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Energy to Serve Your World

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

Edwin I. Hatch Nuclear Plant – Unit 2
GNF-Ziron Lead Test Assemblies

Ladies and Gentlemen:

This letter provides an information report describing the two (2) GE14 bundles with GNF-Ziron fuel cladding contained in lead test assemblies (LTAs) loaded into the Plant Hatch-Unit 2 core during the twentieth refueling outage (2R20). Also enclosed in this report is information related to the applicability of NRC-approved methods used to analyze the assemblies, the objective of the lead test assembly program, and measurements to be performed as part of the test program.

This letter contains no NRC commitments. If additional information is required, please contact R. D. Baker at 205-992-7367.

Sincerely,

A handwritten signature in cursive script that reads "Mark J. Ajluni".

M. J. Ajluni
Manager, Nuclear Licensing

MJA/PAH/daj

Enclosure: Information Report Description of Lead Test Assemblies

cc: Southern Nuclear Operating Company
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Mr. L. A. Reyes, Regional Administrator
Mr. R. E. Martin, NRR Project Manager – Hatch
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**Edwin I. Hatch Nuclear Plant - Unit 2
GNF-Ziron Lead Test Assemblies**

Enclosure

**Information Report
Description of Lead Test Assemblies**

Enclosure

Plant Hatch GNF-Ziron LTAs Information Report Description of Lead Test Assemblies

Two lead test assemblies (LTAs), with selected fuel rods (~30 rod in each assembly) fabricated from GNF-Ziron cladding material, will be loaded into Plant Hatch Unit 2 during reload 20 for Cycle 21, with planned operation through Cycles 22 and 23. The LTAs also incorporate water rods manufactured from GNF-Ziron material. These GNF-supplied fuel assemblies are standard GE14 fuel assemblies with the exception of the cladding material and water rod material. GNF-Ziron is a zirconium-based alloy with composition very similar to the industry standard Zircaloy-2 but with increased iron content. The dimensions and processing of all assembly components are identical to the standard GE14 assemblies.

GE14 fuel is licensed according to criteria and requirements specified in GESTAR II (General Electric Standard Application For Reactor Fuel, NEDE-24011-P-A), as reported in the GE14 compliance report (GE14 Compliance With Amendment 22 of NEDE- 24011-P-A, NEDC-32868P, Rev. 2). The GE14 compliance report states that the GE14 fuel cladding and water rods are made of Zircaloy-2. Because the composition of GNF-Ziron falls outside of the ASTM-specification ranges for Zircaloy-2, the current GE14 compliance report does not cover the use of GNF-Ziron for reload applications. Specific approval from the NRC on the use of GNF-Ziron as cladding material is therefore required before the alloy can be deployed in reload quantities; in addition, an amendment to the GE14 compliance report will be needed. GNF is in the process of preparing a Licensing Topical Report to seek NRC approval for the use of GNF-Ziron as cladding material. In the absence of specific approval from the NRC, Reference 1 discusses how LTAs could be loaded provided LTAs are analyzed with approved methods. Accordingly, the two GE14 GNF-Ziron LTAs are being loaded into Plant Hatch Unit 2 per provisions in 10 CFR Part 50, Section 50.59. However, 10 CFR Part 50, Section 50.46 and Appendix K specifically address cladding material made from Zircaloy or Zirlo. As GNF-Ziron is not a Zircaloy, an exemption to the requirements of 10 CFR Part 50, Section 50.46 and Appendix K was submitted to the NRC (Reference 2). A more detailed description of GNF-Ziron is given in Reference 3, which forms one of the attachments in the exemption request (Reference 2).

Applicability of GESTAR-II Methods and Exemptions From Requirements of 10 CFR Part 50, Section 50.46 and Appendix K

The key properties of GNF-Ziron are described in Reference 4. A discussion on the applicability of approved methods to GNF-Ziron cladding is given in Reference 3. In particular, the impact of GNF-Ziron on thermal-mechanical evaluations is given in Reference 5, with the conclusion that GNF-Ziron behavior can be adequately modeled by the existing GNF methods; hence, no impact on thermal-mechanical licensing limits is expected. The application of selected GNF-Ziron fuel rods in the two GE14 LTAs is therefore consistent with "As long as the analysis of the LTAs using approved methods meets the approved criteria, it would be concluded that no unreviewed safety question exists" as discussed in Reference 1.

Enclosure

Plant Hatch GNF-Ziron LTAs Information Report Description of Lead Test Assemblies

In support of the Reference 2 application for exemption from 10 CFR Part 50, Section 50.46 and Appendix K requirements to use zircaloy fuel cladding, information on the high temperature oxidation behavior of GNF-Ziron pertaining to postulated loss-of coolant accident (LOCA) considerations is provided in Reference 3. The exemption request was approved by the NRC on Nov 7, 2008 (Reference 6).

Objective of LTA Program

The objective of the LTA program at Plant Hatch is to obtain operational experience with GNF-Ziron. The performance of GNF-Ziron under normal operating conditions is expected to be similar to that of Zircaloy-2. The LTA program will provide confirmation on the GNF-Ziron performance.

Outline of Measurements

Since obtaining operational experience with GNF-Ziron is the objective of the Hatch LTA program, poolside inspections (e.g., visual, eddy current liftoff, and profilometry) will be conducted on selected rods.

References

1. NRC Letter, "Lead Test Assembly Licensing," T. A. Ippolito (NRC) to R. E. Engel, September 23, 1981.
2. SNC Letter to NRC, "Edwin I. Hatch Nuclear Plant - Unit 2 Submittal of Additional Information to Support Proposed Exemption to 10 CFR 50.46 and 10 CFR 50 Appendix K to Allow Ziron Fuel Cladding," September 22, 2008, ML082681156.
3. "Technical Basis Supporting GNF-Ziron Lead Test Assembly Introduction into the Hatch Nuclear Plant" in License support letter for GNF-Ziron LTA at Hatch, eDRFsection 0000-0079-7396, Rev. 4, as attachment in Reference 2.
4. "Properties of GNF-Ziron" in Proprietary and Non-Proprietary versions of GNF-Ziron Properties and TM Assessment, eDRFsection 0000-0087-8749, Rev. 2, ML082250038.
5. "Impact of GNF-Ziron Cladding on Thermal-Mechanical Licensing Limits" in Proprietary and Non-Proprietary versions of GNF-Ziron Properties and TM Assessment, eDRFsection 0000-0087-8749, Rev. 2., ML082250037.
6. NRC Letter, "Edwin I. Hatch Nuclear Plant, Unit No 2- Exemptions from the Requirements of 10 CFR Part 50, Section 50.46, and Appendix K (TAC No. MD8356)," R. E. Martin to D. H. Jones, November 7, 2008, ML082950149.