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

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Notification of Intended Use of NSF Lead Use Channels

Reference: Letter from T. A. Ippolito (U. S. NRC) to R. E. Engle (General Electric Company), "Lead Test Assembly Licensing," dated September 23, 1981

In accordance with NEDE-24011-P-A, "General Electric Standard Application for Reactor Fuel (GESTAR II)," Exelon Generation Company, LLC (EGC) is notifying the NRC of the intended use of Global Nuclear Fuel NSF lead use channels (LUC) at Clinton Power Station, Unit 1.

The referenced letter indicates the notification should include a description of the LUCs, a statement of applicability to GESTAR II, the objectives of the LUC program, and an outline of the measurements to be made on the LUCs. The attachment to this letter provides this information.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this letter, please contact Mr. Mitchel A. Mathews at (630) 657-2804.

Respectfully,

Patrick R. Simpson
Manager – Licensing

Attachment: Information for Clinton Power Station Lead Use Channels

ATTACHMENT

Information for Clinton Power Station Lead Use Channels

Background

Exelon Generation Company, LLC (EGC) is required to provide an information letter to the NRC describing the lead-test assemblies (LTA) or in this case the 8% lead-use channel (LUC) program per Section 1.2.1.b. of GESTAR (i.e., Reference 1). Specifically, the agreed upon content includes a description of the LUCs, a statement of applicability of GESTAR, a description of the objectives of the LUC program, and an outline of the kinds of measurements that will be made on the LUCs (i.e., Reference 2).

The use of this LUC process for inserting NSF channels on up to 8% of the bundles in a core was requested and approved in References 3 and 4, respectively, and incorporated into GESTAR.

Description of Lead Use Channels

48 NSF channels will be loaded into the Clinton Power Station, Unit 1 reactor core at the beginning of Cycle 16. The Global Nuclear Fuel (GNF) supplied assemblies contain standard GNF2 components and fuel with the exception of the channel. The channels will be manufactured with a distortion-resistant material known as NSF. The term NSF reflects the presence of Niobium (Nb), Tin (Sn), and Iron (Fe) as the primary alloying metals combined with Zirconium. Similar zirconium-niobium alloys are commonly used in PWR and Russian plants, but not commercially used in BWR's.

The NSF alloy is resistant to channel bow. The mechanical properties of NSF, including in-reactor creep, are similar to the standard Zircaloys, 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 material properties of NSF have been documented in Reference 5 – a licensing topical report that the NRC is currently reviewing.

The surface condition of these NSF channels is different from the current standard channel. The NSF channels to be inserted in Clinton Cycle 16 will have a pre-oxidized surface condition similar to the pre-oxidized surface condition that was standard on Zircaloy-4 channels prior to 1990. As of January 2014, there were 16 pre-oxidized NSF channels operating in three different BWRs. By January 2015, an additional 84 pre-oxidized NSF channels will be inserted into four additional plants.

Applicability of GESTAR

GNF has 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, of fuel channels as described in GESTAR and the relevant LTRs. GNF has concluded that the use of NSF as a channel material meets the approved criteria of GESTAR and may be used in an LUC or LTA.

ATTACHMENT

Information for Clinton Power Station Lead Use Channels

Objectives of NSF LUC Program

The objectives of this program are to expand the experience base for NSF channels to provide a better understanding of the inherent statistical variability in the performance of this new material. Channel distortion will be monitored to confirm previous measurements that indicate NSF is resistant to channel bow. Standard analyses will be performed to assure that the safety and licensing bases are maintained.

Outline of Measurements

In addition to the monitoring and inspection plan required in Reference 3, the corrosion performance will be evaluated visually during fuel outages and after discharge.

References:

1. NEDE-24011-P-A-20 and NEDE-24011-P-A-20-US, "General Electric Standard Application for Reactor Fuel and Supplement for United States", (i.e., GESTAR II, Licensing Topical Report).
2. Letter from T.A. Ippolito (NRC) to R.E. Engel (GE), "Lead Test Assembly Licensing," dated September 23, 1981
3. MFN 12-074, "Enhanced Lead Use Channel (LUC) Program for NSF Fuel Bundle Channels," dated September 25, 2012
4. Letter from Sher Bahadur (NRC) to A. A. Lingenfelter (GNF-A), "Final Safety Evaluation for Global Nuclear Fuel- Americas Topical Report (TR) Enhanced Lead Use Channel Program for NSF Fuel Bundle Channels (TAC No. ME9829), MFN 13-020," dated March 29, 2013
5. MFN 13-008/NEDE-33798P, "Application of NSF to GNF Fuel Channel Designs," dated February 13, 2013