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General Comment

See attached letter for comments to USNRC Staff Consideration Of DANU-ISG-2022-07 - Risk-Informed Inservice Inspection/Inservice Testing Programs For Non-LWRs

Attachments

ISG Comments Letter On RIPB ISI and IST



July 14, 2023

SUBJECT: Comments For USNRC Staff Consideration Of DANU-ISG-2022-07 - Risk-Informed Inservice Inspection/Inservice Testing Programs For Non-LWRs

To whom it may concern,

Thank you for the opportunity to review this draft ISG. I wish to offer the following comments for consideration by the USNRC staff during the finalization of this draft ISG.

COMMENT 1

It is understood that this draft is written primarily to provide guidance for developing ISI and IST programs for Non-LWRs. That said, the foundations of the two Codes and Standards (i.e., ASME XI Division 2, specifically Reference 11, and the to be soon released standard OM-2, which are proposed for endorsement by this draft ISG are **technology neutral**.. They would be of equal relevance and applicability to advanced LWRs as well as Non-LWRs.

Foot note 2 on page two of the ISG draft states: *“Applicants desiring to use this ISG for a light water reactor application should contact the NRC staff to hold pre-application discussions on their proposed approach.”*

The foot note implies that if an applicant intends to utilize ASME XI Division 2 (RIM) for an advanced LWR design that the process might somehow be different than what is codified in in ASME XI Division 2 (i.e., Reference 11) which is endorsed by the USNRC via Regulatory Guide 1.246 (i.e., Reference 12). This footnote makes little sense and the basis for this disclaimer is at best ambiguous, notwithstanding adding likely uncertainty and confusion to applicants of advanced LWR designs.

RIM is a process and its approach to establishing a Risk Informed Performance Based ISI program has nothing to do with the intended reactor technology.

COMMENT 2

On page 4 under the heading of Application Guidance it is stated: *Applications for an OL, COL, DC, SDA, or ML may describe other programs in addition to risk-informed ISI/IST programs (e.g., programs for maintenance, reliability assurance, and aging management). If the ISI or IST program is being used to satisfy any of these other operational requirements, the applicant should state this and explain how the ISI or IST activities will satisfy such requirements. This may be done either in the ISI/IST program or in the application. A clarification seems appropriate. As written it suggests that applications for an OL, COL, etc. **may** describe other programs in addition to risk informed ISI/IST programs, but then goes on to state that the applicant should state this and explain how the ISI or IST activities will satisfy*



such requirements. This may be done either in the ISI/IST program or in the application.

The ISG is for the development and submittal of ISI/IST programs, yet this section as written seems to imply that operational criteria (e.g., maintenance programs, aging management criteria, etc.) are to be submitted to the staff as well.

COMMENT 3

On page 5 first full paragraph, last sentence under the heading of Application Guidance it is stated:

For non-LWR applicants that propose to use 10 CFR 50.69 to risk-inform their ISI/IST programs, justification must be provided showing how the resulting RISC-3 and 4 SSCs were derived from the PRA.

It is not obvious how the criteria of 50.69 would be applied to a RIPB ISI program developed based on ASME XI Division 2 (RIM). RIM in of itself is a process that is predicated on the establishment of which systems, structures, and components (SSC) are selected and to be included into the RIM program. Further RIM's foundation for selection of SSC is based upon Reference 8 of this ISG. If the staff intends on permitting a combination of processes for establishing a risk informed performance based (RIPB) ISI program, it would be informative to applicants as well as staff performing reviews to provide guidance rather than just indicating that ***justification must be provided.*** This rather open-ended provision is likely to result in confusion on the part of applicants, as well as to staff reviewers and result in needless review delays and RAI exchanges. This is particularly likely, since 50.69 is based on LWR considerations which is even noted in this draft ISG on page 5 and which reads: *The special treatment requirements that the 10 CFR 50.69 requirements may replace include certain ISI/IST requirements in 10 CFR 50.55a.* *treatment requirements that the 10 CFR 50.69 requirements may replace include certain ISI/IST requirements in 10 CFR 50.55a,* yet the ISG is limited to non-LWR applications.

COMMENT 4

- (A) On page 6 of the draft ISG, it is stated: *The reviewer should consider the topics discussed in RIS 2012-08 when evaluating risk-informed ISI/IST programs for a non-LWR application. Note: the reviewer should consider component "snubbers" with other components described in RIS 2012-08.* RIS 2012-08 is NRC Guidance for ISI/IST programs developed under PART 52 licensing provisions. While an advanced reactor design might pursue application via PART 52, it is believed that some may opt for more traditional PART 50 licensing routes. As this portion is currently drafted, it is not obvious whether the expectations of staff reviewers would be that an applicant for an advanced reactor designer would need to have considered the provisions of RIS 2012-08, even though they intend on employing PART 50 provisions for licensing. This should be clarified.
- (B) Additionally, it is not clear as to why only **snubbers** should additionally be considered. Other variable structural load carrying devices, such as variable spring, flexible pipe supports, sliding shoe supports, etc. might be critical for the safe operation of an SSC over its the anticipated operating



conditions including normal operations or off normal events, not merely snubbers. A clarification of the intent of this ISG provision is probably warranted.

COMMENT 5

- (A) On page 7 in the third paragraph, it is stated: *The scope of the program should include all safety-related and safety-significant piping and components (including supports and snubbers), consistent with the results of the plant-specific PRA.* Industry guidance on the term Safety Related has some consistent meaning and understanding for advanced non-LWR designs as provided by NEI 18-04 and other USNRC documents such as ADRC and regulatory guides. However, the term and general understanding of **safety significant** is at best a vague description as it applies to non-LWRs SSCs. The use of this specific terminology should either be withdrawn or clarified by defining it. For example, is it meant to be analogous to SSC which would be classified as NSRST using NEI 18-04 guidance or is it something else?
- (B) The same question applies to the fourth paragraph where the term safety significant is used and indicates that: *The scope of the program should include all safety-related and safety-significant piping and components (including supports and snubbers), consistent with the results of the plant-specific PRA.*
- (C) In the last paragraph on page 7 of the draft ISG it reads: *In addition, the application should describe the process to be followed when the ISI program identifies that degradation has occurred. This process should include tracking of the degradation over time. If necessary, it should also include actions such as expanding the inspections to other similar components or locations, reducing the time interval to the next inspection, or taking corrective action. The application should include the criteria for deciding what additional actions to take to allow continued operation consistent with the licensing basis.* While the basis for citing this guidance is understood, what is not apparent is whether there is some expectation that the outlined provisions in the draft ISG are to be different or somehow augmented with provisions that are already provided for in ASME XI Division 2 – RIM (Reference 11) which is a likely candidate for the development of a RIPB ISI program for non-LWR designs. RIM-3, RIM-4.4 and the non-LWR relevant technology specific supplements contained in RIM (e.g., Appendix VII supplements). If there is some other criterion that is expected of an applicant that the criteria for *expanding the inspections, reducing the time interval to the next inspection, taking corrective action, analytically evaluating, etc.*, which are all integral provisions of RIM should be outlined in the final ISG.



COMMENT 4

(A) On page 8 second paragraph of the draft ISG, it reads: *ASME BPV Code, Section XI, Division 2, does not call for a specific risk-informed ISI program to be implemented but rather allows the applicant to propose a program specific to the design and technology of the non-LWR, based on input from expert panels and considering the degradation mechanisms relevant to the materials and the operating conditions of the design.* Since the entire founding premise of RIM is a RI-PB approach to the development of an ISI program for non-LWRs, it is not understood what the phrasing of *does not call for a specific risk-informed ISI program to be implemented.* As written this statement is extremely confusing to any applicant intending to employ RIM which is USNRC endorsed under Reg Guide 1.246.

(B) On page 8 third paragraph of the draft ISG it reads: *ASME BPV Code, Section XI, Division 2, also contains acceptance criteria for the inspections; however, these apply only in the temperature range allowed in ASME BPV Code, Section III, "Rules for Construction of Nuclear Facility Components," Division 1 (Ref. 13). Appropriate justification for flaw evaluation acceptance criteria for any components that will be used in applications in which the temperature exceeds the temperature limits specified in the ASME BPV Code, Section III, Division 1 should be provided as part of the information to be included in an application.*

The draft ISG is accurate in that the 2019 edition of ASME XI Division 2 which is the Regulatory Guide 1.246 endorsed edition of RIM, does not contain provisions for high temperature (e.g., creep regime) flaw evaluation. However, it is important that the staff recognize that a high temperature flaw evaluation Code Case has been in development since 2019. That ASME action is now approved by the ASME XI Standards Committee and is expected to be approved by the Board of Nuclear Codes and Standards imminently.

The ASME C&S record number is Record 20-144. By the time the ISG is likely to be finalized this Code Case will have been approved and issued. The Code Case is entitled: *Evaluation Procedure and Acceptance Criteria for Flaws where Crack Growth from Creep Might Occur at Elevated Temperatures.* Consideration of this soon to be issued Code Case should be identified in the final issuance of this ISG.

(C) On page 8 the fourth paragraph of the draft ISG reads: *The scope of a risk-informed ISI program should include all piping, pressure-retaining components, and component supports that perform safety-related and safety-significant functions, as well as piping or other components whose failure could prevent SSCs from performing their safety functions. Therefore, the reviewer should confirm that the scope of the applicant's proposed risk-informed ISI program includes all safety-related and safety-significant piping and components (including supports and snubbers).* While this statement is logical, it is totally devoid of providing any insight for anticipated critical SSC which are not pressure retaining nor are classic supports.



- (D) ASME III Division 5 already permits the use of graphite and ceramics composite materials for structural application during construction. Soon ASME XI Division 2 (RIM) will address these same materials from an ISI perspective based on code committee work that has been in development for several years. These materials will be essential to some advanced reactor designs, yet there is no discussion in the draft ISG about any of these materials which might be used but will need to be addressed as an integral part of an ISI program if they are employed.
- (E) On page 8 in the fifth paragraph the draft ISG reads: *The reviewer should confirm that the PRA models all of the SSCs that are part of the ISI program and models the piping in segments to identify the most risk significant piping sections and welds.* While there may very well be certain welds and piping sections that are determined to be risk significant for some specific advanced reactor design, many of the potential degradation mechanisms that could challenge the safe operation of SSC in the array of advanced reactor designs may not be isolated to weld locations. For example, corrosion due to highly caustic coolant (e.g., molten salts in a molten salt reactor) would not introduce the potential of piping/vessel corrosion exclusively at welds. ASME Section XI Division 1 for LWRs is in stark contrast to the considerations relevant to ASME Division 2 (RIM). Division 1 tends to have a weld centric focus based on expected operating conditions such as fatigue, SCC etc. Division 2's technical basis for ISI program development is to determine relevant degradation mechanisms applicable to a given reactor technology and the assignment of examination and monitoring methods to detect the onset of those anticipated degradation mechanisms. It is apparent that some aspects of this draft ISG were drafted but predicated on historic LWRs framework. It is suggested that such language as appears in this paragraph, but also throughout locations in this draft ISG, be restructured as to not undermine the value of the ISG by using limiting technical basis which may still be very relevant to some of the advanced reactor design that are more akin historic LWR design technologies, but which has little direct relevance to non-LWR advanced reactor designs.

COMMENT 4

On page 9 in parentheses (9) the draft ISG reads: *Is the QA to be applied to the program in accordance with 10 CFR Part 50, Appendix B, or is an exemption from these requirements justified?* If an applicant chooses to utilize ASME XI Division 2 (RIM) as the foundation for the development of their ISI program, it should be noted that RIM mandates the use of NQA-1 for the associated QA program criteria. Is it the intent of this ISG to suggest that an applicant would be permitted to use Appendix B QA program provisions in lieu of NQA-1 if the applicant has elected to use RIM and if so, would they need to formally file or provide a justification for an exemption as inferred by the language currently in the draft ISG?



COMMENT 5

As a general comment, on page 12 the draft ISG reads: *ASME is currently considering the development of OM-2 for non-LWRs*. This is an accurate statement and OM-2 is slated for review and balloting in late 2023 with its anticipated issuance also in 2023. Since OM-2 is not available to be specifically addressed within this draft ISG, it is understood that this portion of the ISG that is devoted to IST can only shed general insights back to the existing OM Standard for LWRs.

This, however, raises a generic question about the future timeliness of revisions to this ISG, especially once it is officially issued. For example, aside from the OM-2 expected publication in 2023, ASME XI Division 2 is already working on a host new actions to address known gaps within USNRC endorsed 2019 Edition of RIM.

These include supplements to provide ISI provisions for graphite, liquid metal reactor designs, molten salt reactor designs, and as previously noted in comment 4(B), an already approved action for a new Code Case for the evaluation of flaws in materials operating in the creep temperature range, soon to be published.

These and other measures are being undertaken by various Codes and Standards committees based on priorities that are being provided through inputs from the advanced reactor design community to address their needs.

The resulting generic question both for ISI and IST as related to this draft ISG is how the staff intends to provide for future timely reviews and as needed revisions, as new Codes and Standards actions are published for industry use?

If there are any questions about these comments, please free to contact me directly.

Sincerely:

A handwritten signature in cursive script that reads "Allen Thomas Roberts III".

Principal Officer
POMO18 Consult LLC

Chair of ASME Section XI Division 2