



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 25, 2019

MEMORANDUM TO: Dennis C. Morey, Chief
Licensing Processes Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

FROM: Joseph A. Golla, Project Manager */RA/*
Licensing Processes Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF PARTIALLY CLOSED MEETING WITH GLOBAL
NUCLEAR FUEL ON FEBRUARY 27, 2019, REGARDING ARMOR
FUEL

On February 27, 2019, the U.S. Nuclear Regulatory Commission (NRC) staff held a partially closed public meeting with representatives of Global Nuclear Fuel (GNF) and General Electric Hitachi (GEH) regarding GNF's "ARMOR" (abrasion resistant, more oxidation resistant) fuel technology. The purpose of the meeting was for GNF to provide the NRC staff with an update on ARMOR fuel technology and licensing plans.

The meeting was structured with a public portion at the beginning, then a portion that was closed to the public where GNF commercial proprietary information was discussed, and an open portion at the end. A list of attendees is enclosed with this summary.

After opening remarks Mr. Andrew Proffitt, Project Manager, Office of Nuclear Reactor Regulation made a presentation regarding NRC preparations to license accident tolerant fuel (ATF). The slides for this public presentation may be accessed in the NRC's Agencywide Documents Access and Management System (ADAMS) at Accession No. ML19057A131. After this portion of the meeting, the "closed" portion was held whereby representatives of GNF provided presentations. A redacted/public version of these presentations may be viewed at ADAMS Accession No. ML19102A031.

Discussion topics for the meeting included:

- NRC public update on ATF
- Irradiated data testing
- Thermal / mechanical testing and uncertainties
- LOCA-Related ARMOR data & analysis
- IronClad PIRT (phenomena identification and ranking table)
- Severe accident plans
- Full scale tube production readiness
- Transportation and storage plans

- Closing summary and public comment

The following is a synopsis of meeting discussions:

A GNF representative asked what the NRC staff's current thinking is relative to the need for an exemption to 10 CFR 50.46 for coated cladding. A staff member responded that historically, fuel vendors have sought an exemption to keep using 50.46 but that represents a precedent and is not a requirement. Staff indicated that staff will consult with the NRC Office of General Council regarding this. GNF stated they would provide the appropriate technical content in the Licensing Topical Report (LTR) for ARMOR if an exemption is necessary.

An NRC staff member asked what GNF would do regarding the 50.46 maximum cladding oxidation requirement. GNF responded that it would be treated the same as uncoated cladding.

A staff member asked if radiation detectors in main steam lines can detect activated chromium. GNF responded they would look into that.

A staff member asked if the PRIME code would need to be modified for licensing calculations. GNF responded they are not expecting to have to modify the code but may have to change some assumptions.

A staff member asked about loss-of-coolant accident (LOCA) testing and stated that needs to be addressed. GNF responded that LOCA testing would be addressed in the ARMOR LTR. The NRC staff member stated that NRC would like to have early discussions regarding LOCA testing and not wait for the LTR.

The following was also expressed by the NRC staff at the meeting:

- Accurate and timely updated scheduling information is critical for NRC resource planning, especially with the aggressive schedules of ATF.
- Staff would like to receive data from the irradiated testing as soon as possible to understand our needs for computational analysis.
- Staff would like to further engage and understand plans for critical power testing.
- Staff wants to further understand GNF's testing plans for loss of coolant and reactivity insertion accident conditions to support batch loading.
- Delamination should be addressed and, if credible, consequences should be assessed.
- NRC staff would like to further engage GNF on the timing of a PIRT exercise for IronClad cladding.

There were no members of the public present in the meeting room or on the phone for the closing public portion of the meeting.

CONTACT: Joseph A. Golla, NRR/DLP/PLPB
301-415-1002

Enclosure: Attendees List

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ON FEBRUARY 27, 2019, REGARDING ARMOR FUEL DATE: APRIL 25, 2019

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NAME	JGolla	DMorey	JGolla
DATE	4/22/2019	4/25/2019	4/25/2019

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NRC PARTIALLY CLOSED MEETING WITH GLOBAL NUCLEAR FUEL

ON FEBRUARY 27, 2018, REGARDING ARMOR FUEL

ATTENDEE LIST

February 27, 2018

Myles Connor	GNF
Sarah DeSilva	GNF
Russ Fawcett	GNF
Michelle Catts*	GEH
Patty McCumbee	GNF
Fran Bolger	GEH
Yang-Pi Lin	GNF
Kent Halac	GNF
Patrick Hogan	GNF
Paul Cantonwine*	GNF
Andrew Proffitt	NRC
Mirela Gavrilas	NRC
Paul Clifford	NRC
Jim Hammelman	NRC
Reed Anzalone	NRC
Mathew Panicker	NRC
Tae Ahn	NRC
Ian Porter	NRC
Bob Lukes	NRC
Dennis Morey	NRC
James Corson	NRC
Kent Wood	NRC
Joe Golla	NRC
Josh Whitman	NRC
Dennis Morey	NRC
Phillip Sahd	NRC
Joshua Kaiser	NRC
Jen Whitman	NRC

*attended via phone

Enclosure