

April 20, 2001

MEMORANDUM TO: Gary M. Holahan, Director
Division of Systems Safety and Analysis
Office of Nuclear Reactor Regulation

FROM: Farouk Eltawila, Acting Director **/RA/**
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research

SUBJECT: ADDITIONAL INFORMATION ON Zr1%Nb CLADDING

REFERENCE: Memorandum from Farouk Eltawila to Gary Holahan, "Applicability of 10 CFR 50.46 to M5 and ZIRLO Cladding," dated December 21, 2000

In the referenced memorandum, I provided you with a paper on Embrittlement of Zr1%Nb cladding. During my recent visit to KFKI in Hungary, I got several additional papers, which are attached to this memorandum.

In the paper titled "Hydrogen Up-take of Zr Alloys," the author concluded that thermal shock and ballooning tests of the fuel rods with Zr1%Nb cladding material fulfil the emergency core cooling safety criteria. The experiments confirmed that for Zr1%Nb cladding:

- no fuel failure can be expected due to thermal stresses during quenching below the 1200 °C temperature and 17% oxidation range calculated by the conservative correlation of safety criteria,
- the reduction of the coolant flow cross section due to ballooning does not lead to blockage formation.

The above conclusion was not provided in the original paper that was attached to the referenced memorandum. This final conclusion does not appear to take ring-compression test result into account. We, therefore, are planning to assess the appropriateness of ring-compressions test to demonstrate cladding integrity.

Attachments: As stated

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FROM: Farouk Eltawila, Acting Director **/RA/**
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research

SUBJECT: ADDITIONAL INFORMATION ON RUSSIA Zr1%Nb CLADDING

REFERENCE: Memorandum from Farouk Eltawila to Gary Holahan, "Applicability of 10 CFR 50.46 to M5 and ZIRLO Cladding

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