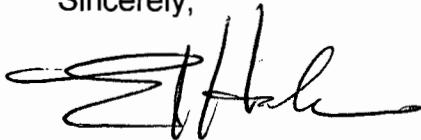


Ernest J. Harkness  
Vice President440-280-5382  
Fax: 440-280-8029March 23, 2015  
L-15-012ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001SUBJECT:  
Perry Nuclear Power Plant  
Docket No. 50-440, License No. NPF-58  
Notification of the Intended Use of Lead Use Channels - Operating Cycle 16

Pursuant to NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II)," FirstEnergy Nuclear Operating Company (FENOC) is making a notification to the Nuclear Regulatory Commission (NRC) of the intended use of lead use channels (LUCs) at the Perry Nuclear Power Plant in operating cycle 16. FENOC's required LUC notification information is provided in the attachment.

There are no regulatory commitments contained in this submittal. 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,



Ernest J. Harkness

Attachment:  
Lead Use Channels for Use in Perry Nuclear Power Plant Operating Cycle 16cc: NRC Region III Administrator  
NRC Resident Inspector  
NRC Project Manager

Lead Use Channels for Use in Perry Nuclear Power Plant Operating Cycle 16

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**Intended Use Notification Requirements**

A letter dated September 23, 1981 from the Nuclear Regulatory Commission (NRC) to the General Electric Company, which is referenced in NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II)," indicates an intended use notification should include a description of the lead test assembly (LTA), a statement of applicability to GESTAR II, the objective of the LTA program, and an outline of the measurements to be made on the LTA.

For lead use channel (LUC) notifications, the requirements for LTA notifications are applicable and are provided herein.

**Status of Existing Lead Test Assemblies**

By correspondence dated April 15, 2011 (Accession No. ML111050424), FirstEnergy Nuclear Operating Company (FENOC) notified the NRC that eight LTAs would be inserted into the Perry Nuclear Power Plant (PNPP) core for use in operating cycle 14, which began in June 2011. These eight LTAs, which were supplied by Global Nuclear Fuel – Americas, LLC (GNF), contain standard GE14 fuel and components, with the exception of the channel. These eight LTAs will continue to be a part of the PNPP core in operating cycle 16, which is expected to begin in April 2015.

By correspondence dated November 14, 2012 (Accession No. ML12319A515), FENOC notified the NRC that two additional LTAs would be inserted into the PNPP core for use in operating cycle 15, which began in May 2013. These two LTAs will not be a part of the PNPP core in operating cycle 16.

**Description of New Lead Use Channels**

GNF will supply 48 new LUCs for insertion into the PNPP core for use in operating cycle 16, which is expected to begin in April 2015. These 48 LUCs are of standard GNF2 design, except for the channel material. Unlike LTAs, LUCs are not restricted to nonlimiting core regions.

The channels are manufactured with a distortion-resistant material known as NSF. The term NSF reflects the presence of niobium, tin, and iron as the primary alloying metals combined with zirconium. Similar zirconium-niobium alloys are commonly used in pressurized water reactors and Russian plants.

The NSF alloy is resistant to channel bowing. The mechanical properties of NSF, including in-reactor creep, are similar to the standard Zircalloys and are considered adequate for reactor service. Corrosion performance of NSF is adequate based on visual and hot-cell examinations after six years of operation.

The surface condition of these NSF channels is different from the current standard channel. These channels have a pre-oxidized surface condition similar to the pre-oxidized condition that was standard on Zircaloy-4 channels prior to 1990.

### **Applicability of NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II)"**

GNF reviewed the properties of the NSF channels relative to the properties of Zircaloy-2 and Zircaloy-4 in the context of required functions, including safety. GESTAR II and the following documents supported the GNF review:

- NEDE-21354-P, "BWR<sup>1</sup> Fuel Channel Mechanical Design and Deflection," September 1976.
- NEDE-21175-3-P-A, "BWR Fuel Assembly Evaluation of Combined Safe Shutdown Earthquake (SSE) and Loss-of-Coolant Accident (LOCA) Loadings (Amendment No. 3)," October 1984.
- GNF Letter MFN 12-074, "Enhanced Lead Use Channel (LUC) Program for NSF Fuel Bundle Channels," September 25, 2012. [Accession No. ML12270A245]
- GNF Letter MFN 12-074, Supplement 1, "Supplemental Information for Enhanced Lead Use Channel (LUC) Program for NSF Fuel Bundle Channels," January 25, 2013. [Accession No. ML130280676]

GNF concluded that the use of NSF as a channel material meets the approved criteria of GESTAR II and may be used in a LUC or LTA.

### **Objective of LUC Program**

The objective of the program is to expand the experience base on NSF channels, including assessing corrosion performance, channel distortion, and channel bow.

### **Outline of Measurements**

In addition to the monitoring and inspection plan required in MFN 12-074, corrosion performance is evaluated visually during refueling outages and after discharge.

### **March 29, 2013 NRC Safety Evaluation**

In its March 29, 2013 safety evaluation (Accession No. ML13072B229), the NRC staff found that MFN 12-074, "Enhanced Lead Use Channel (LUC) Program for NSF Fuel Bundle Channels," is acceptable for referencing to the extent specified and under the conditions and limitations delineated in MFN 12-074 and in Section 5.0 of the safety evaluation. These conditions and limitations include:

- 1) NSF LUCs are restricted to currently approved channel design specifications with NSF alloy compositions that meet current GNF specifications, which target the nominal composition listed in GNF Letter MFN 12-074, Enclosure 1, dated September 25, 2012.
- 2) NSF LUCs may be used in quantities up to 8 percent of the total number of channels in the core. This limit is exclusive of other LTA programs.
- 3) The NSF LUC program monitoring and inspection plan, which is detailed in Section 3.2 of the March 29, 2013 safety evaluation, must be fulfilled.

FENOC complies with these conditions and limitations.

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<sup>1</sup> Boiling Water Reactor (BWR)

**Acceptability of NSF LUCs with GNF2 Fuel**

In Section 3.1 of its March 29, 2013 safety evaluation, the NRC staff discussed the GNF2 fuel bundle design. Specifically, design specifications remain unchanged from currently approved channels, material property differences between NSF and Zircaloy have been factored into channel design evaluations, and NSF channels satisfy all design requirements. Therefore, it is acceptable to use NSF LUCs with GNF2 fuel in the PNPP core.

**Notification Summary**

The PNPP core is designed for 748 fuel assemblies. A total of 56 lead use assemblies (8 LTAs and 48 LUCs) will be a part of the PNPP core in operating cycle 16. These totals do not exceed the 2 percent LTA or 8 percent LUC allowances described in GESTAR II, Section 1.2.1.b. This LUC program for cycle 16 envelopes the previous standard GE14 fuel assemblies with NSF channels inserted into the PNPP core under the LTA program.