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**DTE Energy**



10 CFR 50.46

January 16, 2008  
NRC-08-0003

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington D C 20555-0001

- References:
- 1) Fermi 2  
NRC Docket No. 50-341  
NRC License No. NPF-43
  - 2) Detroit Edison Letter to USNRC, "2006 Annual Reports for Fermi 2," dated April 24, 2007 (NRC-07-0019)
  - 3) General Electric "10 CFR 50.46 Notification Letter 2006-01," dated July 28, 2006
  - 4) Detroit Edison Letter to USNRC, "30-Day 10 CFR 50.46 Report, Plant Specific ECCS Evaluation Changes," dated July 3, 2007 (NRC-07-0038)
  - 5) General Electric "10 CFR 50.46 Notification Letter 2007-01," dated December 18, 2007

Subject: 30-Day 10 CFR 50.46 Report, Plant Specific ECCS Evaluation Changes

In accordance with 10 CFR 50.46(a)(3)(ii), this letter reports model changes or errors in the General Electric (GE) Plant Specific Emergency Core Cooling System (ECCS) evaluation for Fermi 2. General Electric (GE) and Global Nuclear Fuel (GNF) issued GE Notification Letter 2007-01 (Reference 5) which indicates that a change has been made in the small break ECCS-loss of coolant accident (LOCA) analyses. Specifically, it has been found that Division I Battery failure, which causes the loss of Automatic Depressurization System (ADS), is the limiting single failure with

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respect to Licensing Basis Peak Clad Temperature (LBPCT). This case had previously been assumed to be bounded by the Division II Battery failure which causes the loss of High Pressure Coolant Injection (HPCI) capability. The change discussed in Reference 5 requires the performance of the small break analysis to consider that all ADS valves for Fermi 2 rely on the Division I Battery for electricity. Division I Battery failure has always been a candidate failure for the analysis, though only relevant to small break LOCA scenarios that depend on ADS availability to depressurize the vessel. It had been considered in prior analyses and was erroneously concluded to be non-limiting when compared to Division II Battery failure in conjunction with a 0.15 sq. ft recirculation line break. LBPCT was determined historically on the basis of limiting Design Basis Accident (DBA) large breaks. However, the current analysis for Fermi 2 had revealed small breaks as the limiting cases for LBPCT for GE14 fuel.

Analyses have been performed of the small break LOCA scenario for Fermi 2 under the assumption that the Division I Battery fails. The results are reported for fuel types currently resident in the core. For GE14 fuel, the current LBPCT is based on a limiting small break case. The result of the analysis shows a direct addition to LBPCT that needs to be applied to account for the single failure of the Division I Battery becoming limiting. For GE11 fuel, the current LBPCT is based on a limiting DBA (large) break case. The effect of this change, applying the single failure of the Division I Battery to the current small break case result, makes the GE11 analysis small break limiting, as well. To this small break result, the effect of top-peaked power distribution, as reported in GE Notification Letter 2006-01 (Reference 3), must also be applied. The reported Change in Calculated Peak Cladding Temperature is the net change in LBPCT.

Reference 5 indicates that the Fermi 2 peak cladding temperature (PCT) has increased by 105°F for GE11 fuel, and has increased by 255°F for GE14 fuel. The PCT increases apply to the small break LOCA only. A special report is required in accordance with 10 CFR 50.46(a)(3)(ii) in addition to the annual report of methodology changes. Incorporating the changes in PCT in accordance with Reference 5, the PCT is 1696°F for the GE11 fuel in the Fermi 2 core, and has increased to 1930°F for the GE14 fuel in the core. This results in a 270°F margin to the 2200°F PCT limit in 10 CFR 50.46.

Enclosure 1 provides updated information regarding the PCT for the limiting LOCA analysis evaluations and detailed assessment for each model change or error reported for Fermi 2.

Detroit Edison plans to reanalyze the SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis for Fermi 2 due to the discovered error. Reanalysis of the SAFER/GESTR-LOCA Loss-of-Coolant Accident will be provided by June 30, 2008.

Detroit Edison will continue to track future methodology changes and errors in the SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis evaluation models to ensure that the analyzed PCT remains below the 10 CFR 50.46 limits, and to ensure that the 10 CFR 50.46 reporting requirements are met.

Enclosure 2 contains a summary of regulatory commitments associated with this letter.

Should you have any questions or require additional information, please contact Mr. Ronald W. Gaston of my staff at (734) 586-5197.

Sincerely,

A handwritten signature in black ink, appearing to read "Joseph H. Plone". The signature is written in a cursive style with a large initial "J".

Enclosures:

1. Peak Cladding Temperature Analysis Update and Assessment of Model Changes
2. Summary of Regulatory Commitments

cc: NRC Project Manager  
NRC Resident Office  
Reactor Projects Chief, Branch 4, Region III  
Regional Administrator, Region III  
Supervisor, Electric Operators,  
Michigan Public Service Commission

**ENCLOSURE 1 TO  
NRC-08-0003**

**PEAK CLADDING TEMPERATURE  
ANALYSIS UPDATE**

**AND**

**ASSESSMENT OF MODEL CHANGES**

Plant Name: Fermi 2 Power Plant  
ECCS Evaluation Model: SAFER/GESTR-LOCA  
Report Revision Date: 01/16/2008  
Current Operating Cycle: 13

## **ANALYSIS OF RECORD**

### **Evaluation Model:**

1. NEDC-23785-1-PA Rev. 1, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-Of-Coolant Accident Volume II, SAFER-Long Term Inventory Model for BWR Loss-Of-Coolant Analysis," October 1984.
2. NEDC-30996P-A, "SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-jet Pump Plants, Volume I, SAFER-Long Term Inventory Model for BWR Loss-of-Coolant Analysis," October 1987.
3. NEDC-32950P, "Compilation of Improvements to GENE's SAFER ECCS-LOCA Evaluation Model," January 2000.
4. NEDC-23785-1-PA Rev. 1, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-Of-Coolant Accident Volume III, SAFER/GESTR Application Methodology," October 1984. (Jet Pump Plant-SAFER)

### **Calculations:**

1. "DTE Energy Enrico Fermi 2 SAFER/GESTR Loss of Coolant Accident Analysis for GE14 Fuel," GE-NE-0000-0030-6565-R0, dated September 2004.
2. "DTE Energy Enrico Fermi 2 SAFER/GESTR Loss of Coolant Accident Analysis for GE11 Fuel," GE-NE-0000-0047-1716-R0, dated December 2005.

**Fuel Analyzed in Calculations:** GE11 and GE14

**Limiting Fuel Type for Original Analyses:** GE11

**Limiting Single Failure for Original Analyses:** Division II Battery Power

**Limiting Break Size and Location for Original Analyses:** Double Ended Guillotine in a Recirculation Suction Pipe

**Reference LBPCT for Original Analyses:** 1650°F for GE11 Fuel

**MARGIN ALLOCATION**

**Prior LOCA Model Assessments for GE11 and GE14 Fuel**

	GE14	GE11
NRC-06-0016 dated March 16, 2006 (See Note 1)	$\Delta PCT = 0^{\circ}F$	$\Delta PCT = 0^{\circ}F$
NRC-07-0019 dated April 24, 2007 (See Note 1)	$\Delta PCT = 0^{\circ}F$	$\Delta PCT = 0^{\circ}F$
NRC-07-0038 dated July 3, 2007 (See Note 2)	$\Delta PCT = 55^{\circ}F$	$\Delta PCT = 0^{\circ}F$
Net PCT	1675°F *	1650°F **

**Current LOCA Model Assessment for GE11 and GE14 Fuel**

	GE14	GE11
10 CFR 50.46 Notification Letter dated December 18, 2007, Division I Battery Failure and ADS Impact for Small Break LOCA Analysis (See Note 3)	$\Delta PCT = 255^{\circ}F$	$\Delta PCT = 105^{\circ}F$
Net PCT	1930°F *	1696°F *

- \* Small break LOCA is limiting.  
 \*\* Large break LOCA is limiting.

**Notes of LOCA Model Assessments for GE11 and GE14 Fuel**

1. The referenced letter provided the annual 50.46 report for Fermi 2. There were no errors reported for the 2005 and 2006 reporting periods.
2. The referenced letter provided a 30 day report on GE LOCA errors. GE reported that the small break ECCS-LOCA analyses have assumed a mid-peaked power shape, consistent with DBA break LOCA analyses. GE determined that for small break cases, a top-peaked axial power shape can result in higher peak cladding temperature. Evaluations were performed on representative BWR plant types. The impact on the Fermi licensing basis peak cladding temperature was 55°F for the small break LOCA only. The large break LOCA was unaffected by the error.

For GE14, since the small break LOCA was already limiting, the GE14 PCT was raised by 55°F from 1620°F to 1675°F. The GE11 large break LOCA was limiting prior to the error but was changed to be 25°F lower. The Limiting LOCA was considered to be the GE14 Division II Battery failure with a 0.15 sq. ft break size.

For GE11, the small break LOCA PCT was raised from 1536°F to 1591°F with the 55°F error. The small break LOCA remained non-limiting for GE11 fuel. Therefore, the large break LOCA PCT was reported for GE11 fuel in Reference 4 and remained unchanged from the original LOCA evaluation cited in Enclosure 1.

3. GE Notification Letter 2007-01 affects the small break LOCA only; however, it causes the small break LOCA to be the limiting case for both GE11 and GE14 fuel. Both GE11 and GE14 are impacted with a 255°F error on GE14 fuel and 105°F error on GE11 fuel. For GE14, since the small break LOCA was already limiting, the GE14 PCT was raised by 255°F from 1675°F to 1930°F. The Limiting LOCA changes from the Division II Battery failure with a 0.15 sq. ft break size to the Division I Battery failure small break.

For GE11, the large break LOCA was reported as limiting in Reference 4 at 1650°F with the small break LOCA PCT at 1591°F after accounting for the 55°F error reported in Reference 3. With the issuance of Reference 5, the GE11 limiting LOCA PCT has switched from the large break at 1650°F to the small break LOCA. The small break LOCA PCT was raised from 1591°F to 1696°F with the 105°F error reported in Reference 5. The small break LOCA became limiting for GE11 fuel and the Limiting GE14 LOCA changes from the Division II Battery failure with a 0.15 sq. ft break size to the Division I Battery failure small break.

**ENCLOSURE 2 TO  
NRC-08-0003**

**SUMMARY OF REGULATORY COMMITMENTS**

**SUMMARY OF REGULATORY COMMITMENTS**

The following table identifies the action committed to by Detroit Edison in this document. Any other statements in this submittal are provided for information purpose and are not considered to be regulatory commitments. Please direct questions regarding the commitment to Ronald W. Gaston, Manager - Nuclear Licensing, at (734) 586-5197.

<b>REGULATORY COMMITMENT</b>	<b>DUE DATE</b>
1. Detroit Edison commits to provide a reanalysis of the SAFER/GESTR-LOCA Loss-of-Coolant Accident to the NRC.	To be provided by June 30, 2008.