than the containment pressure once the blowdown phase of the LBLOCA is complete. This pressure difference has the potential to draw air from containment into the reactor vessel and react with hydrogen, thus creating a new source of heat that could potentially increase the clad temperature and oxidation that was predicted. An evaluation concluded that this effect is not related to the B&W-designed plants and does not need to be considered or addressed because there is no impact on the five 10 CFR 50.46 criteria. The break and ECCS locations, as well as the transient evolutions, preclude this issue from impacting the limiting TMI LOCA analyses. The evaluation determined that this phenomenon was not applicable to the limiting TMI LOCA analyses.