



TMI-13-073
May 10, 2013

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

Three Mile Island Nuclear Station, Unit 1
Renewed Facility Operating License No. DPR-50
NRC Docket No. 50-289

Subject: 10 CFR 50.46 Annual Report

Reference: 1) Letter from M. D. Jesse (Exelon Generation Company, LLC) to
U.S. Nuclear Regulatory Commission, "10 CFR 50.46 Annual Report,"
dated May 11, 2012

The purpose of this letter is to submit the 10 CFR 50.46 reporting information for Three Mile Island Nuclear Station (TMI), Unit 1. The most recent annual 50.46 Report for TMI, Unit 1 (Reference 1) provided the cumulative Peak Cladding Temperature (PCT) errors for the most recent fuel designs.

Since the Reference 1 report was issued, no vendor notifications of Emergency Core Cooling System (ECCS) model errors/changes applicable to TMI, Unit 1 have been issued. No other ECCS-related changes or modifications have occurred at TMI, Unit 1 that affect the assumptions of the ECCS system. However, we note that in the Reference 1 letter, a prior LOCA model assessment dated May 15, 2008 for the LBLOCA model was removed. It was determined that this note was incorrectly removed from the Reference 1 submittal under the belief that the penalty did not apply to the Mark B-HTP fuel. Upon further review, this note should have remained, so it was re-included in the rack-up for the LBLOCA. This issue was documented in the corrective action program Issue Report 1502737.

Two attachments are included with this letter that provide the current TMI, Unit 1, 10 CFR 50.46 status. Attachment 1 ("Peak Cladding Temperature Rack-Up Sheets") provides updated information regarding the PCT for the limiting SBLOCA and LBLOCA analyses. 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 Tom Loomis at (610) 765-5510.

Respectfully,



David P. Helker
Manager - Licensing & Regulatory Affairs
Exelon Generation Company, LLC

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

cc: W. Dean, USNRC Administrator, Region I
P. J. Bamford, USNRC Project Manager, TMI, Unit 1
D. L. Werkheiser, USNRC Senior Resident Inspector, TMI, Unit 1

ATTACHMENT 1

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**

Assessments as of May 10, 2013

Peak Cladding Temperature Rack-Up Sheets

TMI, Unit 1

PLANT NAME: Three Mile Island Nuclear Station, Unit 1
ECCS EVALUATION MODEL: Small Break Loss of Coolant Accident (SBLOCA)
REPORT REVISION DATE: 5/10/13
CURRENT OPERATING CYCLE: 19

ANALYSIS OF RECORD (AOR)

Evaluation Model: BWNT ¹

Calculation: AREVA NP, 86-9111507-000, August 2009 (Mark-B-HTP with Enhanced Once-Through Steam Generators (EOTSGs))

Fuel: Mark-B-HTP

Limiting Fuel Type: Mark-B-HTP

Limiting Single Failure: Loss of One Train of ECCS

Limiting Break Size and Location: 0.07 ft² Break in Cold Leg Pump Discharge Piping

Reference Peak Cladding Temperature (PCT)

PCT = 1444°F

MARGIN ALLOCATION

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

Annual 10 CFR 50.46 Report dated May 16, 2007 (See Note 1)	$\Delta PCT = 0^{\circ}F$
Annual 10 CFR 50.46 Report dated May 15, 2009 (See Note 3)	$\Delta PCT = 0^{\circ}F$
Annual 10 CFR 50.46 Report dated May 14, 2010 (See Note 4)	$\Delta PCT = 0^{\circ}F$
30-Day 10 CFR 50.46 Report dated September 7, 2010 (See Note 5)	$\Delta PCT = 225^{\circ}F$
Annual 10 CFR 50.46 Report dated May 13, 2011 (See Note 6)	$\Delta PCT = 0^{\circ}F$
30-Day 10 CFR 50.46 Report dated March 21, 2012 (See Note 7)	$\Delta PCT = 0^{\circ}F$
Annual 10 CFR 50.46 Report dated May 11, 2012 (See Note 8)	$\Delta PCT = 0^{\circ}F$
NET PCT	PCT = 1669°F

B. CURRENT LOCA MODEL ASSESSMENTS

None (See Note 9)	$\Delta PCT = 0^{\circ}F$
NET PCT	PCT = 1669°F

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

PLANT NAME: Three Mile Island Nuclear Station, Unit 1
ECCS EVALUATION MODEL: Large Break Loss of Coolant Accident (LBLOCA)
REPORT REVISION DATE: 5/10/13
CURRENT OPERATING CYCLE: 19

ANALYSIS OF RECORD (AOR)

Evaluation Model: BWNT²
Calculation: AREVA NP, 86-9111507-000, August 2009 (Mark-B-HTP with EOTSGs)
Fuel: Mark-B-HTP
Limiting Fuel Type: Mark-B-HTP
Limiting Single Failure: Loss of One Train of ECCS
Limiting Break Size and Location: Guillotine Break in Cold Leg Pump Discharge Piping

Reference Peak Cladding Temperature (PCT)

PCT = 1890°F

MARGIN ALLOCATION

A. PRIOR LOCA MODEL ASSESSMENTS

Annual 10 CFR 50.46 Report dated May 16, 2007 (See Note 1)	$\Delta PCT = 0^{\circ}F$
Annual 10 CFR 50.46 Report dated May 15, 2008 (See Note 2)	$\Delta PCT = 0^{\circ}F$
Annual 10 CFR 50.46 Report dated May 15, 2009 (See Note 3)	$\Delta PCT = 0^{\circ}F$
Annual 10 CFR 50.46 Report dated May 14, 2010 (See Note 4)	$\Delta PCT = 0^{\circ}F$
Annual 10 CFR 50.46 Report dated May 13, 2011 (See Note 6)	$\Delta PCT = 0^{\circ}F$
30-Day 10 CFR 50.46 Report dated March 21, 2012 (See Note 7)	$\Delta PCT = 0^{\circ}F$
Annual 10 CFR 50.46 Report dated May 11, 2012 (See Note 8)	$\Delta PCT = 0^{\circ}F$
NET PCT	PCT = 1890°F

B. CURRENT LOCA MODEL ASSESSMENTS

None (See Note 9)	$\Delta PCT = 0^{\circ}F$
NET PCT	PCT = 1890°F

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

ATTACHMENT 2

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**

Assessments as of May 10, 2013

Peak Cladding Temperature Rack-Up Sheets

TMI, Unit 1

Assessment Notes

1. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated May 16, 2007 reported an evaluation for a LOCA model change which resulted in a 0°F PCT change. The reported evaluation considered the effect on the containment pressure response for LOCA due to GSI-191 related reactor building sump screen replacement. The evaluation resulted in 0°F impact for LBLOCA and SBLOCA PCTs.

2. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated May 15, 2008 reported an evaluation for LOCA model change which resulted in a 0°F PCT change. The reported change included the impact of an energy deposition factor error which resulted in a LBLOCA PCT impact of 0°F.

3. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated May 15, 2009 reported no evaluations or PCT penalties for either SBLOCA or LBLOCA.

4. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated May 14, 2010 reported a change to the reference PCT value for LBLOCA due to the final discharge of all Mark-B9 fuel.

Also identified in this report was a new SBLOCA analysis, implemented beginning with the Cycle 18 operation. This SBLOCA analysis was evaluated with the mixed core of Mark-B12 and Mark-B-HTP and a new PCT of 1444°F was calculated for the limiting Mark-B-HTP fuel type, which bounds the Mark-B12 fuel type. This analysis also includes consideration of the effect of reduced EFW wetting associated with the Enhanced Once-Through Steam Generators (EOTSGs).

5. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated September 7, 2010 reported an evaluation for the SBLOCA analysis due to a non-bounding axial power shape from middle-of-cycle to end-of-cycle conditions. This resulted in a PCT increase of 225°F. The large break LOCA is not affected in this report.

6. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated May 13, 2011 reported no evaluations or PCT penalties for either SBLOCA or LBLOCA.

7. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated March 21, 2012 reported two changes to the TMI LOCA model. One consisted of an error in the ECCS Bypass Calculation that affected the LBLOCA analysis. The second change consisted of correcting the Upper Plenum Column Weldment Model which affected both the SBLOCA and LBLOCA analysis. The results of both of these changes were a 0°F PCT impact for both SBLOCA and LBLOCA.

8. Prior LOCA Model Assessment

With the Cycle 19 reload, all Mark-B12 fuel types were discharged from the core. Currently, the limiting fuel type is Mark-B-HTP for both SBLOCA and LBLOCA. The limiting PCT for LBLOCA has been updated to 1890°F in accordance with our referenced calculation (86-9111507-000). All previous PCT assessments that are not applicable to Mark-B-HTP fuel have been removed.

The 10 CFR 50.46 report dated May 11, 2012 reported no evaluations or PCT penalties for either SBLOCA or LBLOCA.

9. Current LOCA Model Assessment

No new model changes or errors were identified for this annual report.