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August 21, 2017
L-17-261

10 CFR 50.46

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

SUBJECT:
Perry Nuclear Power Plant
Docket No. 50-440, License No. NPF-58
Report of ECCS Model Changes Pursuant to 10 CFR 50.46

On August 2, 2017, Global Nuclear Fuel - Americas, LLC issued a notification that identified a change in the evaluation model regarding the emergency core cooling system (ECCS) - loss of coolant accident (LOCA) analyses for the Perry Nuclear Power Plant (PNPP). Pursuant to 10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors," FirstEnergy Nuclear Operating Company is notifying the Nuclear Regulatory Commission (NRC) of the change.

The change notification stated that fuel rod temperature modeling was based on historic fuel rod designs, which featured a getter for hydrogen absorption. The change notification also stated that advances in fuel rod design have altered the fuel rod geometry and have removed the getter, such that the original model is not viewed as representative of the modern core. The GE14 and GNF2 fuel rods currently installed at the PNPP were designed without hydrogen getters. As a result, there is a slightly larger free volume inside the GE14 and GNF2 fuel rods that was not factored into the LOCA analysis for both GE14 and GNF2 fuel assemblies. Evaluation of test cases, without the getter included in the fuel rod plenum, have confirmed that this change would not show an appreciable effect and that the licensing basis peak cladding temperature (PCT) under the current methodology would remain unchanged. The effect on calculated PCT is reported as 0 degrees Fahrenheit (°F).

The attachment contains a summary of the 10 CFR 50.46 changes and errors, including the most recent change, applicable to the GE14 fuel in use at the PNPP. The summation of the absolute values of these changes and errors results in a value that

meets the definition of a significant change as defined by 10 CFR 50.46(a)(3)(i). Therefore, pursuant to 10 CFR 50.46(a)(3)(ii), NRC notification of the recent change is required within 30 days, relative to the GE14 fuel. Although there is the same effect on the PCT for GNF2 fuel, NRC notification is not required, since the summation of absolute values of the changes and errors applicable to GNF2 fuel does not meet the definition of a significant change.

As a result of this change, along with previously reported changes and errors, the PNPP PCT for GE14 fuel remains 1555°F and continues to satisfy the 10 CFR 50.46(b)(1) criteria of PCT not to exceed 2200°F.

The impact on the ECCS evaluation model does not result in any challenge to the 10 CFR 50.46(b) acceptance criteria. The change has been evaluated, and there are no other known changes or errors to be evaluated at this time. The overall evaluation model is considered acceptable; therefore, a reanalysis is not required.

There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 315-6810.

Sincerely,

David B. Hamilton

Attachment:
Perry Nuclear Power Plant 10 CFR 50.46 Changes and Errors

cc: NRC Region III Administrator
NRC Resident Inspector
NRC Project Manager

Attachment
L-17-261

Perry Nuclear Power Plant 10 CFR 50.46 Changes and Errors

Vendor Notification Number	Summary of Change/Error	Licensing Basis Peak Clad Temperature (PCT) Impact	Licensee Report of Notification (Accession No.)
2001-02	Impact of SAFER[1] pressure rate inconsistency error.	PCT impact for GE14 fuel is +5 degree Fahrenheit (°F).	ML020710641
2002-01	Impact of SAFER core spray injection elevation error.	PCT impact for GE14 fuel is +15°F.	ML030710170
2002-02	Impact of SAFER bulk water level error.	PCT impact for GE14 fuel is 0°F.	ML030710170
2002-04	Impact of SAFER04 computer platform change.	PCT impact for GE14 fuel is 0°F	ML030710170
2002-05	Impact of error in WEVOL[2] calculation of downcomer free volume.	PCT impact for GE14 fuel is 0°F.	ML030710170
2003-01	Impact of SAFER level/ volume table error.	PCT impact for GE14 fuel is +5°F.	ML040710502
2003-03	Impact of SAFER initial steam separator pressure drop error.	PCT impact for GE14 fuel is 0°F.	ML040710502
2003-05	Impact of postulated post-LOCA[3] hydrogen-oxygen recombination.	PCT impact for GE14 fuel is 0°F.	ML040710502
2006-01	Impact of top peaked power shape for small break LOCA analysis.	PCT impact for GE14 fuel is 0°F.	ML062490520 ML070390113
2011-02	Impact of database error for heat deposition for 10X10 fuel bundles.	PCT impact for GE14 fuel is +25°F.	ML112290919
2011-03	Impact of updated formulation gamma heat deposition to channel wall for 10X10 fuel bundles.	PCT impact for GE14 fuel is -40°F.	ML112290919
2012-01	Impact of change in fuel properties from GESTR to PRIME	PCT impact for GE14 fuel is +20°F.	ML12353A320

Perry Nuclear Power Plant 10 CFR 50.46 Changes and Errors (Continued)

Vendor Notification Number	Summary of Change/Error	Licensing Basis Peak Clad Temperature (PCT) Impact	Licensee Report of Notification (Accession No.)
2014-01	Impact of use of a new version of SAFER04A.	PCT impact for GE14 fuel is 0°F	ML14170A178
2014-02	Impact of system mass divergence error.	PCT impact for GE14 fuel is 0°F	ML14170A178
2014-03	Impact of minimum delta pressure error.	PCT impact for GE14 fuel is -15°F.	ML14170A178
2014-04	Impact of counter current flow limitation (CCFL) error.	PCT impact for GE14 fuel is 0°F	ML14170A178
2017-02	Impact of fuel rod plenum temperature update.	PCT impact for GE14 fuel is 0°F	This submittal
TOTAL	Summation of the absolute values of the changes/errors.	125°F	

Notes: 1. SAFER – Name of the code developed by General Electric Company that calculates long term reactor vessel inventory and peak cladding temperature for LOCA and loss of inventory events.
2. WEVOL – Name of a code that is used to calculate the weight and volume inputs for jet pump plant SAFER analyses.
3. LOCA – Loss of coolant accident.