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July 8, 2010

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Subject: Transmittal of Report; *Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs. EPRI, Palo Alto, CA: 2010. 1021467 (Ref. EPRI Project Number 669)*

Dear Ms. Mensah :

Enclosed is EPRI Report "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs." EPRI, Palo Alto, CA: 2010. 1021467. This report is an update to EPRI Report Number 1018427, which was previously submitted to NRC, and incorporates responses developed to Requests for Additional Information (RAIs) issued by the staff.

This report is being transmitted as a means of exchanging information with the NRC for the purposes of supporting generic regulatory improvements with respect to application of risk-informed technology to inservice inspection (RI-ISI) programs.

EPRI report 1021467 has been developed to provide guidance in defining which technical elements and supporting requirements of the plant PRA are applicable to RI-ISI programs. Also, for those supporting requirements that are applicable to RI-ISI programs, this report provides guidance on the appropriate capability category. This guidance is provided for both EPRI's traditional RI-ISI methodology (EPRI TR-112657) and our streamlined RI-ISI methodology (ASME Code Case N716).

If you have any questions on this subject, please contact Patrick O'Regan (poregan@epri.com, 508-497-5045).

Sincerely,

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Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs

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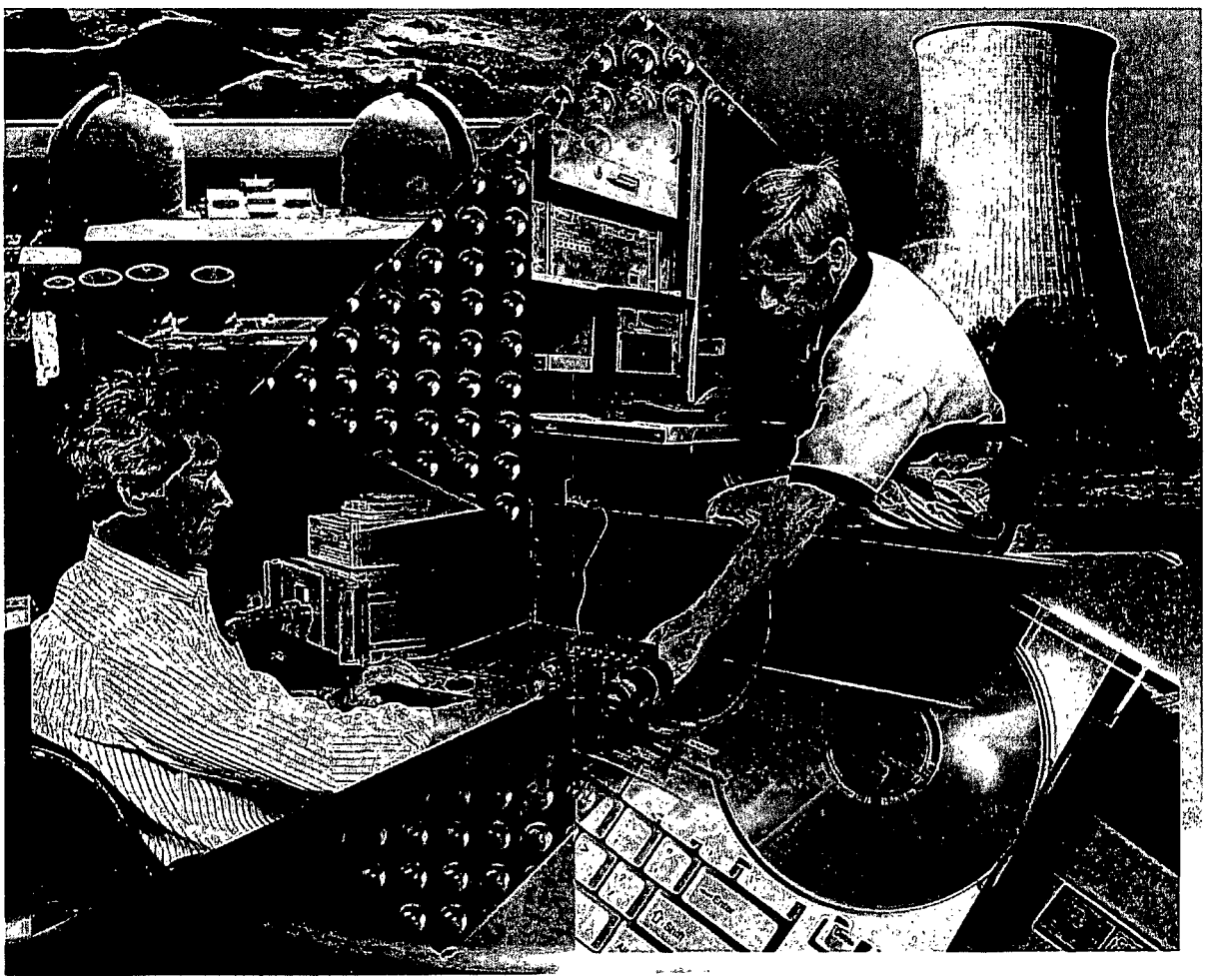

Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs

1021467

Technical Update, July 2010

EPRI Project Manager

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The report is a corporate document that should be cited in the literature in the following manner:

Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs. EPRI, Palo Alto, CA: 2010. 1021467.

PRODUCT DESCRIPTION

Risk-informed methodologies have been developed in order to establish alternative in-service inspection requirements that are defined as risk-informed in-service inspection (RI-ISI) programs. Plant-specific probabilistic risk assessments (PRAs) are typically used during the RI-ISI development process. The ASME PRA Standard (ASME RA-Sb-2005) and the U.S. Nuclear Regulatory Commission (NRC) Regulatory Guide (RG) 1.200 R1 and R2 have been issued and provide guidance in determining PRA technical adequacy. Thus, a need was identified to determine which attributes in these documents pertain to RI-ISI programs.

Results and Findings

This report provides guidance on determining the technical adequacy of PRAs used to develop RI-ISI programs. The technical adequacy of the PRA is determined by demonstrating that the PRA meets technical elements and associated supporting requirements (SRs) of the ASME PRA Standard as clarified in USNRC RG 1.200. Most but not all of these technical elements and supporting requirements relate to the technical aspects of the plant PRA, and so peer-review findings and/or gaps related to documentation that do not impact the results would still allow the PRA to support development of an RI-ISI program.

Challenges and Objectives

Risk-informed methodologies have been developed in order to establish alternative in-service inspection requirements. Plant-specific PRAs are typically used during RI-ISI development to support the consequence assessment that will also impact the risk ranking, element selection, and delta risk evaluation steps.

With respect to PRA technical adequacy, the ASME PRA Standard has been developed (ASME RA-Sb-2005), and the NRC RG 1.200 R1 and R2 were issued, providing a review and an endorsement (with positions) of the PRA Standard.

This report will be useful to personnel responsible for developing and maintaining an RI-ISI program. It will also be useful to personnel who support RI-ISI program development. In particular, it can be used by plant PRA staff to assess the technical adequacy of the plant's PRA as needed to support RI-ISI development.

Applications, Value, and Use

The information contained in this report can be used by plant operators who wish to implement and maintain RI-ISI programs. While initially developed in response to revision 1 of RG1.200, basis for the applicability of revision 2 to RI-ISI programs is also provided. As future revisions to RG 1.200 occur, this work will be updated to support future RI-ISI application and maintenance.

EPRI Perspective

The vast majority of U.S. plants that implemented RI-ISI programs have used methodologies (e..g. EPRI TR-112657, ASME Code Case N716) developed by the Electric Power Research Institute (EPRI). This report reviews these methodologies against the ASME PRA Standard and the NRC RG 1.200. This report will support industry implementation and maintenance of these tools and products.

Approach

Each of the supporting requirements in the ASME Standard was reviewed for applicability to RI-ISI programs. For supporting requirements applicable to RI-ISI programs, an assessment was made in order to define the capability category necessary to support the development of an RI-ISI program. Positions in RG 1.200 R1 and R2 were also addressed in this assessment.

Keywords

Risk-informed
In-service inspection
Risk-informed in-service inspection (RI-ISI)
Probabilistic risk assessment (PRA)
Probabilistic safety assessment (PSA)

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1
INTRODUCTION

The Electric Power Research Institute (EPRI) has developed alternative piping selection methodologies based on risk-informed insights, operating experience, and an inspection for cause philosophy. These methodologies have been validated in several NRC-approved pilot applications, by numerous additional plant applications, and subsequently embodied in ASME Standards (for example, Code Cases, non-mandatory Appendix). Figure 1-1 provides a status of RI-ISI applications in the United States. When the risk-informed methods are used, changes to the number and locations for inspection required are accompanied with increases in plant safety or a negligible change in plant risk.

These risk-informed methodologies use plant-specific PRAs as a key input into the development of the RI-ISI program. Use of the plant-specific PRA includes the following:

- Success criteria are used to define safety functions and backup trains.
- Conditional core damage probabilities (CCDP) are used for initiating events.
- The PRA system and/or train unavailabilities are used to determine the equivalent train worth for each backup train.
- PRA results are used to determine conditional LERF, given core damage, and to identify event sequences that provide the dominant contribution to LERF.
- Plant-specific failure data are used for isolation valves.
- Internal flood results, when used, help define spatial effects associated with postulate piping failure.

The NRC has issued a revision 1 and revision 2 to Regulatory Guide 1.200 (RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessments Results for Risk-informed Activities"). This regulatory guide describes NRC's approach for determining whether the quality of the PRA, in total or the parts that are used to support an application, is sufficient to provide confidence in the results so that the PRA can be used in regulatory decision making (for example, RI-ISI applications). In particular, the regulatory guide defines the quality of a PRA analysis used to support a particular application in terms of its appropriateness with respect to scope, level of detail, and technical acceptability.

As discussed in RG 1.200 and other related documents (for example, Regulatory Guide 1.174), the confidence in the information derived from the PRA is an important issue in that the accuracy of the technical content must be sufficient to justify the specific results and insights that are used to support the decision under consideration—in this case, the development of the RI-ISI program. It is also recognized that necessary sophistication of the evaluation, including the use of the PRA, depends on the contribution that the risk assessment makes to the integrated decision making, which depends to some extent on the magnitude of the potential risk impact of the application. That is, for applications that may have a more substantial impact, an in-depth and comprehensive PRA analysis would be required. Whereas in other applications, bounding estimates, simplified analyses, and/or qualitative assessments are sufficient.

This report provides guidance in defining which technical elements and supporting requirements of the plant PRA are applicable to RI-ISI programs. Also, for those supporting requirements that are applicable to RI-ISI programs, this report provides guidance on the appropriate capability category.

The PRA Technical Adequacy Guidelines contained in this report are the same whether the intended application is to develop a pre-service inspection (PSI) plan or an inservice inspection plan (ISI). The timing of when these guidelines can be met for PSI programs is a function of the status and timeline of the actual plant design, construction and ITAAC implementation.

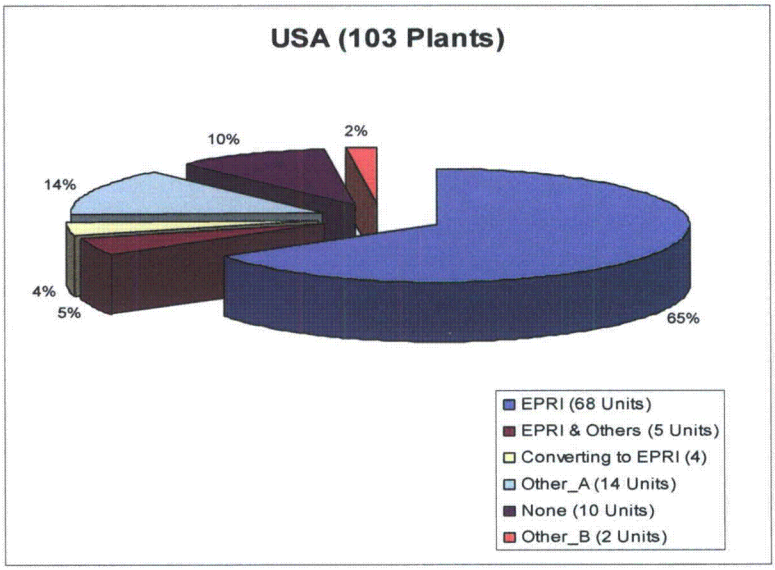

Figure 1-1
Status of RI-ISI applications in the United States

2
PRA TECHNICAL ADEQUACY GUIDANCE FOR RI-ISI APPLICATIONS

2.1 Regulatory Guide 1.200 Revision 1

Risk-informed methodologies have been developed in order to establish alternative in-service inspection requirements. Plant-specific PRAs are typically used during the RI-ISI development to support the consequence assessment, risk ranking, element selection, and delta risk evaluation steps.

For ease of reference, a summary description of the EPRI traditional and streamlined RI-ISI methodologies are presented in Appendix B.

With respect to PRA technical adequacy, the ASME PRA Standard has been developed (ASME RA-Sb-2005), and the NRC Regulatory Guide (RG) 1.200 R1 and R2 were issued, providing a review and endorsement (with positions) of the PRA Standard.

A PRA meeting Capability Category II of the PRA Standard is a major step forward in the PRA maturation process and is an acceptable starting point for almost all risk assessment applications. This viewpoint is supported by the general trend that Capability Category I supporting requirements (SRs) have a conservative bias, whereas Capability Category III SRs represent more realism in the analysis. In addition, an increasing capability category tends to increase the completeness as well as documentation requirements of the PRA.

There are some SRs in which this trend is not observed, and the bias can be in either direction (conservative or nonconservative). For example, the supporting requirement SC-B1 is an example of the general trend in that the higher capability categories are less conservative and provide more realism. The supporting requirement IF-C3 is one of the few supporting requirements that exhibits the opposite trend in that the higher capability categories are more complete and realistic, but the lower capability categories are not conservative.

For IF-C3, in particular, the NRC in RG 1.200 has taken the position that for Capability Category II, conservative assumptions are to be used to preserve the general trend, although only between Capability Categories II and III.

With respect to risk-informed applications, Section 3 of the PRA Standard provides a roadmap for determining the capability of a PRA needed to support a particular risk-informed application. Key aspects of this roadmap include the following:

- Role of the PRA in the application and extent of reliance of the decision on the PRA results
- Risk metrics to be used to support the application and associated decision criteria
- Significance of the risk contribution from the hazard group to the decision

- Degree to which bounding or conservative methods for the PRA or in a given portion of the PRA would lead to inappropriately influencing the decisions made in the application and approach(es) for accounting for this in the decision-making process
- Degree of accuracy and evaluation of uncertainties and sensitivities required of the PRA results
- Degree of confidence in the results that are required to support the decision
- Extent to which the decisions made in the application will impact the plant design basis

Each of these aspects is discussed in detail in EPRI TR-112657, which provides the foundation for the EPRI traditional RI-ISI approach and the EPRI streamlined RI-ISI approach codified in ASME Code Case N716.

This report provides guidance as to the capability categories for each supporting requirement that is applicable to RI-ISI applications. RI-ISI applications using the EPRI traditional RI-ISI approach do not use the internal flooding directly. As such, IF supporting requirements are not applicable and Section 3.3 of EPRI Report TR-112657 is the appropriate resource. This is in contrast to the EPRI streamlined RI-ISI approach which uses the internal flooding study directly.

For the purposes of RI-ISI, the capability category relates to the technical aspects of the plant PRA and so peer review findings and/or gaps related to documentation that do not impact the results would allow the capability category to still be considered met.

Tables 2-1 and 2-2 summarize the results of this review. As can be seen in the tables, for many of the supporting requirements, there is no differentiation between capability categories. That is, the requirements of the Standard have the same wording for all three capability categories. Additionally, 22 supporting requirements were identified as not applicable to the EPRI traditional RI-ISI approach and 23 supporting requirements were identified as not applicable to the EPRI streamlined RI-ISI approach (that is, need not be met).

Tables 2-1 and 2-2 provide only a summary of the review documented in this report. Appendix A provides the detailed breakdown of each supporting requirement and provides the basis for the capability category assignments. Thus, Appendix A should be used when comparing an existing plant PRA to the guidelines contained in this report.

2.2 Regulatory Guide 1.200 Revision 2

With respect to the influence of RG1.200 revision2 (i.e. hazards groups) on RI-ISI program development, it is important to note that the RI-ISI supporting analyses (e.g. consequence assessment) are based upon the internal events PRA. The purpose of developing a RI-ISI program is to define an alternative in-service inspection strategy for piping systems (e.g. non destructive examination (NDE) of a piping weld). The use of the internal events PRA only, can be justified by the following:

- The very small changes in the potential for piping failure due to changes in ISI, when augmented inspection programs such FAC, IGSCC-BWR categories B through G, localized corrosion (e.g. MIC) are left unchanged or improved
- The small contribution of piping failure, which would be influenced by changes in ISI, to the risk attributable to external events such as fire

- The use of defense in depth and safety margin to provide additional assurance of piping integrity

Thus any potential quantitative insights from the analyses of other hazards groups would not impact conclusions with respect to acceptance criteria. This approach was and is consistent with risk informed decision making as discussed, for example, in Regulatory Guide 1.174. However, for completeness, the RI-ISI methodologies were originally developed to assess the impact, as appropriate, on a qualitative basis, of other hazard groups. Experience with RI-ISI application to almost the entire US fleet has shown that these hazard groups do not impact the RI-ISI conclusions.

With respect to RG 1.200, rev 2, please note that Regulatory Guide 1.174, "AN APPROACH FOR USING PROBABILISTIC RISK ASSESSMENT IN RISK-INFORMED DECISIONS ON PLANT-SPECIFIC CHANGES TO THE LICENSING BASIS", including the draft version of revision 2 to this regulatory guide, includes provision for a qualitative approach when the decision would not be impacted. As noted this has been the experience to date, and as discussed below is the basis for not needing to quantify other hazards in the future.

Consider the following (Note 1: language from Draft Regulatory Guide DG-1226, which provides a proposed revision to this RG 1.174 is used here. The language in the existing regulatory guide is essentially the same. Note 2: Relevant guidance is noted in italic font.):

> From Section 2.2: "The necessary sophistication of the evaluation, including the scope of the risk assessment (e.g., internal hazards only, at-power only), *depends on the contribution the risk assessment makes to the integrated decisionmaking*, which *depends to some extent on the magnitude of the potential risk impact*. For LB changes that may have a more substantial impact, an in-depth and comprehensive risk assessment, in the form of a PRA (i.e., one appropriate to derive a quantified estimate of the total impact of the proposed LB change) will be necessary to provide adequate justification. In other applications, calculated risk importance measures or bounding estimates will be adequate. *In still others, a qualitative assessment of the impact of the LB change on the plant's risk may be sufficient.*"
>
> From Section 2.3: "The technical acceptability of a PRA analysis used to support an application is measured in terms of its appropriateness with respect to scope, level of detail, technical adequacy, and plant representation. The scope, level of detail, and technical adequacy of the PRA *are to be commensurate with the application for which it is intended and the role the PRA results play in the integrated decision process*. The more emphasis that is put on the risk insights and on PRA results in the decisionmaking process, the more requirements that have to be placed on the PRA in terms of both scope and how well the risk and the change in risk is assessed.
>
> Conversely, emphasis on the PRA scope, level of detail, and technical adequacy can be reduced if a proposed change to the LB results in a risk decrease *or a change that is very small, or if the decision could be based mostly on traditional engineering arguments,* or if compensating measures are proposed such that it can be convincingly argued that the change is very small.
>
> From Section 2.3.1 Scope: The scope of a PRA is defined in terms of the causes of initiating events and the plant operating modes it addresses. The causes of initiating events are classified into hazard groups. A hazard group is defined as a group of similar

hazards that are assessed in a PRA using a common approach, methods, and likelihood data for characterizing the effect on the plant. Typical hazard groups considered in a nuclear power plant PRA include: internal hardware faults (internal events), internal floods, internal fires, seismic events, high winds, external floods, and transportation accidents. Although the assessment of the risk implications in light of the acceptance guidelines discussed in Section 2.4 of this guide requires that all plant operating modes and hazard groups be addressed, it is not always necessary to have a PRA of such scope. *A qualitative treatment of the missing modes and hazard groups may be sufficient when the licensee can demonstrate that those risk contributions would not affect the decision; that is, they do not alter the results of the comparison with the acceptance guidelines in Section 2.4 of this guide.* However, when the risk associated with a particular hazard group or operating mode is significant to the decision being made, it is the Commission's policy that, if a staff-endorsed PRA standard exists for that hazard group or operating mode, then the risk will be assessed using a PRA that meets that standard (Ref. 13). Section 2.5 of this guide discusses this further."

Each Hazard group is addressed below.

Internal Fire Events– The potential contribution of piping failure to internal fire risk is insignificant as the failure probability of piping is insignificant compared to the failure probability of other systems, structures and components (SSCs), such as pumps, valves and power supplies. Fire events are also not likely to present significantly different challenges to the piping in the scope of this application. Meeting defense in depth and safety margin principles provides additional assurance that this conclusion will remain valid. ISI is an integral part of defense in depth, and the RI ISI process will maintain the basic intent of ISI (i.e. identifying and repairing flaws) and thus provide reasonable assurance of an ongoing substantive assessment of piping condition. In addition, there are no changes to design basis events and thus Safety Margins are maintained.

Seismic Events - Well engineered systems and structures (e.g. piping systems) are seismically rugged. IPEEE and other industry and NRC studies (e.g. EPRI TR-1000895, NUREG/CR-5646) have shown piping systems to have seismic fragility capacities greater than the screening values typically used in seismic assessment and are not considered likely to fail during a seismic event. ISI is not considered in establishing fragilities of such SSCs. Meeting defense in depth and safety margin principles provides assurance that this conclusion will remain valid. ISI is an integral part of defense in depth, and the RI ISI process will maintain the basic intent of ISI (i.e. identifying and repairing flaws) and thus provide reasonable assurance of an ongoing substantive assessment of piping condition. In addition, there are no changes to design basis events and thus Safety Margins are maintained.

High Winds, External Floods, and Other External Hazards - As discussed above, the purpose of developing a RI-ISI program is to define an alternative in-service inspection strategy for piping systems. Other hazards (e.g. high wind, external floods) are not considered in the development of an in-service inspection program for piping. The reasons include: the structural ruggedness of the piping systems, location, as relevant systems are typically inside well engineered structure, and the consequence assessment for internal events already includes the consideration of spatial impacts. In addition, the substantial industry experience with plants implementing RI-ISI programs has not identified changes based upon insight from the evaluation of these other external hazards. The very small potential impact on the potential for piping failure

of a RI ISI process, and the approaches to maintaining defense in depth and safety margins summarized above, provide confidence in this conclusion.

Conclusion: Quantification of other hazard groups will not change the conclusions derived from the RI ISI process. As such, EPRI 1018427 guidance on meeting Regulatory Guide 1.200, revision 1 and Regulatory Guide 1.174 is sufficient for developing RI-ISI programs. Based on RG 1.174:

- The magnitude of the potential risk impact is not significant.
- Traditional engineering arguments including defense in depth and safety margin are applied.
- Including other hazard groups would not affect the decision; that is, they would not alter the results of the comparison with the acceptance guidelines.

2.3 New Build Fleet (e.g. PSI and ISI Programs)

Application of the EPRI Traditional RI-ISI method results in the subject piping being classified into seven risk categories (1 through 7). Consistent with ASME Non-Mandatory Appendix R, risk categories 1 through 5 are considered high safety significant (HSS). Also, consistent with Appendix R, piping classified as HSS should be subjected to PSI. Piping classified as low safety significant (LSS) does not require PSI. ASME Code Case N716 (EPRI Streamlined RI-ISI method) contains explicit PSI criteria. [Please note that revision 1 to N716 is currently being processed by ASME.]

As to the PRA itself, the ASME PRA Standard was originally developed in response to operating reactors. As such, there are a number of supporting requirements that are not achievable early in the plant design while there are others that can be achieved as the plant approaches operation and finally some others that can not be fully achieved until after plant operation. In recognition of this situation, there is an ASME ALWR working group currently developing guidance on this matter with revision to the PRA Standard the ultimate end-product.

With respect to RI-PSI and RI-ISI program development, Table 2-3 provides a listing of supporting requirements (SRs) that have a variable degree of achievability during the transition from a DC PRA, to a COL PRA and finally to a fully operational plant PRA. Of the SRs listed in the table, 6 SRs need not be met in order to support the development of a RI-ISI/RI-PSI program. Of the remaining SRs listed in the table, 17 can be met for RI-ISI/PSI purposes, 29 can be fully (28) or mostly (1) met at Fuel Load and 23 can be fully met by the first inspection period (e.g. obtaining operating and maintenance data).

RI-ISI and RI-PSI have extensive experience with the operating fleet. This experience covers not only initial development of the RI-ISI program but numerous updates (periodic and interval updates) including re-submittal of the updated program to NRC for review and approval. This experience provides several advantages to the New Build fleet with respect to understanding the impact of a DC/COL PRA versus an operational plant PRA on RI-ISI/RI-PSI programs. Every plant (~90 % of the US industry) that has implemented a RI-ISI program has done so on piping that was not subjected to PSI per the ISI requirements defined in the RI-ISI program. Examples of this are as follows:

- Class 1 only RI-ISI applications: Examination categories B-F and B-J, require a volumetric PSI examination be conducted on larger bore piping (e.g. $\geq$ 4 NPS). This examination is

consistent with some, but not all RI-ISI required examinations for large bore piping (e.g. volumes may be different). Additionally, smaller bore piping (< 4 NPS), which some RI-ISI applications have shown to be safety significant, are subjected to an outside diameter surface only PSI examination. Per RI-ISI, if this piping is selected for inspection (e.g. thermal fatigue), a volumetric examination is required. Thus, similar to some large bore locations, the PSI provides no benefit.

- Class 1 and 2 RI-ISI applications: In addition to the above discussion on Class 1 piping, only 7.5 percent of Class 2 piping receives any PSI at all. Thus, many Class 2 locations selected for inspection per the RI-ISI program were not previously subject to a PSI examination.
- Fullscope RI-ISI applications: Experience has shown that RI-ISI inspections were conducted on Code (e.g. Class 3) and non-Code (e.g. non safety-related) piping that had not received a PSI examination.

Thus, having a PSI conducted on every location that will be subjected to a RI-ISI inspection is not necessary. This experience and position is also consistent with criteria contained in ASME Non Mandatory Appendix R.

RI-ISI and RI-PSI programs also have unique aspects that are different from a number of other risk-informed initiatives. For example, the RI-ISI inspection population is spread out over a ten year inspection interval. There are minimum and maximum requirements as to how many inspections can be credited. That is, in the first inspection period, a minimum of 16 percent of the population must be inspected but no more than 50 percent can be credited. For the second inspection period, a minimum of 50 percent of the population must be inspected but no more than 75 percent can be credited, and for the third (final) period, all remaining inspections must be completed to reach 100 percent of the inspection population.

The RI-ISI program also has a living program component. This component requires that periodic and interval based updates be conducted, and the inspection population adjusted accordingly. As such, if a supporting requirement could not be met until the first inspection period is completed (e.g. DA-C2), the RI-ISI process requires that the RI-ISI analyses be updated to reflect this new information. If this new information increases or decreases the inspection population, the necessary change (add or delete inspections) will be implemented over the remaining two inspection periods thereby completing 100 percent of the inspection population by the end of the first inspection interval.

Finally, because of how the EPRI RI-ISI methodologies have been built (e.g. absolute ranking, large thresholds for binning consequence ranking with the Traditional method and conservative identification of HSS for the Streamlined method (e.g. all Class 1, all large bore BER)) only large changes in the PRA would be expected to have an impact on the RI-ISI results and therefore any significant change to the RI-ISI by PRA updates are not expected. This is not only an anticipation but has been borne out via numerous updates conducted on the operating fleet, including a number of plants that have upgraded their PRAs to better meet the requirements in the PRA standard.

One additional lesson learned from the operating fleet that provides further confidence in the stability of the New Build fleet RI-ISI programs, is that all of the Part52 plants (DCDs and COLAs) have committed to meeting SRP sections 3.6.1 and 3.6.2. Meeting the requirements

contained in these two sections of the SRP provides for a robust design from a spatial separation perspective.

As such, meeting the guidelines of this report will provide for the development of robust RI-PSI/ISI programs.

Table 2-1
Summary of Capability Category Guidance

Capability Category	EPRI Traditional RI-ISI [1]	EPRI Streamlined RI-ISI [1,2]
III and II		1 IF SR
II and I	11 non-IF SRs	11 non-IF SRs + 2 IF SRs = 13 SRs
II		1 non-IF SR + 3 IF SRs = 4 SRs
I	67 non-IF SRs	69 SRs (non-IF and IF)
Need not be met	22 non-IF SRs	23 SRs (non-IF and IF)
Spans all three categories and needs to be met	156 non-IF SRs	196 SRs (non-IF and IF)

Notes:

1. For purposes of RI-ISI, the capability category relates to technical aspects of the plant PRA and so peer review findings and/or gaps related to documentation that do not impact the results would allow the capability category to still be considered met.
2. The EPRI streamlined RI-ISI methodology has been codified in ASME Code Case N716.

Table 2-2
Supporting Requirement by Capability Category

Capability Category	EPRI Traditional RI-ISI [1]	EPRI Streamlined RI-ISI [1,2]
III and II		IF-D5A
II and I	IE-A3a, IE-C11, IE-C12, AS-A7, SY-A7, SY-A15, SY-B2, HR-D7, HR-F1, DA-B2, DA-C9	IE-A3a, IE-C11, IE-C12, AS-A7, SY-A7, SY-A15, SY-B2, HR-D7, HR-F1, DA-B2, DA-C9, IF-D3a, IF-E3a
II		IE-A4, IF-C3, IF-C6, IF-C8
I	IE-A4, IE-E4a, IE-A6, IE-A7, IE-B3, AS-A9, AS-A10, SC-A2, SC-A5, SC-B1, SC-B2, SY-A4, SY-A20, SY-B1, SY-B7, SY-B11, HR-B1, HR-C2, HR-D2, HR-D3, HR-E3, HR-E4, HR-F2, HR-G1, HR-G3, HR-G4, HR-G5, HR-H1, DA-B1, DA-C7, DA-C8, DA-C10, DA-C12, DA-D1, DA-D3, DA-D4, DA-D5, DA-D6, DA-D7, QU-A2b, QU-D3, QU-D5a, QU-E3, QU-F3, LE-B1, LE-B2, LE-C1, LE-C2a, LE-C2b, LE-C3, LE-C4, LE-C8a, LE-C8b, LE-C9a, LE-C9b, LE-C10, LE-D1a, LE-D1b, LE-D2, LE-D3, LE-D4, LE-D5, LE-D6, LE-E2, LE-E3, LE-F1a, LE-G3	IE-E4a, IE-A6, IE-A7, IE-B3, AS-A9, AS-A10, SC-A2, SC-A5, SC-B1, SC-B2, SY-A4, SY-A20, SY-B1, SY-B7, SY-B11, HR-B1, HR-C2, HR-D2, HR-D3, HR-E3, HR-E4, HR-F2, HR-G1, HR-G3, HR-G4, HR-G5, HR-H1, DA-B1, DA-C7, DA-C8, DA-C10, DA-C12, DA-D1, DA-D3, DA-D4, DA-D5, DA-D6, DA-D7, IF-A1a, IF-C3b, IF-D3, QU-A2b, QU-D3, QU-D5a, QU-E3, QU-F3, LE-B1, LE-B2, LE-C1, LE-C2a, LE-C2b, LE-C3, LE-C4, LE-C8a, LE-C8b, LE-C9a, LE-C9b, LE-C10, LE-D1a, LE-D1b, LE-D2, LE-D3, LE-D4, LE-D5, LE-D6, LE-E2, LE-E3, LE-F1a, LE-G3
Need not be met	IE-A10, IE-B5, IE-C1, IE-C1a, IE-C2, IE-C3, IE-C4, IE-C5, IE-C13, IE-D3, AS-C3, SC-C3, SY-C3, HR-I3, DA-E3, QU-E1, QU-E2, QU-E4, QU-F4, LE-F2, LE-F3, LE-G4	IE-A10, IE-B5, IE-C1, IE-C1a, IE-C2, IE-C3, IE-C4, IE-C5, IE-C13, IE-D3, AS-C3, SC-C3, SY-C3, HR-I3, DA-E3, IF-D6, QU-E1, QU-E2, QU-E4, QU-F4, LE-F2, LE-F3, LE-G4

Table 2-2 (continued)
Supporting Requirement by Capability Category

Capability Category	EPRI Traditional RI-ISI[1,2]	EPRI Streamlined RI-ISI[2,3]
Spans all three categories and needs to met	IE-A1, IE-A2, IE-A3, IE-A5, IE-B1, IE-B2, IE-B4, IE-C1b, IE-C6, IE-C7, IE-C8, IE-C9, IE-C10, IE-D1, IE-D2, AS-A1, AS-A2, AS-A3, AS-A4, AS-A5, AS-A6, AS-A8, AS-A11, AS-B1, AS-B2, AS-B3, AS-B4, AS-B5, AS-B5a, AS-B6, AS-C1, AS-C2, SC-A1, SC-A4, SC-A4a, SC-A6, SC-B3, SC-B4, SC-B5, SC-C1, SC-C2, SY-A1, SY-A2, SY-A3, SY-A5, SY-A6, SY-A8, SY-A10, SY-A11, SY-A12, SY-A12a, SY-A12b, SY-A13, SY-A14, SY-A16, SY-A17, SY-A18, SY-A18a, SY-A19, SY-A21, SY-A22, SY-B3, SY-B4, SY-B5, SY-B6, SY-B8, SY-B10, SY-B12, SY-B13, SY-B14, SY-B15, SY-B16, SY-C1, SY-C2, HR-A1, HR-A2, HR-A3, HR-B2, HR-C1, HR-C3, HR-D1, HR-D4, HR-D5, HR-D6, HR-E1, HR-E2, HR-G2, HR-G6, HR-G7, HR-G9, HR-H2, HR-H3, HR-I1, HR-I2, DA-A1, DA-A1a, DA-A2, DA-A3, DA-C1, DA-C2, DA-C3, DA-C4, DA-C5, DA-C6, DA-C11, DA-C11a, DA-C13, DA-C14, DA-C15, DA-D2, DA-D6a, DA-D8, DA-E1, DA-E2, QU-A1, QU-A2a, QU-A3, QU-A4, QU-B1, QU-B2, QU-B3, QU-B4, QU-B5, QU-B6, QU-B7a, QU-B7b, QU-B8, QU-B9, QU-C1, QU-C2, QU-C3, QU-D1a, QU-D1B, QU-D1C, QU-D4, QU-D5b, QU-F1, QU-F2, QU-F5, QU-F6, LE-A1, LE-A2, LE-A3, LE-A4, LE-A5, LE-B3, LE-C5, LE-C6, LE-C7, LE-E1, LE-E4, LE-F1b, LE-G1, LE-G2, LE-G5, LE-G6	IE-A1, IE-A2, IE-A3, IE-A5, IE-B1, IE-B2, IE-B4, IE-C1b, IE-C6, IE-C7, IE-C8, IE-C9, IE-C10, IE-D1, IE-D2, AS-A1, AS-A2, AS-A3, AS-A4, AS-A5, AS-A6, AS-A8, AS-A11, AS-B1, AS-B2, AS-B3, AS-B4, AS-B5, AS-B5a, AS-B6, AS-C1, AS-C2, SC-A1, SC-A4, SC-A4a, SC-A6, SC-B3, SC-B4, SC-B5, SC-C1, SC-C2, SY-A1, SY-A2, SY-A3, SY-A5, SY-A6, SY-A8, SY-A10, SY-A11, SY-A12, SY-A12a, SY-A12b, SY-A13, SY-A14, SY-A16, SY-A17, SY-A18, SY-A18a, SY-A19, SY-A21, SY-A22, SY-B3, SY-B4, SY-B5, SY-B6, SY-B8, SY-B10, SY-B12, SY-B13, SY-B14, SY-B15, SY-B16, SY-C1, SY-C2, HR-A1, HR-A2, HR-A3, HR-B2, HR-C1, HR-C3, HR-D1, HR-D4, HR-D5, HR-D6, HR-E1, HR-E2, HR-G2, HR-G6, HR-G7, HR-G9, HR-H2, HR-H3, HR-I1, HR-I2, DA-A1, DA-A1a, DA-A2, DA-A3, DA-C1, DA-C2, DA-C3, DA-C4, DA-C5, DA-C6, DA-C11, DA-C11a, DA-C13, DA-C14, DA-C15, DA-D2, DA-D6a, DA-D8, DA-E1, DA-E2, IF-A1, IF-A1b, IF-A3, IF-A4, IF-B1, IF-B1a, IF-B1b, IF-B2, IF-B3, IF-B3a, IF-C1, IF-C2, IF-C2a, IF-C2b, IF-C2c, IF-C3A, IF-C3c, IF-C4, IF-C4a, IF-C5, IF-C5a, IF-C7, IF-C9, IF-D1, IF-D4, IF-D5, IF-D7, IF-E1, IF-E3, IF-E4, IF-E5, IF-E5a, IF-E6, IF-E6a, IF-E6b, IF-E7, IF-E8, IF-F1, IF-F2, IF-F3, QU-A1, QU-A2a, QU-A3, QU-A4, QU-B1, QU-B2, QU-B3, QU-B4, QU-B5, QU-B6, QU-B7a, QU-B7b, QU-B8, QU-B9, QU-C1, QU-C2, QU-C3, QU-D1a, QU-D1B, QU-D1C, QU-D4, QU-D5b, QU-F1, QU-F2, QU-F5, QU-F6, LE-A1, LE-A2, LE-A3, LE-A4, LE-A5, LE-B3, LE-C5, LE-C6, LE-C7, LE-E1, LE-E4, LE-F1b, LE-G1, LE-G2, LE-G5,LE-G6

Notes:

1. For purposes of RI-ISI, the capability category relates to technical aspects of the plant PRA and so peer review findings and/or gaps related to documentation that do not impact the results would allow the capability category to still be considered met.
2. The EPRI streamlined RI-ISI methodology has been codified in ASME Code Case N716.

Table 2-3
Assessment for New Build (e.g. RI-PSI/IS)

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
IE-A3 (IE-A3)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CCI/II/III
IE-A3a (IE-A4)	CCI/II can be met partially as some components may be unique	CCI/II can be met partially as some components may be unique Will be met via the RI-ISI living program component	CC I/II
IE-A4a (IE-A6)	CC II and III need routine alignment information which may not be available until plant operation	CC I can be met	CC I
IE-A6 (IE-A8)	CCII and III require interviews of "plant personnel" whom may not be assigned until post-DC PRA	CCI can be met	CC I
IE-A7 (IE-A9)	CCII and III require review of plant-specific operating experience which may not be available until 1st Period	CCI can be met	CC I
IE-C1 (IE-C1)	Plant-specific data may not be available until 1st Period. "Relevant" generic data needs to be selected.	Need not be met	Need not be met
IE-C1a (IE-C2)	Plant-specific data may not be available until 1st Period	Need not be met	Need not be met
IE-C1b (IE-C3)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CCI/II/III
IE-C2 (IE-C4)	Plant-specific data may not be available until 1st Period	Need not be met	Need not be met
IE-C3 (IE-C5)	CC I/II could be met by using an assumption CCIII can not be met until 1st Period	Need not be met	Need not be met
IE-C5 (IE-C7)	CC III can not be met until 1st Period	Need not be met	Need not be met
IE-C9 (IE-C11)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CCI/II/III
IE-C12 (IE-C14)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II

Table 2-3 (continued)
Assessment for New Build (e.g. RI-PSI/IS)

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
AS-A5 (AS-5)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
AS-B5a (AS-B6)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
SC-A6	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
SY-A2 (SY-A2)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
SY-A3 (SY-A3)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
SY-A4 (SY-A4)	Plant staff / operating data staff may not be available Can be mostly met at Fuel Load and completely met at 1st Period	Plant staff / operating data may not be available Can be mostly met at Fuel Load and completely met at 1st Period	CC I
SY-A5 (SY-A5)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
SY-A7 (SY-A7)	Detailed design information may not be available Can be met at Fuel Load	Detailed design information may not be available Can be met at Fuel Load	CC I/II
SY-A18 (SY-A19)	Operating experience may not be available Can be met at 1st Period	Operating experience may not be available Can be met at 1st Period	CC I/II/III
SY-A18a (SY-A20)	Operating experience and Procedures may not be available Can be met at 1st Period	Operating experience and Procedures may not be available Can be met at 1st Period	CC I/II/III
HR-A1 (HR-A1)	Operating experience and procedures may not be available Can be met at 1st Period	Operating experience and procedures may not be available Can be met at 1st Period	CC I/II/III
HR-A2 (HR-A2)	Operating experience and procedures may not be available Can be met at 1st Period	Operating experience and procedures may not be available Can be met at 1st Period	CC I/II/III
HR-A3 (HR-A3)	Operating experience and procedures may not be available Can be met at 1st Period	Operating experience and procedures may not be available Can be met at 1st Period	CC I/II/III

Table 2-3 (continued)
Assessment for New Build (e.g. RI-PSI/IS)

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
HR-C3 (HR-D3)	Operating experience and procedures may not be available Can be met at 1st Period	Operating experience and procedures may not be available Can be met at 1st Period	CC I/II/III
HR-D3 (HR-D3)	For CC II/III plant procedures may not be available	CC I can be met	CCI
HR-D4 (HR-D4)	Procedures may not be available Note: SR is only relevant if applicable Can be met at Fuel Load	Procedures may not be available Note: SR is only relevant if applicable Can be met at Fuel Load	CC I/II/III
HR-D7 (HR-D7)	CCI/II can be met	CCI/II can be met	CC I/II
HR-E1 (HR-E1)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
HR-E2 (HR-E2)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
HR-E3 (HE-E3)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I
HR-E4 (HR-E4)	CCII/III require use of "simulator observations or talk-throughs…" which may not be possible until post DC PRA	CC I can be met	CC I
HR-F2 (HR-F2)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I
HR-G3 (HR-G3)	For CC II/III plant procedures may not be available Can be met at Fuel Load	CC I can be met	CC I
HR-G5 (HR-G5)	For CC II and III plant procedures may not be available or walkdowns / talkthroughs may not be possible Can be met at Fuel Load	CC I can be met	CC I
HR-G6 (HR-G6)	Procedures and operating experience may not be available Can be met at 1st Period	Procedures and operating experience may not be available Can be met at 1st Period	CC I/II/III
HR-G7 (HR-G7)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III

Table 2-3 (continued)
Assessment for New Build (e.g. RI-PSI/IS)

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
HR-H2 (HR-H2)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
DA-B2 (DA-B2)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II
DA-C2 (DA-C2)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I/II/III
DA-C3 (DA-C3)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I/II/III
DA-C4 (DA-C4)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I/II/III
DA-C5 (DA-C5)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I/II/III
DA-C6 (DA-C6)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I/II/III
DA-C7 (DA-C7)	Plant-specific data may not be available Can be met at 1st Period	CCI can be met	CC I
DA-C8 (DA-C8)	CCII/III require review of plant-specific operating experience Can be met at 1st Period	CCI can be met	CC I
DA-C9 (DA-C9)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I/II
DA-C10 (DA-C10)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I
DA-C11 (DA-C11)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I/II/III

Table 2-3 (continued)
Assessment for New Build (e.g. RI-PSI/IS)

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
DA-C12 (DA-C13)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I
DA-C13 (DA-C14)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I/II/III
DA-C14 (DA-C15)	Plant-specific data may not be available Can be met at 1st Period	Plant-specific data may not be available Can be met at 1st Period	CC I/II/III
DA-D1 (DA-D1)	CCII and III require review of plant-specific operating experience Can be met at 1st Period	CC I can be met	CC I
DA-D2 (DA-D2)	Can be met. This SR also shows that other Data SRs may be supplemented by this approach	Can be met. This SR also shows that other Data SRs may be supplemented by this approach	CC I/II/III
DA-D4 (DA-D4)	For CC II/III, plant specific data may not be available Can be met at 1st Period	CCI can be met	CC I
IF-A3 (IFPP-A4)	As-built and as-operated sources may not be available As-built can be met at Fuel Load As-operated can be met at 1st Period	As-built and as-operated sources may not be available As-built can be met at Fuel Load As-operated can be met at 1st Period	CC I/II/III
IF-A4 (IFPP-A5)	Walkdowns may not be possible Can be met at Fuel Load	Walkdowns may not be possible Can be met at Fuel Load	CC I/II/III
IF-B3a (IFSO-A6)	Walkdowns may not be possible Can be met at Fuel Load	Walkdowns may not be possible Can be met at Fuel Load	CC I/II/III
IF-C6 (IFSN-A14)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC II
IF-C8 (IFSN-A16)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC II
IF-C9 (IFSN-A17)	Walkdowns may not be possible Can be met at Fuel Load	Walkdowns may not be possible Can be met at Fuel Load	CC I/II/III

Table 2-3 (continued)
Assessment for New Build (e.g. RI-PSI/IS)

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
IF-D5a (IFEV-A6)	Noted information may not be fully available Most can be met at Fuel Load, Operating data can be met at 1st Period	Noted information may not be fully available Most can be met at Fuel Load, Operating data can be met at 1st Period	CC II/III
IF-D6 (IFEV-A7)	Maintenance procedures and experience may not be available Most can be met at Fuel Load, Operating data can be met at 1st Period	Need not be met	Need not be met
IF-E5a (IFQU-A6)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
IF-E8 (IFQU-A11)	Walkdown may not be possible Can be met at Fuel Load	Walkdown may not be possible Can be met at Fuel Load	CC I/II/III
QU-D1b (QU-D2)	Procedures and operating experience may not be available Can be met at 1st Period	Procedures and operating experience may not be available Can be met at 1st Period	CC I/II/III
QU-D3 (QU-D4)	CCII/III require review of similar plant results which may not be available	CC I can be met	CC I
LE-C2a (LE-C2)	For CC II/III procedures may not be available Can be met at Fuel Load	CC I can be met	CC I
LE-C2b (LE-C3)	For CC II/III applicability of available generic data needs to be confirmed.	CC I can be met	CC I
LE-C3 (LE-C4)	For CC II and III applicability of available generic calculations needs to be confirmed	CCI can be met	CC I
LE-C6 (LE-C7)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III
LE-D5 (LE-D6)	Procedures may not be available BWR – Not applicable PWR – Can be met at Fuel Load	Procedures may not be available BWR – Not applicable PWR – Can be met at Fuel Load	CC I
LE-E1 (LE-E1)	Procedures may not be available Can be met at Fuel Load	Procedures may not be available Can be met at Fuel Load	CC I/II/III

3
SUMMARY/CONCLUSIONS

Risk-informed methodologies have been developed to establish alternative in-service inspection requirements. Plant-specific PRAs are typically used during the RI-ISI development to support the consequence assessment, risk ranking, element selection, and delta risk evaluation steps.

With respect to PRA technical adequacy, the ASME PRA Standard has been developed (ASME RA-Sb-2005), and the USNRC Regulatory Guide 1.200 R1 and R2 were issued, providing a review and an endorsement (with positions) of the PRA Standard.

This report provides guidance in determining which supporting requirements are applicable to RI-ISI programs. Also, for those supporting requirements that are applicable to RI-ISI programs, this report provides guidance on the appropriate capability category.

The PRA Technical Adequacy Guidelines contained in this report are the same whether the intended application is to develop a pre-service inspection (PSI) plan or an inservice inspection plan (ISI). The timing of when these guidelines can be met for PSI programs is a function of the status and timeline of the actual plant design, construction and ITAAC implementation.

A
CAPABILITY CATEGORY ASSESSMENT AND ASSIGNMENT

SR	Assessment For RI-ISI Purposes [1,2]
IE-A1	Spans all three capability categories.
IE-A2	Spans all three capability categories.
IE-A3	Spans all three capability categories.
IE-A3a	EPRI traditional CCI/II because the assessment will review the impact of system failures either through a specific consequence assessment of flood-induced events or use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined CCI/II because this is captured by the internal flooding study for flood-induced events (see IF-A, IF-B, IF-C, and IF-E).
IE-A4	EPRI traditional CCI because the assessment will review the impact of system failures either through a specific consequence assessment of flood-induced events or use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined CCII because this is captured by the internal flooding study for flood-induced events (see IF-A, IF-B, IF-C, and IF-E). As the Streamlined method relies on the plant PRA directly (i.e. a consequence assessment per TR 112657, Revision B-A is not performed) it was felt prudent to assign a higher capability category (i.e. CCII) for this supporting requirement, as compared to the traditional approach, thereby providing added assurance that all applicable initiating events are properly accounted for when applying the Streamlined approach.
IE-A4a	EPRI traditional CCI because the assessment will review the impact of system failures either through a specific consequence assessment of flood-induced events or use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined CCI because this is captured by the internal flooding study for flood-induced events (see IF-A, IF-B, IF-C, and IF-E).
IE-A5	Spans all three capability categories.
IE-A6	EPRI traditional CCI because the assessment will review the impact of system failures, including plant interviews as needed, either through a specific consequence assessment of flood-induced events or use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined CCI because this is captured by the internal flooding study, including plant interviews as needed, for flood-induced events (see IF-A, IF-B, IF-C, and IF-E).
IE-A7	EPRI traditional CCI because the assessment will review the impact of system failures either through a specific consequence assessment of flood-induced events or use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined CCI because this is captured by the internal flooding study for flood-induced events (see IF-A, IF-B, IF-C, and IF-E).
IE-A8	Deleted.
IE-A9	Deleted.

SR	Assessment For RI-ISI Purposes [1,2]
IE-A10	Need not be met: EPRI traditional because the assessment will review these impacts either through a specific consequence assessment of flood-induced events or use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined because this is captured by the internal flooding study for flood-induced events (see IF-A, IF-B, IF-C, and IF-E).
IE-B1	Spans all three capability categories.
IE-B2	Spans all three capability categories.
IE-B3	EPRI traditional CCI because the EPRI approach is an absolute risk ranking and so applying conservatisms for this SR would potentially increase, but not reduce, inspections. EPRI streamlined CCI because applying conservatisms for this SR would increase the scope of HSS segments per Section 2(a)(5) of case.
IE-B4	Spans all three capability categories.
IE-B5	Need not be met: EPRI traditional because the assessment will review these impacts either through a specific consequence assessment of flood-induced events or use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined because this is captured by the internal flooding study for flood-induced events (see IF-A, IF-B, IF-C, and IF-E).
IE-C1	Need not be met: EPRI traditional because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications. For plants that directly used the PRA results and did not benchmark the results against the methodology look-up tables, this SR is required. EPRI streamlined because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications.
IE-C1a	Need not be met: EPRI traditional because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications. For plants that directly used the PRA results and did not benchmark the results against the methodology look-up tables, this SR is required. EPRI streamlined because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications.
IE-C1b	Spans all three capability categories.
IE-C2	Need not be met: EPRI traditional because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications. For plants that directly used the PRA results and did not benchmark the results against the methodology look-up tables, this SR is required. EPRI streamlined because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications.

SR	Assessment For RI-ISI Purposes [1,2]
IE-C3	Need not be met: EPRI traditional because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications. For plants that directly used the PRA results and did not benchmark the results against the methodology look-up tables, CCI/II is required. EPRI streamlined because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications.
IE-C4	Need not be met: EPRI traditional because the assessment will review these impacts either through a specific assessment of flood-induced events or use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined because this is captured by the internal flooding study for flood-induced events (see IF-A, IF-B, IF-C, and IF-E).
IE-C5	Need not be met: EPRI traditional because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications. Also, the living component of an RI-ISI program will capture the impact of future performance, if any. EPRI streamlined because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications. Also, the living component of an RI-ISI program will capture the impact of future performance, if any.
IE-C6	Spans all three capability categories.
IE-C7	Spans all three capability categories.
IE-C8	Spans all three capability categories.
IE-C9	Spans all three capability categories.
IE-C10	Spans all three capability categories.
IE-C11	EPRI traditional CCI/II because rare initiating events are not very relevant to RI-ISI applications, which model application-specific pressure-boundary failure-related initiating events. EPRI streamlined CCI/II because rare initiating events are not very relevant to RI-ISI applications, which model application-specific pressure-boundary failure-related initiating events.
IE-C12	EPRI traditional CCI/II—Only bounding estimates of multiple valve failures are needed to support RI-ISI, the pipe is assumed to break with probability of 1, and if credit for ISLOCA mitigation is used, the consequences of the break must be confirmed. EPRI streamlined CCI/II bounding analyses can be used because it would at most require pipe segments to be classified as HSS.
IE-C13	Need not be met: EPRI traditional mean values are sufficient due to the order of magnitude ranking and grouping approach used. EPRI streamlined mean values are sufficient due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
IE-D1	Spans all three capability categories.
IE-D2	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
IE-D3	Need not be met because RI-ISI is interested only in initiating events caused by pressure boundary failures.
AS-A1	Spans all three capability categories.
AS-A2	Spans all three capability categories.
AS-A3	Spans all three capability categories.
AS-A4	Spans all three capability categories.
AS-A5	Spans all three capability categories.
AS-A6	Spans all three capability categories.
AS-A7	CCI/II is sufficient due to the order of magnitude ranking and grouping approach used in the EPRI methodology. Also, it is generally acknowledged that CCII is adequate for all but the most challenging of PRA applications.
AS-A8	Spans all three capability categories.
AS-A9	EPRI traditional CCI because the EPRI approach uses an order of magnitude absolute risk ranking and grouping approach. Substantial differences between the generic analyses and realistic plant-specific analyses would be required to impact the RI-ISI results. EPRI streamlined CCI because substantial differences between the generic analyses and realistic plant-specific analyses would be required to have a significant enough impact to increase the scope of HSS segments, per Section 2(a)(5) of case.
AS-A10	EPRI traditional CCI—The EPRI approach is an absolute risk-ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
AS-A11	Spans all three capability categories.
AS-B1	Spans all three capability categories.
AS-B2	Spans all three capability categories.
AS-B3	Spans all three capability categories.
AS-B4	Spans all three capability categories.
AS-B5	Spans all three capability categories.
AS-B5a	Spans all three capability categories.
AS-B6	Spans all three capability categories.
AS-C1	Spans all three capability categories.
AS-C2	Spans all three capability categories.
AS-C3	Need not be met: EPRI traditional—Although helpful from a living program perspective, this is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Although helpful from a living program perspective, this is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
SC-A1	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
SC-A2	EPRI traditional—Per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because applying conservatism for this SR would increase the scope of HSS segments, per Section 2(a)(5) of case.
SC-A3	Deleted.
SC-A4	Spans all three capability categories.
SC-A4a	Spans all three capability categories.
SC-A5	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
SC-A6	Spans all three capability categories.
SC-B1	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
SC-B2	EPRI traditional CCI—Per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI—per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
SC-B3	Spans all three capability categories.
SC-B4	Spans all three capability categories.
SC-B5	Spans all three capability categories.
SC-C1	Spans all three capability categories.
SC-C2	Spans all three capability categories.
SC-C3	Need not be met: EPRI traditional—Although helpful from a living program perspective, this is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Although helpful from a living program perspective, this is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
SY-A1	Spans all three capability categories.
SY-A2	Spans all three capability categories.
SY-A3	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
SY-A4	EPRI traditional CCI because this SR will be supplemented by the RI-ISI consequence assessment or IF analyses. EPRI streamlined CCI because this SR will be supplemented by SRs in Section IF.
SY-A5	Spans all three capability categories.
SY-A6	Spans all three capability categories.
SY-A7	EPRI traditional CCI/II because per Table 1.3-1 of the RA-2005, by meeting CCII, any departure from realism will have a small impact on the conclusions and risk insights. Thus, any impact on the RI-ISI results would be minimal. EPRI streamlined CCI/II because per Table 1.3-1 of the RA-2005, by meeting CCII, any departure from realism will have a small impact on the conclusions and risk insights. Thus, any impact on the RI-ISI results would be minimal.
SY-A8	Spans all three capability categories.
SY-A9	Deleted.
SY-A10	Spans all three capability categories.
SY-A11	Spans all three capability categories.
SY-A12	Spans all three capability categories.
SY-A12a	Spans all three capability categories.
SY-A12b	Spans all three capability categories.
SY-A13	Spans all three capability categories.
SY-A14	Spans all three capability categories.
SY-A15	EPRI traditional CCI/II—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI/II—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
SY-A16	Spans all three capability categories.
SY-A17	Spans all three capability categories.
SY-A18	Spans all three capability categories.
SY-A18a	Spans all three capability categories.
SY-A19	Spans all three capability categories.
SY-A20	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
SY-A21	Spans all three capability categories.
SY-A22	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
SY-B1	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
SY-B2	EPRI traditional CC I/II is acknowledged to be adequate for most PRA applications; this includes RI-ISI applications. EPRI streamlined CC I/II is acknowledged to be adequate for most PRA applications; this includes RI-ISI applications.
SY-B3	Spans all three capability categories.
SY-B4	Spans all three capability categories.
SY-B5	Spans all three capability categories.
SY-B6	Spans all three capability categories.
SY-B7	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
SY-B8	Spans all three capability categories.
SY-B9	Deleted.
SY-B10	Spans all three capability categories.
SY-B11	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
SY-B12	Spans all three capability categories.
SY-B13	Spans all three capability categories.
SY-B14	Spans all three capability categories.
SY-B15	Spans all three capability categories.
SY-B16	Spans all three capability categories.
SY-C1	Spans all three capability categories.
SY-C2	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
SY-C3	Need not be met: EPRI traditional—Although helpful from a living program perspective, this is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Although helpful from a living program perspective, this is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
HR-A1	Spans all three capability categories.
HR-A2	Spans all three capability categories.
HR-A3	Spans all three capability categories.
HR-B1	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
HR-B2	Spans all three capability categories.
HR-C1	Spans all three capability categories.
HR-C2	EPRI traditional CCI because this level of detail in the system models is not expected to impact the RI-ISI results, given that this SR requires that any unique design or operational features of the plant need to be accounted for. EPRI streamlined CCI because this level of detail in the system models is not expected to impact the RI-ISI results, given that this SR requires that any unique design or operational features of the plant need to be accounted for.
HR-C3	Spans all three capability categories.
HR-D1	Spans all three capability categories.
HR-D2	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
HR-D3	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
HR-D4	Spans all three capability categories.
HR-D5	Spans all three capability categories.
HR-D6	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
HR-D7	EPRI traditional CCI/II because per Table 1.3-1 of the RA-2005, by meeting CCII, any departure from realism will have a small impact on the conclusions and risk insights. Thus, any impact on the RI-ISI results would be minimal. EPRI streamlined CCI/II because per Table 1.3-1 of the RA-2005, by meeting CCII, any departure from realism will have a small impact on the conclusions and risk insights. Thus, any impact on the RI-ISI results would be minimal.
HR-E1	Spans all three capability categories.
HR-E2	Spans all three capability categories.
HR-E3	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
HR-E4	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
HR-F1	EPRI traditional CCI/II because per Table 1.3-1 of the RA-2005, CCII provides resolution and specificity sufficient to identify the importance of significant contributors at the component level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI/II because per Table 1.3-1 of the RA-2005, CCII provides resolution and specificity sufficient to identify the importance of significant contributors at the component level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
HR-F2	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).

SR	Assessment For RI-ISI Purposes [1,2]
HR-G1	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
HR-G2	Spans all three capability categories.
HR-G3	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments per section 2[a][5] of case).
HR-G4	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments per section 2[a][5] of case).
HR-G5	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
HR-G6	Spans all three capability categories.
HR-G7	Spans all three capability categories.
HR-G8	Deleted.
HR-G9	Spans all three capability categories.
HR-H1	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
HR-H2	Spans all three capability categories.
HR-H3	Spans all three capability categories.
HR-I1	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
HR-I2	Spans all three capability categories.
HR-I3	Need not be met: EPRI traditional—Although helpful from a living program perspective, this is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Although helpful from a living program perspective, this is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
DA-A1	Spans all three capability categories.
DA-A1a	Spans all three capability categories.
DA-A2	Spans all three capability categories.
DA-A3	Spans all three capability categories.
DA-B1	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-B2	EPRI traditional CCI/II because per Table 1.3-1 of the RA-2005, CCII provides resolution and specificity sufficient to identify the importance of significant contributors at the component level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI/II because per Table 1.3-1 of the RA-2005, CCII provides resolution and specificity sufficient to identify the importance of significant contributors at the component level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-C1	Spans all three capability categories.
DA-C2	Spans all three capability categories.
DA-C3	Spans all three capability categories.
DA-C4	Spans all three capability categories.
DA-C5	Spans all three capability categories.
DA-C6	Spans all three capability categories.
DA-C7	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).

SR	Assessment For RI-ISI Purposes [1,2]
DA-C8	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-C9	EPRI traditional CCI/II because per Table 1.3-1 of the RA-2005, CCII provides resolution and specificity sufficient to identify the importance of significant contributors at the component level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI/II because per Table 1.3-1 of the RA-2005, CCII provides resolution and specificity sufficient to identify the importance of significant contributors at the component level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-C10	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-C11	Spans all three capability categories.
DA-C11a	Spans all three capability categories.
DA-C12	EPRI traditional CCI because the EPRI approach uses an absolute risk ranking approach, so applying conservatism for this SR would only add inspections. EPRI streamlined CCI because applying conservatism for this SR would increase the scope of HSS segments, per Section 2(a)(5) of case.
DA-C13	Spans all three capability categories.
DA-C14	Spans all three capability categories.
DA-C15	Spans all three capability categories.
DA-D1	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-D2	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
DA-D3	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-D4	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-D5	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify theimportance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-D6	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking. EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-D6a	Spans all three capability categories.
DA-D7	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
DA-D8	Spans all three capability categories.
DA-E1	Spans all three capability categories.
DA-E2	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
DA-E3	Need not be met: EPRI traditional—Although helpful from a living program perspective, this is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Although helpful from a living program perspective, this is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
IF-A1	Spans all three capability categories.
IF-A1a	EPRI streamlined CCI—The higher capability categories require further resolution of plants areas/rooms. CCI does not allow propagation outside of the defined area, including through drain lines or other paths. By not requiring higher resolution per CCII/III, a conservative CCDP would be developed which would result in an increase in HSS scope only (per Section 2[a][5] or conservative CCDP/CLERPs for the delta risk evaluation).
IF-A1b	Spans all three capability categories.
IF-A2	Deleted: Moved to IF-C2c.
IF-A3	Spans all three capability categories.
IF-A4	Spans all three capability categories.
IF-B1	Spans all three capability categories.
IF-B1a	Spans all three capability categories.
IF-B1b	Spans all three capability categories.
IF-B2	Spans all three capability categories. **Note:** RI-ISI applies to piping and NDE requirements only; therefore, this SR is only partially applicable (that is, human-induced mechanisms for overfilling tanks are not applicable).
IF-B3	Spans all three capability categories.
IF-B3a	Spans all three capability categories.
IF-B4	Relocated to IF-C2.
IF-C1	Spans all three capability categories.
IF-C2	Spans all three capability categories.
IF-C2a	Spans all three capability categories.
IF-C2b	Spans all three capability categories.
IF-C2c	Spans all three capability categories.
IF-C3	EPRI streamlined CCII—RG 1.200 R1 comment requires that CCII assess CCIII mechanisms **by using conservative assumptions**. Thus, CCII is conservative and could increase the scope of HSS piping and inspection population.
IF-C3a	Spans all three capability categories.
IF-C3b	EPRI streamlined CCI—Higher capability categories are not required because the flood areas are defined as independent per SR IF-A1a. For CCI, SF IF-A1a does not allow propagation outside of the defined area, including through drain lines or other paths. If areas are not independent (that is, individual rooms are defined), CCII is required. It is noted that N716 applies to piping and RI-ISI applications. ISI has limited or negligible ability to impact maintenance-induced unavailability of barriers and vice versa.
IF-C3c	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
IF-C4	Spans all three capability categories.
IF-C4a	Spans all three capability categories.
IF-C5	Spans all three capability categories.
IF-C5a	Spans all three capability categories.
IF-C6	EPRI streamlined CCII—Higher capability category is not required because the CCII requirements assure high reliability for these actions. EPRI TR-112657, Rev B-A provides additional guidance. [Note: additional clarification on this supporting requirement is provided at the end of this Appendix]
IF-C7	Spans all three capability categories.
IF-C8	EPRI streamlined CCII—Higher capability category is not required because the CCII requirements assure high reliability for these actions. EPRI TR-112657, Rev B-A provides additional guidance. [Note: additional clarification on this supporting requirement is provided at the end of this Appendix]
IF-C9	Spans all three capability categories.
IF-D1	Spans all three capability categories.
IF-D2	Deleted.
IF-D3	EPRI streamlined CCI—The higher capability categories require further resolution. By not requiring higher resolution, a conservative CCDP would be developed which would result in an increase in HSS scope only, per Section 2(a)(5) or conservative CCDP/CLERPs for the delta risk evaluation. It is noted that, in these groupings, the sum of their frequencies will be retained for use in the quantification step.
IF-D3a	EPRI streamlined C I/II because subsuming these scenarios into existing plant initiating events will not impact the application or results. This information needs to be retrievable to support the application (for example, CCDP, HSS determination).
IF-D4	Spans all three capability categories.
IF-D5	Spans all capability categories. This requirement includes the retention (that is, total frequency of the group versus dominant frequency) of all summed frequencies for all scenarios addressed by the flood scenario group.
IF-D5a	EPRI streamlined CCII/III—EPRI TR-112657, EPRI TR-102266, and EPRI TR-1012302 provide acceptable ways of meeting this requirement. In lieu of these, conservative/bounding values may be used.
IF-D6	Need not be met: EPRI streamlined—The purpose of RI-ISI is to develop an alternative ISI program (that is, periodic NDE on piping). Implementation of a periodic NDE will not impact maintenance activities.
IF-D7	Spans all capability categories. When option (b) is used, it must also be shown to result in total scenario frequencies less than 1E-06 per year (CDF) and 1E-07 per year (LERF).
IF-E1	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
IF-E2	Moved to IF-C3c.
IF-E3	Spans all three capability categories.
IF-E3a	EPRI streamlined because CCI/II is sufficient to capture all important contributors.
IF-E4	Spans all three capability categories.
IF-E5	Spans all three capability categories.
IF-E5a	Spans all three capability categories.
IF-E6	Spans all three capability categories.
IF-E6a	Spans all three capability categories.
IF-E6b	Spans all three capability categories.
IF-E7	Spans all three capability categories.
IF-E8	Spans all three capability categories.
IF-F1	Spans all three capability categories.
IF-F2	Spans all three capability categories.
IF-F3	Spans all three capability categories as needed to support the RI-ISI application.
QU-A1	Spans all three capability categories.
QU-A2a	Spans all three capability categories.
QU-A2b	EPRI traditional CCI because the order of magnitude ranking and grouping approach used and higher capability categories are not expected to have a significant impact on the ranking results. EPRI streamlined CCI because the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping and higher capability categories are not expected to have a significant impact on the ranking results.
QU-A3	Spans all three capability categories.
QU-A4	Spans all three capability categories.
QU-B1	Spans all three capability categories.
QU-B2	Spans all three capability categories.
QU-B3	Spans all three capability categories.
QU-B4	Spans all three capability categories.
QU-B5	Spans all three capability categories.
QU-B6	Spans all three capability categories.
QU-B7a	Spans all three capability categories.
QU-B7b	Spans all three capability categories.
QU-B8	Spans all three capability categories.
QU-B9	Spans all three capability categories.
QU-C1	Spans all three capability categories.
QU-C2	Spans all three capability categories.
QU-C3	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
QU-D1a	Spans all three capability categories.
QU-D1b	Spans all three capability categories.
QU-D1c	Spans all three capability categories.
QU-D2	Deleted.
QU-D3	EPRI traditional CCI because methodology look-up tables serve to benchmark the PRA inputs. For plants that directly used the PRA results and did not benchmark these results against the methodology look-up tables, CCII/III is applicable. EPRI streamlined CCI because this level of detail has no impact on classification.
QU-D4	Spans all three capability categories.
QU-D5a	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
QU-D5b	Spans all three capability categories.
QU-E1	Need not be met: EPRI traditional—Although helpful from a living program perspective, this is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Although helpful from a living program perspective, this is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
QU-E2	Need not be met: EPRI traditional—Although helpful from a living program perspective, this is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Although helpful from a living program perspective, this is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
QU-E3	EPRI traditional CCI because the order of magnitude ranking and grouping approach used and higher capability categories are not expected to have a significant impact on the ranking results. EPRI streamlined CCI because the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping and higher capability categories are not expected to have a significant impact on the ranking results.
QU-E4	Need not be met: EPRI traditional—Analyzing the impact from uncertainties on the PRA results is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Analyzing the impact from uncertainties on the PRA results is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
QU-F1	Spans all three capability categories.

SR	Assessment For RI-ISI Purposes [1,2]
QU-F2	Spans all three capability categories.
QU-F3	EPRI traditional CCI—Although potentially helpful, further level of detail is not required to support the RI-ISI applications. EPRI streamlined CCI—Although potentially helpful, further level of detail is not required to support the RI-ISI applications.
QU-F4	Need not be met: EPRI traditional—Although helpful from a living program perspective, this is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Although helpful from a living program perspective, this is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
QU-F5	Spans all three capability categories.
QU-F6	Spans all three capability categories.
LE-A1	Spans all three capability categories.
LE-A2	Spans all three capability categories.
LE-A3	Spans all three capability categories.
LE-A4	Spans all three capability categories.
LE-A5	Spans all three capability categories.
LE-B1	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
LE-B2	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
LE-B3	Spans all three capability categories.
LE-C1	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).

SR	Assessment For RI-ISI Purposes [1,2]
LE-C2a	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-C2b	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
LE-C3	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
LE-C4	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-C5	Spans all three capability categories.
LE-C6	Spans all three capability categories.
LE-C7	Spans all three capability categories.
LE-C8a	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-C8b	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-C9a	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-C9b	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.

SR	Assessment For RI-ISI Purposes [1,2]
LE-C10	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-D1a	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-D1b	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per section 2[a][5] of case).
LE-D2	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-D3	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-D4	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-D5	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-D6	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-E1	Spans all three capability categories.
LE-E2	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.
LE-E3	EPRI traditional CCI—The EPRI approach is an absolute risk ranking approach, so applying conservatisms for this SR will at worst only add inspections. EPRI streamlined CCI—Applying conservatisms for this SR will at worst increase the scope of HSS segments, per Section 2(a)(5) of case.

SR	Assessment For RI-ISI Purposes [1,2]
LE-E4	Spans all three capability categories.
LE-F1a	EPRI traditional CCI because it is consistent with conservative bias in supporting requirements; additional detail is not required. EPRI streamlined CCI because it is consistent with conservative bias in supporting requirements; additional detail is not required.
LE-F1b	Spans all three capability categories.
LE-F2	Need not be met: EPRI traditional—Analyzing the impact from uncertainties is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Analyzing the impact from uncertainties is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
LE-F3	Need not be met: EPRI traditional—Analyzing the impact from uncertainties is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Analyzing the impact from uncertainties is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
LE-G1	Spans all three capability categories.
LE-G2	Spans all three capability categories.
LE-G3	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, absolute risk ranking versus relative risk ranking). EPRI streamlined CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Thus, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, per Section 2[a][5] of case).
LE-G4	Need not be met: EPRI traditional—Although helpful from a living program perspective, this is not necessary due to the order of magnitude ranking and grouping approach used. EPRI streamlined—Although helpful from a living program perspective, this is not necessary due to the conservative identification of pre-defined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
LE-G5	Spans all three capability categories.
LE-G6	Spans all three capability categories.

Notes:

1. The EPRI streamlined RI-ISI methodology has been codified in ASME Code Case N716.
2. For purposes of RI-ISI, the capability category relates to technical aspects of the plant PRA and so peer review findings and/or gaps related to documentation that do not impact the results would allow the capability category to still be considered met.

Additional Clarification on Supporting Requirements IF-C6 and IF-C8

Supporting requirements IF-C6/IF-C8 pertain to screening of plant areas and sources. The intent of these SRs is that the screening approach be conservative for lower capability categories and more realistic for higher capability categories. This is a general, although not absolute trend, in the philosophy upon which the PRA Standard is founded. That is, Capability Category I SRs typically have a conservative bias while Capability Category III SRs typically represent more realism in the analysis. With this in mind, the only way that screening can be performed on the basis of human actions and meet Capability Category I for these SRs, is if the bounding amount of time for damage is **significantly greater** than the time required to diagnose and isolate the flood scenario, **for the worst flood initiator**. Said in another way, if there is any realistic potential for failure to isolate the flood scenario and it is not modeled in the PRA, this SR would be considered "Not Met".

The use of the internal flooding study in the EPRI Streamlined RI-ISI approach (i.e. N716) is to identify any plant-specific piping that may have a substantial impact on plant risk that is not captured by the criteria in section 2(a)(1) through 2(a)(4) of the approach. Capability Category I and its conservative bias (e.g. relative to Capability II and III), would only act to add piping to the high safety significant (HSS) scope as compared to meeting a higher Capability Category. Thus, meeting Capability Category I for these SRs, for this application, is acceptable.

Consistent with the general premise of the PRA Standard, higher capability categories for these SRs requires that more realism be input into the evaluation. For example, Capability Category II for these SRs allows screening based on very reliable human actions, for the worst flood. Capability Category III also allows for crediting operators actions for these scenarios, however, these scenarios must be retained in the PRA model for Capability Category III, while they do not need to be included quantitatively in the PRA model to meet Capability Category II.

Given the above, Capability II is potentially non conservative, from a quantitative perspective relative to Capability Category III with regard to the need to incorporate additional flood scenarios into the PRA model. However, from a realistic perspective, these Capability Category II "screened scenarios" will have a negligible impact on plant risk. This is due to a combination of: the nature of the screening process itself (e.g. use of the worst flood source/initiator), applicability to a single flood zone at a time, initiating frequency and highly reliable operator actions.

Thus, an internal flooding PRA done to Capability Category II for these SRs is more than sufficient to support a RI-ISI application using either the traditional EPRI RI-ISI approach or the EPRI streamlined RI-ISI approach (e.g. an N716 application). And, as discussed above, Capability Category I is also acceptable.

To further illustrate the above, the following screening evaluation is provided:

Upper bound plant piping failure rate of 1E-02/year is conservative for a variety of reasons, for example;

- This value contains a number of failures due to FAC failures. The FAC program is not altered in any way by application of EPRI's RI-ISI methodologies

- This value contains a large fraction of failures in low energy systems which tend to leak versus rupture (see Generic Letter 90-05)
- This value includes contributions from non-piping sources

Given the above, a more realistic yet conservative value of 1E-03/year is proposed

Plants typically have ~ 100 flood zones

HEP for IF-C6/C8 Capability Category II ~ 1E-03

Thus, if one were to quantitatively assess the screening allowed by Capability Category II for SRs IF-C-6/8, one could reasonably conclude a CDF contribution of less than 1E-08/year as follows:

> 1E-03/year (pipe break frequency per plant) * 1E-02 (Number of zones per plant) * 1E-03 (HEP for CCII) or CDF contribution < 1E-08/year

Even taking into account that some flood zones may be more heavily weighted with sources (e.g. more piping) than others, the simplified example above illustrates that meeting CCII for these two SRs will still assure that any zones/sources screened out will have a negligible impact on plant risk.

From a broader perspective, it is important to note that one of the objectives of an internal flood PRA is to identify and quantify scenarios/sequences that contribute to core damage frequency and large early release frequency. In addition to SRs IF-C-6 and IF-C-8, several Internal Flood SRs address the identification, quantification and review of significant sequences, where significance is established at the systemic or functional level at a value of 1% of total calculated CDF/LERF. See, for example, SRs IFQU-A3, IFQU-A7, and QU-D6. Therefore several SRs and the objectives set forth for an internal flood PRA provide reasonable assurance that segments with a CDF/LERF greater than 1E-6/1E-7 per year are not qualitatively screened.

B
SUMMARY DESCRIPTION OF RI-ISI METHODOLOGIES

Traditional RI-ISI Methodology

The EPRI methodology was developed to be implemented on a system-by-system basis. In order to conduct and document the analysis, the piping systems are divided into segments based on the pipe rupture potential and its consequences. Although the analysis is conducted on a segment basis, it is for ease of use rather than being a technical component of the analyses. Thus, differences in segment definition or segment boundary definition will have no impact on the final results for applications using the EPRI RI-ISI methodology. Each segment, which includes all of the elements within the segment, is placed onto the appropriate place on the EPRI Risk Characterization Matrix, as shown in Table B-1.

The failure potential category is determined on the basis of identified degradation mechanism.

The consequence evaluation focuses on the impact of a pipe-section failure (loss of pressure boundary integrity) on plant operation. This impact can be direct, indirect, or a combination of both, as follows:

- Direct impacts—A failure results in a diversion of flow and a loss of the train and/or system or an initiating event (such as a LOCA).
- Indirect impacts—A failure results in a flood, spray, or pipe whip, spatially affecting neighboring structures, systems, and components; a failure may also result in the depletion of a tank and loss of the systems supplied by the tank.

The possibility of isolating a break is also identified and accounted for as part of the consequence analysis. A break could be isolated by a protective check valve, a closed isolation valve, or it could be automatically isolated by an isolation valve that closes on a given signal. If not automatically isolated, a break can be isolated by an operator action, given a successful diagnosis. The likelihood of isolating a break depends on the availability of isolation equipment, a means of detecting the break, the amount of time available to prevent specific consequences (for example, flooding of the room or draining of the tank), and human performance. If isolation is possible, the consequence assessment should be conducted for both cases, that is, successful and unsuccessful isolations. Operator recovery actions are further discussed in EPRI TR-112657, Section 3.3.3.2.

For each run of piping under evaluation, a spectrum of break sizes is evaluated. The break size ranges from a small leak to a rupture. Larger leaks and breaks have the potential to disable systems or trains and to cause initiating events, flooding, or diversions of water sources. Typically, small breaks (minor leakage) would not render a train inoperable. They may, however, depending on the energy level of the system, spray onto adjacent equipment and cause equipment malfunction.

The consequence category is determined from the plant-specific PRA by calculating the conditional core damage probability (CCDP) and the conditional large early release probability (CLERP), as follows:

High = CCDP > 1E-4

Medium = 1E-6 < CCDP < 1E-4

Low = CCDP < 1E-6

For CLERP, the boundary values are one order of magnitude smaller.

Table B-1
EPRI Risk Matrix

POTENTIAL FOR PIPE RUPTURE PER DEGRADATION MECHANISM SCREENING CRITERIA	CONSEQUENCES OF PIPE RUPTURE IMPACTS ON CONDITIONAL CORE DAMAGE PROBABILITY AND LARGE EARLY RELEASE PROBABILITY			
	NONE	LOW	MEDIUM	HIGH
HIGH FLOW ACCELERATED CORROSION	LOW Category 7	MEDIUM Category 5	HIGH Category 3	HIGH Category 1
MEDIUM OTHER DEGRADATION MECHANISMS	LOW Category 7	LOW Category 6	MEDIUM Category 5	HIGH Category 2
LOW NO DEGRADATION MECHANISMS	LOW Category 7	LOW Category 7	LOW Category 6	MEDIUM Category 4

The risk categories shown are combined into three risk regions for more robust and more efficient utilization. For risk Category 1, 2, or 3, the minimum number of inspection elements in each category should be 25% of the total number of elements in each risk category (rounded up to the next higher whole number). For risk Category 4 or 5, the number of inspection elements in each category should be 10% of the total number of elements in each risk category (rounded up to the higher whole number). Pressure/leakage testing requirements remain in effect regardless of the risk category (that is, risk Categories 1 through 7).

Streamlined RI-ISI Methodology

This approach is a streamlined process for implementing and maintaining RI-ISI, based upon lessons learned from numerous approved RI-ISI applications and has been codified by ASME in Code Case N716. The N716 approach differs from the traditional RI-ISI approaches in two respects. First, the consequence assessment is not required. The consequence assessment has been replaced with a predetermined set of high safety significant locations (for example, reactor coolant system, break exclusion area) and a plant-specific assessment of the impact of pressure boundary failure by directly using the plant PRA. That is, any other safety or non-safety-related

piping, including segments grouped or subsumed with existing plant initiating event (IE) groups, whose pressure boundary failure contributions to CDF is greater than 1E-06 (or LERF greater than 1E-07) based upon a plant-specific PRA is required to be within the scope of the Code Case N-716 application. The second departure is that partial scope application, which is allowed by previous RI-ISI approaches, is not allowed by N716.

According to the process, the inspection selection should equal to 10% of the high safety significant (HSS) welds, plus augmented programs for flow accelerated corrosion, localized corrosion (for example, MIC), and IGSCC in BWRs. HSS welds are selected as follows:

1. A minimum of 25% of the population is identified as susceptible to each degradation mechanism and degradation mechanism combination.
2. For the RCPB, at least two-thirds of the examinations shall be located between the first isolation valve (that is, isolation valve closest to the RPV) and the reactor pressure vessel.
3. A minimum of 10% of the welds in the portion of the RCPB that lies outside containment (for example, portions of the main feedwater system in BWRs) shall be selected.
4. A minimum of 10% of the welds within the break exclusion region (for example, high energy piping penetrating containment) shall be selected. Pressure/leakage testing requirements remain in effect regardless of the safety significance category.

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