



FRP 2024-013

April 26, 2024

Ms. Jennifer Golder
Chief Financial Officer
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Docket Number #99902021

Subject: Request for Exemption of NRC Review Fees for Electric Power Research Institute (EPRI) - Analysis of PWR LOCA-Induced Fuel Fragmentation Relocation and Dispersal (FFRD) for Fuel Operating to Extended Burnup: Alternative Licensing Strategy

Dear Ms. Golder:

The purpose of this letter is to request that the topical reports described below be exempt from NRC review fees in accordance with 10 CFR 170.11(a)(1)(ii).

These topical reports, which will be submitted for NRC review and approval in April 2024, have been developed in response to Commission direction to incorporate risk insights and address FFRD issues within a durable regulatory framework that will assist NRC with meeting objectives outlined within the NRC project plan for efficient and effective licensing of accident tolerant fuel concepts (ML21243A298).

With congressional support provided by cost sharing programs administered by the Department of Energy, the commercial nuclear industry has signaled intentions to deploy advanced fuels with increased enrichments and extended burnups in existing nuclear power plants. In the NRC accident tolerant fuel project plan ("Project Plan to Prepare the U.S. Nuclear Regulatory Commission for Efficient and Effective Licensing of Accident Tolerant Fuels, Version 1.2" September 2021, ML21243A298), the NRC staff identified FFRD as an example technical issue where changes to the in-reactor regulatory framework may be required to support the implementation of higher fuel burnups. In addition to addressing FFRD, the topical reports in this submittal will provide quantitative information to support the on-going rulemaking and other policy actions ("Increased Enrichment of Conventional and Accident Tolerant Fuel Designs for Light Water Reactors: Regulatory Basis Document for Public Comment," September 2023, ML23032A504) to clarify the feasibility and justify benefits of incorporating Leak-Before-Break (LBB) piping system performance features into Emergency Core Cooling System (ECCS) evaluations. Revisions to the existing policies, which currently limit application of LBB for ECCS evaluations, would provide a more uniform and consistent regulatory approach to the application of the LBB concept. In the original LBB policy statement, the Commission encouraged the industry to develop quantitative information that could justify the

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diversion of resources to rulemaking efforts (Federal Register, Vol 54. No. 83 Page 18651). As further discussed below, in relation to the on-going Increase Enrichment Rulemaking (ML23032A504), the ALS approach meets that standard.

The adoption of high burnup fuel varies by the class of plant; as a result, the initial scope of these topical reports focuses on plants most likely to be early adopters of high burnup fuel and provides specific requirements for broader application of this regulatory approach at any PWR plant. EPRI's submittal justifies a simplified analysis approach, which will reduce the scope of the NRC review by justifying that rupture of high burnup fuel cladding is not credible for Large Break LOCA events while demonstrating acceptable performance for smaller break size scenarios.

The EPRI submittals will 1) maximize the efficacy of the proposed framework to the bulk of the PWR fleet, 2) optimize NRC resources during this topical report review to minimize NRC resources for subsequent LARs and vendor topical reviews, and 3) provide the foundations for generic regulatory improvements and supplemental analysis which could be performed to extend the applicability of Leak-Before-Break Technology. The submittal of these topical reports represents a first-of-a-kind application to support NRC's preparation of regulatory guidance to generically address FFRD. The topical reports will also assist the NRC in defining the expected review requirements for incorporation into NUREG-0800 Standard Review Plan guidance with respect to FFRD for future extended burnup applications.

Over the past four years, the NRC has held several public meetings and workshops on the FFRD issues under loss-of-coolant accident (LOCA) conditions. Industry has engaged NRC staff on potential topical report submittals to generically assist NRC in establishing an efficient and predictable licensing mechanism to address FFRD. Public pre-submittal meetings were conducted on August 20, 2022, and November 8, 2023, to discuss EPRI's proposed Alternative Licensing Strategy (ALS) topical reports to address LOCA-induced FFRD considerations with an expected industry fee waiver submittal.

The industry topical report submittals provide risk insights and an approach to address FFRD issues that meets Commission direction over the past twenty plus years related to the use of risk considerations to addressing LOCA impacts:

In 2003, the Commission agreed to consider redefining the design basis Large-Break LOCA in view of the apparent low risk associated with such events in Staff Requirements Memorandum (SRM)-SECY-02-0057 for the Update to SECY-01-0133, 'Fourth Status Report on Study of Risk-Informed Changes to the Technical Requirements of 10 CFR Part 50 (Option 3) and Recommendations on Risk-Informed Changes to § 50.46 (ECCS Acceptance Criteria), March 31, 2003.

In 2013, The Commission stated in SRM-SECY-12-0034, Staff Requirements - SECY-12-0034 – Proposed Rulemaking – 10 CFR 50.46c: Emergency Core Cooling System Performance During Loss-of-Coolant Accidents, January 7, 2013 regarding Generic Safety Issue 191, that the 10 CFR 50.46c proposed rule should contain a provision allowing NRC licensees, on a

case-by-case basis, to use risk-informed alternatives without an exemption request. Accordingly, the staff should modify relevant sections of the proposed rule.

In 2019, the Commission wrote in SRM-SECY-19-0036, Staff Requirements – SECY-19-0036 – Application of the Single Failure Criterion to NuScale Power LLC’s Inadvertent Actuation Block Valves, July 2, 2019: In any licensing review or other regulatory decision, the staff should apply risk-informed principles when strict, prescriptive application of deterministic criteria such as the single failure criterion is unnecessary to provide for reasonable assurance of adequate protection of public health and safety.

In 2021, the Commission directed the Staff in SRM-SECY-21-0109, Rulemaking Plan on Use of Increased Enrichment of Conventional and Accident Tolerant Fuel Designs for Light-Water Reactors),
to:

- appropriately address and analyze FFRD issues relevant to fuels of higher enrichment and burnup levels in the regulatory basis for this rulemaking
- take a risk-informed approach when developing this rule and the associated regulatory basis and guidance
- work expeditiously with stakeholders to identify and develop necessary regulatory guidance and technical bases to support effective and efficient licensing of increased enrichment applications.

On September 5, 2023, the NRC issued its Regulatory Bases for Increased Enrichment of Conventional and Accident Tolerant Fuel Designs for Light Water Reactors (ML23032A503). Of the 5 potential alternatives proposed to address FFRD, alternative 5, based on the EPRI ALS regulatory framework, showed a net averted cost to the NRC for the proposed rulemaking. If the NRC accepts the industry feedback on alternative 5 to retain the current treatment of LBLOCA events as part of the design bases but broaden the application of LBB to allow treatment of certain categories of ECCS effects, the net averted cost to the NRC would further decrease. Additionally, the NRC economic analysis assumes an 8-year fuel transition period. A somewhat faster transition is expected for the ALS option while a longer period is expected for other alternatives. This faster transition increased the value to both the public and plant operators due to a reduction in high level waste following the transition.

At the EPRI ALS public meetings on August 30, 2022, and November 8, 2023, the NRC staff indicated a mutual interest in the development of regulatory guidance to improve regulatory efficiency and recommended further engagements continue possibly under an approved fee exemption to ensure appropriate agency resources are available. NRC staff requested the industry provide details on the submittal plans, schedule, and scope of the fee waiver request. The industry plans to submit four reports in two separate submissions to include:

- Submission #1: Included in this Fee Waiver Request

- *Loss-of-Coolant-Accident-Induced Fuel Fragmentation, Relocation and Dispersal with Leak-Before-Break Credit: Alternative Licensing Strategy*. EPRI, Palo Alto, CA: 2024. 3002028673.
- *Materials Reliability Program: xLPR Estimation of PWR LOCA Frequencies (MRP-480)*. EPRI, Palo Alto, CA: 2024. 3002023895.
- *LOCA Analysis of Fuel Fragmentation, Relocation, and Dispersal for Westinghouse 2-Loop, 3-Loop and 4-Loop Plants: Evaluation of Cladding Rupture in High Burnup Fuel Rods Susceptible to Fine Fragmentation (Proprietary Version)*. EPRI, Palo Alto, CA: 2024. 3002028674.
- Submission #2: Not Included in this Fee Waiver Request
 - Westinghouse – WCAP-18850-P, Adaption of the FULL SPECTRUM LOCA (FSLOCA) Evaluation Methodology to Perform Analysis of Cladding Rupture for High Burnup Fuel, February 2024.

EPRI is requesting a fee waiver for the reports included in Submission #1 since the review of these reports will reduce regulatory burden for NRC and the industry by generically enveloping a significant portion of the PWR technologies, minimizing site specific submittals on this topic, and reducing further cycle-specific regulatory actions. There is no current NRC guidance applicable to site specific submittals in this topic area so the ALS topical reports will assist the NRC in generic regulatory improvements in this area. Additionally, the ALS strategy will demonstrate that cladding rupture in high burnup fuel will not occur and thereby simplify the review since dispersion of nuclear fuel is eliminated from consideration. The reports under Submission #1 are expected to be submitted to NRC in April 2024. Submission #2 was made in February of 2024. Review fees for submission 2 are the responsibility of Westinghouse Electric Company and will be reimbursed under their normal processes.

Specifically, this fee exemption request, described above, is based on the following provisions of 10 CFR 170.11 which state,

10 CFR 170.11(a) No application fees, license fees, renewal fees, inspection fees, or special project fees shall be required for:

- (1) A special project that is a request/report submitted to the NRC— ... (ii) When the NRC, at the time the request/report is submitted, plans to use the information to assist the NRC in generic regulatory improvements or efforts (*e.g.*, rules, regulatory guides, regulations, policy statements, generic letters, or bulletins)

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10 CFR 170.11(d) All fee exemption requests must be submitted in writing to the Chief Financial Officer in accordance with § 170.5, and the Chief Financial Officer will grant or deny such requests in writing.

EPRI requests that the NRC's review of the EPRI reports under Submission #1 above be granted a fee waiver pursuant to the provisions of 10 CFR 170.11. EPRI is an independent non-profit energy research, development, and deployment organization that conducts research, development, and demonstration projects for the benefit of the public. The EPRI submittals meet the exemption requirement in 10 CFR 170.11(a)(1)(ii) in that it will "assist the NRC in generic regulatory improvements or efforts (e.g., rules, regulatory guides, regulations, policy statements, generic letters, or bulletins)."

If you have any questions on this subject, please contact the ALS project manager, Fred Smith, by telephone at 601.832.9637 or by e-mail at fsmith@epri.com.

Sincerely,



Dr. Aylin Kucuk
Program Manager, Nuclear Fuels

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