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Monticello Nuclear Generating Plant
2807 West County Road 75
Monticello, MN 55362-9637

Operated by Nuclear Management Company LLC

December 17, 2001

10 CFR Part 50
Section 50.46(a)(3)

US Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

2001 Report of Changes and Errors in ECCS Evaluation Models

Reference 1: Global Nuclear Fuel (GNF) letter to US Nuclear Regulatory Commission (NRC), FLN 2001-13 "Summary of Changes and Errors in Emergency Core Cooling System (ECCS) Evaluation Models," dated August 10, 2001

Reference 2: General Electric Report: NEDC-32514P, "Monticello SAFER/GESTR-LOCA Loss-of-Coolant Accident Analysis" dated October 1997 (This report is Exhibit G of Revision 1 to License Amendment Request dated July 26, 1996 Supporting Monticello Nuclear Generating Plant Power Rerate Request Program)

Reference 3: Northern States Power (NSP) letter to NRC, "1999 Report of Changes and Errors in ECCS Evaluation Models," dated September 9, 1999

Reference 4: NSP letter to NRC, "2000 Report of Changes and Errors in ECCS Evaluation Models," dated August 16, 2000

Pursuant to 10 CFR 50.46(a)(3), the following is the required annual report of any change or error identified in the ECCS analytical models or their application for the period of July 2000 through July 2001. The impact of the errors on Monticello described in Reference 1 (attached) are discussed below.

The Monticello LOCA analysis of record is contained in the License Amendment Request for Rerate (Reference 2).

A Boiling Water Reactor Owners Group (BWROG) audit of the General Electric Nuclear Energy (GENE) SAFER LOCA analysis raised a concern regarding the time step size on LOCA calculations performed with SAFER04V. The BWROG recommended that the hydraulic and conduction time step sizes be reduced to ensure acceptable numerical convergence of the peak cladding temperature (PCT) calculations. GENE ran sensitivity analyses and determined that the second peak PCT for the licensing PCT calculation is reduced by a bounding value of -5°F for both BWR/3 and BWR/4 plants. This includes Monticello.

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GENE discovered a SAFER coding error that used an inconsistent core exit steam flow in the SAFER pressure equation. In some cases, the error in the pressure calculation resulted in reduced flashing and the premature termination of ECCS condensation due to insufficient steam mass in the vessel. GENE determined that the impact on Monticello for the licensing PCT calculation is +10°F.

To determine the new estimated licensing basis PCT, the actual value of all changes in PCT are added to or subtracted from the current licensing basis PCT from the analysis of record. The licensing basis PCT for the Monticello fuel types in use during the report period are listed below. These values include all adjustments from this reporting period and all previous reporting periods dating back to the analysis of record.

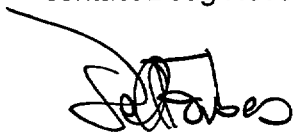
Fuel Type	*Licensing PCT (°F)*
GE10	1932
GE11	2092
GE12	(See note below)

Note:
As described in References 3 and 4, the GE 12 lead use assemblies are bounded by the GE11 LOCA analysis for the following reasons.

(A) The GE12 design has a greater number of fuel rods, resulting in initial temperatures and stored energy lower than GE11 assemblies.
(B) The GE12 fuel has a greater heat transfer area than GE11 fuel, which improves heat transfer characteristics during a LOCA.
(C) The GE12 assemblies are specifically designed to have lower linear heat generation rates than the coresident GE11 fuel.

Two other SAFER errors are discussed in Reference 1. Both have no impact on the licensing PCT. The ECCS leakage flows in the SAFER Analyses does not impact Monticello. The Condensation Error on the PCT included Monticello, but the resultant coding error impact is 0°F on the licensing PCT.

This letter contains no new commitments nor does it modify any existing commitments. Please contact Doug Neve at 763-295-1353 if you have any questions related to this submittal.



Jeffrey S. Forbes
Site Vice President
Monticello Nuclear Generating Plant

c: Regional Administrator – III, NRC
NRR Project Manager, NRC
Sr Resident Inspector, NRC
Minnesota Dept. of Commerce
J E Silberg

Enclosure: Reference 1

Global Nuclear Fuel

A Joint Venture of GE, Toshiba & Hitachi

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August 10, 2001

FLN-2001-13

Document Control Desk
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Attention: J. L. Wermiel

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

Reference: Letter, G. A. Watford to the Document Control Desk (J. L. Wermiel), *Reporting of Changes and Errors in ECCS Evaluation Models*, dated June 30, 2000 (FLN-2000-06).

The purpose of this letter is to summarize the impact of changes and errors in the methodology used by GE/GNF-A to demonstrate compliance with the Emergency Core Cooling System (ECCS) requirements of 10 CFR 50.46. This report covers the period from the last report (Reference) to the present. It is noted that Peak Cladding Temperature (PCT) variations resulting from input errors, plant system changes or fuel design changes are not addressed in this letter.

A summary of the changes and errors is provided in the attached table. The table describes the approved methodology affected, the range of applicability of the change/error, a brief description of the change/error and the estimated impact.

All utilities using these evaluation models have been notified of these changes/errors to assist them in reporting, in accordance with 10CFR50.46 (a) (3) (ii). This report is provided for information only.

If you have any questions, please call me at (910) 675-5446.

Sincerely,

Glen A. Watford, Manager
Fuel Engineering Services

Summary of Changes and Errors in ECCS Evaluation Models
July 2000 through June 2001

Error/ Change	Approved Methodology	Applicability	Description	Impact
Error	NEDC-23785-1-PA, Rev. 1, *The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident*, October 1984. NEDE-30996P-A, *SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-Jet Pump Plants,* October 1987.	BWR/2-6 plants	The ECCS piping inside the vessel (between the vessel wall and shroud) has various leakage paths through slip joints and vent holes. Not all the ECCS water injected into the vessel reaches the region inside the shroud. Some of the water is lost through these leakage paths into the downcomer region. The core spray and LPCI flow rates provided in the OPL-4 usually define flow rates to the vessel and may not account for these leakages. The OPL-4 flow rates must then be adjusted to account for the leakage inside the vessel by subtracting the leakage from the OPL-4 flows. In the SAFER analyses for some plants, the leakage flows had not been subtracted from the OPL-4 values for the ECC system flows. This may result in a disconnect between what the utility understands as the system flow requirement (the flow to the vessel) and the flow rate used in the analysis (the flow inside the shroud). The OPL-4 form has been revised to clearly address the ECCS leakage flows in future SAFER analyses.	<+15°F small BWR/4s with LPCI mods <+5°F other affected plants

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Change	NEDC-23785-1-PA, Rev. 1, *The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-of-Coolant Accident*, October 1984. NEDE-30996P-A, *SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-Jet Pump Plants*, October 1987.	All plants	As the result of a BWROG audit of GENE's LOCA methodology, the SAFER code development documentation was reviewed for conformance with the requirements of Appendix K. The audit team felt that numerical convergence had not been adequately demonstrated for the time step size used in plant-specific calculations. An evaluation was performed to determine the appropriate time step size to be used for plant-specific calculations and to demonstrate convergence for the recommended time step size. This evaluation recommended a change in the time step size to be used in plant-specific calculations.	-35°F to +25°F

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Error	NEDE-30996P-A, SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-Jet Pump Plants, October 1987.	BWR/3 and BWR/4 with LPCI injection through the jet pumps	In SAFER, the amount of condensation that occurs when subcooled ECCS flow enters the vessel is dependent on the location of the injection sparger relative to the fluid level in the injected region and an input maximum condensation efficiency. When the fluid level covers the sparger, no condensation is calculated. When the fluid level is below the injection elevation plus an input mixing length, steam is assumed to condense with the maximum allowable efficiency. When the fluid level is within the mixing length, a linear variation in condensation between the two limits is assumed. The mixture of injection flow and condensate is added to the injected region. For ECCS flow injected into region 1 (lower plenum/jet pump) a coding error was discovered that results in twice the calculated amount of condensate being added to the region. For typical BWR/4 applications, the amount of condensate will be in the range of 10 to 15 percent of the injection flow depending on the vessel pressure. The increased condensate will impact the mass and energy of the lower plenum as well as the calculated liquid and/or vapor flow to the core. Any change in core inventory will impact the calculated second Peak Clad Temperature (PCT) that occurs after ECCS initiation. Injection into all other SAFER regions is calculated correctly.	+45 to +90°F

Summary of Changes and Errors in ECCS Evaluation Models
July 2000 through June 2001

Error/ Change	Approved Methodology	Applicability	Description	Impact
Error	NEDC-23785-1-PA Rev. 1, "The GESTR-LOCA and SAFER Models for the Evaluation of the Loss-Of-Coolant Accident," October 1984. NEDC-30996P-A, "SAFER Model for Evaluation of Loss-of-Coolant Accidents for Jet Pump and Non-jet Pump Plants," October 1987.	All plants	In SAFER, steam condensation on the subcooled ECCS injection flow is calculated as long as sufficient steam mass is available in the vessel. The pressure rate equation maintains sufficient steam mass to fill the vessel by adjusting the flashing rates as the vessel depressurizes. Only when the vessel pressure is predicted to fall below the drywell pressure will the pressure rate be forced to zero, which allows steam mass to be reduced by condensation and not be replenished by flashing due to a decrease in pressure. When there is a change in the two-phase level position in the core, an inconsistent core exit steam flow was used in the SAFER pressure equation. This caused an error in the calculated pressure, which, in some cases, resulted in reduced flashing and the premature termination of ECCS condensation due to insufficient steam mass. Any change in core inventory will impact the calculated second Peak Clad Temperature (PCT) that occurs after ECCS initiation.	+5 to +10°F