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

July 29, 2019

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

FROM: Jonathan G. Rowley, Project Manager ***/RA/***
Licensing Processes Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

SUBJECT: SUMMARY OF MAY 8 - 9, 2019, PARTIALLY CLOSED POST-SUBMITTAL MEETING REGARDING FRAMATOME TOPICAL REPORT ANP-10339P, "ARITA – ARTEMIS/RELAP INTEGRATED TRANSIENT ANALYSIS METHODOLOGY"

On May 8 - 9, 2019, a partially closed post-submittal meeting was held between the U.S. Nuclear Regulatory Commission (NRC) staff and Framatome Inc. (Framatome) representatives to discuss Topical Report (TR) ANP-10339P, "ARITA - ARTEMIS/RELAP Integrated Transient Analysis Methodology" (ARITA).

The purpose of the meeting was for Framatome to provide background information to the NRC reviewers of the TR who didn't participate in the pre-submittal meetings and to discuss the items of concern identified by the NRC staff during the acceptance review. During the open portion of the meeting on May 8th, Framatome went into the background of the TR to help the NRC reviewers better understand the rationale behind the TR. Framatome explained the ARITA methodology, gave a history of previous meetings, went into how ARITA is related to the accident tolerant fuel activities, and explained the development approach for the ARITA methodology.

During the closed portion of the meeting on May 8th, Framatome detailed the ARITA statistical approach, ARITA evaluation model, ARITA event space/domain possible outcomes, ARITA deterministic and non-parametric statistics, and non-parametric methods. On May 9th, Framatome indicated its plans to address each concern found during the acceptance review.

The NRC staff indicated the meeting was helpful for understanding the thought process for the TR and that there are no issues that the NRC staff consider insurmountable. The issues the NRC staff identified would simply require a good deal of information exchange to assure they are adequately and sufficiently addressed. The issues the NRC staff identified can be broken down into two categories, areas of disagreement and staff observations. "Areas of Disagreement" are those where NRC and Framatome have not reached consensus on the path forward, while "Staff Observations" are those that identify information gaps or ARITA methodology approaches that could contribute to review complexity but where NRC and Framatome are not necessarily in disagreement.

Areas of Disagreement

1. The ARITA method proposes to make a 95 percent probability with 95 percent confidence (95/95) statistical statement that provides an assessment of **[**

]

The NRC staff feel that application of the ARITA statistical approach may result in a **[**

]. The ARITA statistical approach samples **[**
]. However, certain **[**
].
Additionally, choosing to sample from **[**
]. These Framatome-proposed practices would have the effect of **[**

]. Thus, the NRC staff does not agree with Framatome's proposal to sample **[** **]**. Nor is the NRC comfortable with the proposed sampling distributions and ranges. The NRC staff expressed that **[**
] would ensure that a **[**
] is achieved.

Framatome expressed an understanding of the NRC's position and acknowledged that, in some cases, it is possible to obtain a more limiting result by **[**
]. However, Framatome's position is that **[**

] to assure that the fuel limits are not exceeded during normal operation including consideration for anticipated operational occurrences. NRC staff expressed an understanding of Framatome's intent regarding GDC 10, but also expressed that the **[**

].

2. The ARITA method proposes to make a 95/95 statistical statement **[**
]. These **[** **]** are then compared to the associated acceptance criteria to **[**
]. Framatome indicates the statistical value **[**

]. However, NRC staff noted that the intended objective should be to make a 95/95 statistical statement **[**
]. Framatome indicated the justification for their approach is that **[**

]. Framatome also indicated their position is grounded in the context of **[**

].

The NRC staff observed that the prior TR examples provided by Framatome were 10-20 years old. During this period, statistical safety analysis approaches were a new and evolving technology. The NRC staff observed that more recent statistical safety analysis methods have incorporated a more mature understanding of **[**

]. The NRC staff further noted that reviews of non-parametric statistical safety analysis methods over the past 5-10 years have **[**

].

Sufficient justification would be necessary to **[**

]. The NRC staff is willing to review such justification. Additionally, NRC staff cited relevant and recent precedents of approved topical reports that make use of **[** **]**.

3. The NRC staff questioned Framatome's use of the phenomena identification and ranking table (PIRT) process and whether ANP-10339P would allow plant-specific PIRT modifications at the time of methodology implementation. The NRC staff's understanding is that the ARITA TR would allow reranking of certain PIRT items on a plant-specific level following NRC approval of the methodology. The NRC staff felt that Framatome could then use the reranking to justify a different uncertainty treatment than was agreed upon during generic NRC review of the TR. Framatome's response was that there was a generic PIRT performed which supported the code assessment and the selection of key parameters and the determination of uncertainties for the parameters. While the importance of individual parameters may be influenced by plant-specific characteristics, Framatome does not plan to perform plant specific PIRTs.

   While the NRC staff understands it is not Framatome's stated intention to generate plant-specific PIRTs, considering the NRC staff's interpretation of ANP-10339P and discussion during the post-submittal meeting, the concern that Framatome may implement plant-specific PIRT modifications when applying the methodology has not been resolved. Regardless, both NRC and Framatome agree that a fixed, generic uncertainty approach (inasmuch is possible) is preferable to a customizable approach that must be approved on a plant-specific basis.

4. The ARITA method proposes to **[**

   ] that may compromise the fidelity of calculated 95/95 tolerance limits. The NRC staff expressed that **[**

   ] should be demonstrated either (1) to have a physical basis (e.g., prevention of nonphysical phenomena, documented manufacturing tolerances) or (2) to not adversely impact the fidelity of the calculated 95/95 figure of merit.

It is important to note that much of the discussion during the post-submittal meeting focused on the first two issues identified above. The NRC staff planned to have internal discussions regarding these issues, and then have a follow-up meeting with Framatome in the July timeframe.

Additional Staff Observations

1. The NRC staff questioned whether Framatome's proposed **[**

   ] could lead to a small but non-negligible fraction of the calculated output being significantly more limiting than the bulk of the population. The NRC staff referred to this concept as the cohesiveness of the output distribution. The NRC staff further questioned whether a 95/95 upper tolerance limit would be an acceptable metric for Framatome's new approach under circumstances where some fraction of the calculated cases (i.e., albeit less than 5 percent) **[**

   ]

2. The ARITA PIRT contains a level of detail that includes **[**

   ]. This approach may lead to unwarranted complexity of review/additional requests for additional information (RAIs), since **[**

   ].

3. The ARITA method proposes to make a 95/95 statistical statement about **[**

   ]. The approach by which the ARITA method will do this is a **[**

   ] approach. NRC staff are aware that the adequacy of this approach **[**

   ].

4. The NRC staff has identified that the majority of the information needed to fully assess the ARITA statistical methodology is incorporated by reference into the TR. The NRC staff plan to prepare an RAI to request that Framatome provide a summary table that tabulates all the pertinent information. This includes all information necessary to define the uncertainty distribution types, parameters being sampled, and ranges for all relevant phenomena and parameters. This table would also clearly identify whether the definition of a parameter distribution was generic or plant specific.

5. The ARITA statistical analysis methodology indicates that **[**

   ]. A concern with this approach is that it leaves open the question about whether a **[**

   ]. Passing the acceptance criterion based primarily upon the **[** **]** would be inappropriate because it

would effectively degrade the statistical confidence level. In past reviews, NRC staff found that reanalysis under such circumstances should **[ ]**. The NRC staff expressed that further demonstration would be necessary in the ARITA review to justify **[ ]** would not degrade the 95/95 tolerance limit.

6. The NRC expressed an interest in knowing when a reanalysis would need to be performed due to the plant operation deviating from the parameter distribution used in determining the 95/95 values. In other words, what is the threshold of plant operation at which the 95/95 analysis of record is no longer applicable and must be reassessed?

A list of attendees is enclosed. The Framatome presentation material can be found in the Agencywide Documents Access and Management System at Accession Nos. ML19134A332 (proprietary) and ML19134A321 (non-proprietary). The acceptance review letter can be found at Accession No. ML18345A159.

Docket No. 99902041

Enclosure: List of Attendees

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(301) 415-4053

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ADAMS Accession Nos.:
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OFFICE	NRR/DLP/PLPB/PM	NRR/DLP/PLPB/BC	NRR/DLP/PLPB/PM
NAME	JRowley	DMorey	JRowley
DATE	07/2/19	0723/19	07/29/19

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List of Attendees

ARITA Topical Report Post-Submittal Meeting

May 8 - 9, 2019

Name	**Organization**
Joshua Parker	Framatome Inc. (Framatome)
Kevin Segard	Framatome
Jerald Holm	Framatome
Keith Maupin	Framatome
Buck Barner	Framatome
William Walters	Framatome
Gary Peters	Framatome
Thomas Mathew	University of Maryland
Jonathan Rowley	U.S. Nuclear Regulatory Commission (NRC)
Joshua Kaizer	NRC
Mathew Panicker	NRC
Mirela Gavrilas	NRC
Andrew Proffitt*	NRC
Robert Lukes	NRC
Kevin Heller	NRC
John Lehning	NRC
Yuri Orechwa	NRC
Dennis Morey	NRC
Kenneth Geelhood*	Pacific Northwest National Laboratory

* Participated remotely via conference bridge

Enclosure