CNSC/NRC Cooperation in Pre-application Review Activities Pertinent to GE Hitachi's Boiling Water Reactor X-300 (BWRX-300) – Fuel Verification and Validation

Objective/Scope

To share regulatory experiences and insights for the BWRX-300 SMR design. Specifically, the scope of work is to perform a collaborative review of submissions from GEH intended to demonstrate that the fuel product selected for the First-of-a-Kind (FOAK) BWRX-300 SMR is qualified for deployment. An exchange of information between the CNSC and USNRC will cover analytical and design software code quality assurance, safety review methodologies and regulatory approaches, as provided in GESTAR II.

The analyses described in GESTAR II have been reviewed and accepted by the USNRC but have not been formally reviewed to demonstrate compliance with Canadian requirements for Quality Assurance of Analytical, Scientific, and Design Computer Programs for Nuclear Power Plants, as described in CNSC REGDOC 2.4.1. This activity must be conducted by the CNSC and may require USNRC assistance on an as-needed basis.

The sharing of experiences and insights would not affect the schedule for either USNRC or CNSC licensing reviews.

Context/Background

GEH intends to deploy the GNF2 fuel product in the BWRX-300 SMR. This fuel is presently deployed in the currently operating fleet of GE designed BWRs. GEH has developed a fuel licensing framework with the USNRC called GESTAR II. The framework consists of a description of the fuel licensing criteria and fuel thermal–mechanical, nuclear, and thermal–hydraulic analyses bases. This report provides information and methods used to determine reactor limits that are independent of a plant–specific application. Plant–specific information and the transient and accident methods used are given in the country–specific supplement accompanying this base document.

Specifically, the CNSC will leverage previous USNRC reviews of the GNF2 fuel product in the CNSC's review of OPG's construction license application. Furthermore, the CNSC and the USNRC will collaborate on aspects specifically related to the BWRX-300 SMR design.

Note that the USNRC will not be formally receiving fuel related documentation in support of a Constriction Permit, Design Certification or Combined Construction and Operation License when the CNSC receives such information from OPG in its construction license application

GEH has agreed to facilitate information flow to support these cooperative activities.

Relevance to Memorandum of Cooperation

This project supports MOC 2.a. [1] “Development of shared advanced reactor and SMR technical review approaches that facilitate resolution of common technical questions to facilitate regulatory reviews that address each Participant’s national regulations.”

This project is also supportive of MOC 2.b. “Collaboration on pre- application activities to ensure mutual preparedness to efficiently review advanced reactor and SMR designs.”

Expected Outputs

To the extent practicable, the working group will explore and identify common areas of regulatory alignment or differences and determine suitable products for communicating results of collaborative activities to OPG, GEH and the public. Progress on this cooperative activity will be reported in the semi-annual MoC reports which is expected to document:

• Alignment on key technical areas that will summarize the findings of the CNSC and USNRC collaborative work and identifies items of mutual understanding/agreement that could be used in each regulator’s review process
• areas of regulatory alignment
• key differences in methodologies
• lessons learned from this cooperative initiative and areas for improvement to inform future cooperative work

Work Process

The USNRC and CNSC will form a working group to accomplish this project. Both CNSC and USNRC staff will collaborate on the review of the BWRX-300 pre-qualified fuel V&V equally. The review will be performed by technical reviewers from both agencies. GEH and OPG will need to agree to share key information provided to one regulator with the other regulator. Additionally, GEH and OPG will need to address or highlight unique aspects of regulatory requirements between the two countries.

Milestones

Working group formation – August 2022
Document Submittals OPG/CNSC: November 2022
CNSC will request meetings with the NRC staff - As needed
Project will conclude upon completion of the CNSC licensing review related to the GNF2 fuel product - TBD

Points of Contact

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