ELECTRIC POWER RESEARCH INSTITUTE

NEIL WILMSHURST
Vice President and
Chief Nuclear Officer

June 18, 2012
PT-061812-022

Mr. Sheldon Stuchell
Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Subject: EPRI 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 Mr. Stuchell:

On July 8, 2010, EPRI submitted EPRI Report "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs." EPRI, Palo Alto, CA: 2010. 1021467. This report was an update to EPRI Report 1018427, which was previously submitted to NRC, and incorporated responses developed to Requests for Additional Information (RAIs) issued by the staff.

On January 18, 2012, NRC issued a Safety Evaluation (SE) Report on EPRI Report 1021467 with a request to publish an accepted version of EPRI Report 1021467 including the SE and historical review information. Additionally, during a conference call on May 15th, several changes to the report were agreed upon. As such, please find attached an updated version of EPRI Report 1021467.

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

Sincerely,

PT-061812-022/NW/po/le/tw

Enclosure

c: Art Smith (Entergy)
Sam Volk (Progress)
R. Bradley (NEI)
Patrick O'Regan (EPRI)
John Lindberg (EPRI)

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NRR

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

1021467-A

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

1021467-A

Technical Update, July 2011

NRC Update, June 2012

EPRI Project Manager

P. O'Regan

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NOTE

For further information about EPRI, call the EPRI Customer Assistance Center at 800.313.3774 or e-mail askepri@epri.com.

January 18, 2012

Neil Wilmshurst
Vice President and Chief Nuclear Officer
Electric Power Research Institute
1300 West W. T. Harris Boulevard
Charlotte, North Carolina 28262-8550

SUBJECT: FINAL SAFETY EVALUATION OF ELECTRIC POWER RESEARCH INSTITUTE TOPICAL REPORT, 1021467, REVISION 0, "NONDESTRUCTIVE EVALUATION: PROBABILISTIC RISK ASSESSMENT TECHNICAL ADEQUACY GUIDANCE FOR RISK-INFORMED IN-SERVICE INSPECTION PROGRAMS" (TAC NO. ME1057)

Dear Mr. Wilmshurst:

By letter dated February 18, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML090700594), supplemented by letters dated December 15, 2009, May 12, July 8, and October 12, 2010, January 19, and June 2, 2011 (ADAMS Accession Nos. ML093520080, ML11229A675, ML101930535, ML102920275, ML110250354, ML11158A014), the Electric Power Research Institute (EPRI) submitted for U.S. Nuclear Regulatory Commission (NRC) staff review and approval Topical Report (TR) 1021467, *Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs* (ADAMS Accession No. ML101930535). By letter dated September 30, 2011, the NRC issued for a 30-day public comment period on the draft safety evaluation (SE) (ADAMS Accession No. ML112280525) for the TR. No comments were received as a result of the comment period. This letter transmits the final SE.

TR 1021467 provides guidance on determining the technical adequacy of probabilistic risk assessments (PRAs) used to develop a risk-informed in-service inspection (RI-ISI) program. The NRC staff reviewed TR 1021467 to determine whether its guidance will provide reasonable assurance that the described alternative in-service inspections are risk-informed and provide PRA technical adequacy. The review also considered compliance with license amendment and license renewal (LR) requirements in order to allow licensees or applicants the option of incorporating the TR guidelines by reference in plant-specific licensing actions.

The NRC staff has found that TR 1021467 is acceptable for referencing in licensing applications for RI-ISI programs to the extent specified in the enclosed final SE. The final SE defines the basis for acceptance of the TR. The NRC staff's final evaluation of TR 1021467, including four plant-specific action items and four conditions is enclosed.

Our acceptance applies only to material provided in the subject TR. We do not intend to repeat our review of the acceptable material described in the TR. When the TR appears as a reference in license amendment requests or LR applications, our review will ensure that the material presented applies to the specific plant involved. License amendment requests or references to this TR in LR applications that deviate from this TR will be subject to a plant-specific review in accordance with applicable review standards.

In accordance with the guidance provided on the NRC public website, we request that EPRI publish an accepted version of this TR within three months of receipt of this letter. The accepted version shall incorporate; the changes outlined in the SE, and this letter and the enclosed final SE after the title page. Also, it must contain historical review information, including NRC requests for additional information and your responses. The accepted version shall include a "-A" (designating accepted) following the TR identification symbol. If future changes to the NRC's regulatory requirements affect the acceptability of this TR, EPRI and/or licensees referencing it will be expected to revise the TR appropriately, or justify its continued applicability for subsequent referencing.

Sincerely,

/RA/

Robert A. Nelson, Deputy Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 669

Enclosure:
Final SE

In accordance with the guidance provided on the NRC public website, we request that EPRI publish an accepted version of this TR within three months of receipt of this letter. The accepted version shall incorporate; the changes outlined in the SE, and this letter and the enclosed final SE after the title page. Also, it must contain historical review information, including NRC requests for additional information and your responses. The accepted version shall include a "-A" (designating accepted) following the TR identification symbol. If future changes to the NRC's regulatory requirements affect the acceptability of this TR, EPRI and/or licensees referencing it will be expected to revise the TR appropriately, or justify its continued applicability for subsequent referencing.

Sincerely,

/RA/

Robert A. Nelson, Deputy Director
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Project No. 669

Enclosure:
Final SE

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

AND THE OFFICE OF NEW REACTORS FOR

THE ELECTRIC POWER RESEARCH INSTITUTE TOPICAL REPORT 1021467

"NONDESTRUCTIVE EVALUATION: PROBABILISTIC RISK ASSESSMENT

TECHNICAL ADEQUACY GUIDANCE FOR

RISK-INFORMED IN-SERVICE INSPECTION PROGRAMS"

PROJECT NO. 669

1.0 INTRODUCTION AND BACKGROUND

1.1 Introduction

The objective of the topical report (TR) process is, in part, to add value by improving the efficiency of other licensing processes, for example, the process for reviewing license amendment requests (LARs) from commercial operating reactor licensees. The purpose of the U.S. Nuclear Regulatory Commission (NRC) TR program is to minimize industry and NRC time and effort by providing for a streamlined review and approval of a safety-related subject with subsequent referencing in licensing actions, rather than repeated reviews of the same subject.

A TR is a stand-alone report containing technical information about a nuclear power plant safety topic, which meets the criteria of a TR. A TR improves the efficiency of the licensing process by allowing the NRC staff to review a proposed methodology, design, operational requirements, or other safety-related subjects that will be used by multiple licensees, following approval, by referencing the approved TR. The TR provides the technical basis for a licensing action.

During the review of the Electric Power Research Institute's (EPRI's) TR 1021467, the NRC staff found that, in general, the TR meets the objectives of a TR and reinforces previously established NRC regulations and guidelines as noted within this safety evaluation (SE). The NRC has evaluated this TR against the criteria of 10 CFR Section 50, and has determined that it does not represent a backfit. Specifically, NRC Staff technical positions outlined in this SE are consistent with the aforementioned regulations and established staff positions, while providing more detailed discussion concerning the methodology and data required supporting risk-informed in-service inspection programs. This SE endorses staff positions previously established through licensing actions and interactions with industry.

1.2 Background

By letter dated February 18, 2009 (Reference 1), supplemented by letters dated December 15, 2009 (Reference 2), May 12, 2010 (Reference 3), July 8, 2010 (Reference 4), October 12, 2010 (Reference 5), January 19, 2011 (Reference 6), and June 2, 2011 (Reference 7), EPRI submitted for NRC staff review and potential endorsement TR 1018427, *Nondestructive*

Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed In-Service Inspection Programs. Under the letter dated July 8, 2010 (Reference 4), EPRI submitted TR 1021467, *Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed In-service Inspection Programs.* Reference 4, numbered 1021467, (the TR), replaces the initial EPRI TR (Reference 1) that was numbered 1018427.

On September 30, 2011 (Reference 9), the NRC issued a draft SE for a 30-day comment period. No comments were received.

1.3 Purpose

The NRC staff reviewed TR 1021467 to determine whether its guidance will provide reasonable assurance that the described alternative in-service inspections are risk-informed and provide probabilistic risk assessment (PRA) technical adequacy. The review also considered compliance with license amendment and license renewal (LR) requirements in order to allow licensees or applicants the option of incorporating the TR guidelines by reference in plant-specific licensing actions.

The TR states that the primary objective of the submittal is to provide guidance on determining the technical adequacy of PRAs used to develop a risk-informed in-service inspection (RI-ISI) program. EPRI has previously supported the development of two related but substantively different RI-ISI methodologies; referred to in the TR as "Traditional" and "Streamlined." These methodologies are summarized in Appendix B of the TR. The TR describes the technical adequacy requirements for both methods and requests NRC endorsement of these requirements. This SE provides conclusions, findings, or endorsement of the PRA technical adequacy requirements that can be referenced by a licensee to support the technical adequacy of the PRA used to develop its proposed RI-ISI program.

The Traditional methodology is described in EPRI TR-112657, Revision B-A, *Revised Risk-Informed In-service Inspection Evaluation Procedure*, December 1999 (Reference 8). The NRC endorsed this methodology as described in Reference 8. Licensees may implement the Traditional methodology by requesting relief to implement the RI-ISI as an alternative to the requirements of the American Society of Mechanical Engineers (ASME) Code Section XI for in-service inspection (ISI) pursuant to Section 50.55a(a)(3)(i) of Title 10 of the Code of Federal Regulations (10 CFR) on the basis that the alternative provides an acceptable level of quality and safety.

The Streamlined methodology is described in ASME Code Case N-716 *Alternative Piping Classification and Examination Requirements, Section XI Division 1* (N-716). The NRC staff has not endorsed N-716 but has approved several relief requests based, in part, on the methodology described in N-716. Licensees may implement the Streamlined method by requesting relief to implement the RI-ISI as an alternative to the requirements of the ASME Code Section XI for ISI pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the alternative provides an acceptable level of quality and safety. New build licensees developing an RI-ISI program using the Streamlined method may have to request relief by providing justification to the NRC of sufficiently similar characteristics that the generic high-safety-significant (HSS) piping segments developed for the operating fleet are applicable. If endorsed by the NRC in

Regulatory Guide (RG) 1.147, *In-service Inspection Code Case Acceptability, ASME Section XI, Division 1,* licensees may implement this alternative ISI program without prior NRC staff review and approval.

1.4 Organization of the Safety Evaluation

Section 2.0 of this SE provides the NRC staff's regulatory evaluation of the TR, including the necessary references for use during licensing actions. Section 3.0 provides the technical evaluation, including NRC staff concerns with the TR as written. Section 4.0 summarizes the limitations and conditions and the applicant/licensee action items. Section 5.0 provides the conclusions resulting from this SE. Section 6.0 provides the references utilized in this SE.

2.0 REGULATORY EVALUATION

Pursuant to 10 CFR 50.55a(g), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements set forth in the Code to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulation in 10 CFR 50.55a(g), "In-service Inspection Requirements," requires, in part, that Classes 1, 2, 3, MC, and CC components and their supports meet the requirements of Section XI, "Rules for In-service Inspection of Nuclear Power Plant Components," of the ASME Boiler and Pressure Vessel Code (BPVC) or equivalent quality standards. Every 3 years the ASME publishes a new edition of the BPVC, including Section XI, and new addenda are published every year. The latest editions and addenda of Section XI that the NRC has approved for use are referenced in 10 CFR 50.55a(b). The ASME also publishes Code Cases quarterly. Code Cases provide alternatives to existing Code requirements that the ASME developed and approved. RG 1.147 identifies the Code Cases that the NRC has determined to be acceptable alternatives to applicable parts of Section XI.

The regulation at 10 CFR 50.55a(g) also states that ISI of the ASME Code, Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME Code and applicable addenda, except where specific written relief has been granted by the NRC. According to 10 CFR 50.55a(a)(3), the NRC may authorize alternatives to the requirements of 10 CFR 50.55a(g), if an applicant demonstrates that the proposed alternatives would provide an acceptable level of quality and safety, or that the specified requirement would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. AN RI-ISI program replaces the number and locations of non-destructive examination (NDE) inspections based on ASME Code Section XI requirements by the number and locations of these inspections based on the RI-ISI guidelines. PRA results are used to develop the RI-ISI program and to demonstrate that the proposed alternative provides an acceptable level of safety. Consequently, confidence in the information derived from a 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 develop the RI-ISI program.

General guidance in defining acceptable methods for implementing an RI-ISI program is provided in RG 1.174, *An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis.* One of the requirements for an acceptable RI-ISI program is that the program is developed using a PRA where the scope, level

of detail, and technical acceptability of the PRA are commensurate with the application for which it is intended and the role the PRA results play in the integrated decision process. Although the TR's title includes only "technical adequacy," the TR also identifies the adequate scope and level of detail of the PRA analysis.

Revision 2 of RG 1.200, *An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities*, issued in March 2009, describes one acceptable approach for determining whether the technical adequacy of the PRA, in total or the parts that are used to support an application, is sufficient to provide confidence in the results, such that the PRA can be used in regulatory decision-making for light-water reactors. RG 1.200 endorses the PRA quality descriptions contained in ASME/American Nuclear Standard (ANS) RA-Sa-2009, *Addenda to ASME/ANS RA-S–2008 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment for Nuclear Power Plant Applications* (ASME/ANS Standard).

For reactors licensed under 10 CFR Part 52, 10 CFR 50.71(h)(1) states that no later than the scheduled date for initial loading of fuel, each holder of a combined operating licensee (COL) shall develop a level 1 and a level 2 PRA. The PRA must cover those initiating events and modes for which NRC-endorsed consensus standards on PRA exist 1-year prior to the scheduled date for initial loading of fuel. PRAs should be developed consistent with NRC-endorsed consensus standards and other external events prior to the RI-ISI implementation.

The regulation at 10 CFR 50.71(h)(2) states that each COL holder must maintain and upgrade the PRA required by 10 CFR 50.71(h)(1). The upgraded PRA must cover initiating events and modes of operation contained in NRC-endorsed consensus standards on PRA in effect 1 year prior to each required upgrade. The PRA must be upgraded every 4 years until the permanent cessation of operations under 10 CFR 52.110(a). The PRA models must be updated and upgraded as necessary during both pre-operation and post-operation phases to maintain quality requirements needed for an RI-ISI program.

When the NRC approved TR appears as a reference in an RI-ISI program, the licensee should have made all changes to the PRA models, methods, and documentation such that the PRA meets, at a minimum, all the supporting requirements at the capability category identified in the endorsed version of the TR. If referenced as part of an RI-ISI program, the NRC staff is not required to perform a review of the PRA technical adequacy.

3.0 TECHNICAL EVALUATION

The ASME/ANS Standard describes the technical requirements for a PRA in a series of tables that list hundreds of detailed Supporting Requirements (SRs). SRs identify basic features of PRA analyses and describe an activity or the process required to support each feature. Some SRs describe a single variation of an activity or process that a PRA has included or not included (i.e., Met or Not-Met). Some SRs provide three variations designated Categories I, II, and III that differ in level of detail, degree of plant-specificity, or degree of realism. The remaining SRs provide two variations by grouping either Categories I and II, or II and III together.

In general, RG 1.200 clarifies that the current good practice, i.e., Capability Category II of the

ASME/ANS Standard, is the level of detail that is adequate for the majority of applications. However, for some applications, Capability Category I may be sufficient for some SRs. In other applications, Capability Category III may be required. For SRs that do not differentiate between capability categories, a "Met" is generally acceptable.

The TR proposes Capability Categories for each SR in Parts 2 (internal events) and 3 (flooding events) of ASME/ANS RA-Sa-2009[1]. Parts 4 through 9 in the ASME/ANS Standard describe the PRA analyses for fires (Part 4); seismic events (Part 5); high winds, external floods, and other external hazards (Parts 6 through 9).

Implementation of RG 1.200 is achieved through a peer review where a team of experienced industry analysts determine if the methodology and the implementation of the methodology meet the attributes described in the ASME/ANS SRs. Findings or "facts and observations" (F&Os) are usually developed when an SR is Not-Met or when Capability Category II, if differentiated, is not achieved. F&Os may also be developed if individual errors are identified or if inconclusive or inconsistent documentation prevents the peer review team from determining what methodology the licensee used. F&Os associated with differences between the licensee PRA and the capability categories identified in the TR should be resolved. To resolve a weakness in an SR caused by missing or inadequate technical evaluation, that evaluation must be performed and documented; compared to the SR attributes; and the capability category identified. To resolve a weakness in an SR caused by an inability to determine the capability category because of inconclusive or inconsistent documentation, the method or activity used by the licensee to address the SR must be clarified and documented, compared to the SR attributes, and the capability category identified.

In addition to peer reviews, operating experience is important to understanding mechanisms that may affect ISI at nuclear power plants. The nature of operating experience is such that it can come from a variety of sources and may affect any number of areas of plant operation. Thus, potentially relevant operating experience must be screened and, if necessary, further reviewed to determine whether any subsequent actions should be taken. The NRC staff recognizes that the capture and review of operating experience may best be accomplished through generic plant operating experience review activities, such as those implemented to address Item I.C.5, "Procedures for Feedback of Operating Experience to Plant Staff," of NUREG-0737, "Clarification of TMI Action Plan Requirements." In this regard, the staff believes that guidance on the ongoing review of operating experience for RI-ISI should be addressed as a generic process that is used to inform and, when necessary, to develop new RI-ISI guidance. This process would be used for the operating experience element of all RI-ISI, similar to how the 10 CFR Part 50, Appendix B, quality assurance program may be applied to the elements of corrective actions, confirmation process, and administrative controls. Therefore, the staff believes that the TR should address the ongoing review of operating experience in the same fashion as the quality assurance program.

[1] The labels in the ASME/ANS Standard endorsed by RG 1.200 that are assigned to many of the individual supporting requirements have been changed during the reorganization between RA-Sb-2005 and RA-Sa-2009. The Topical uses the labels from RA-Sb-2005. This SE uses the same labels as the Topical, but also provides the new labels in RA-Sa-2009 in parentheses throughout the safety evaluation.

3.1 ASME/ANS Standard Parts 2 and 3

Appendix A in the TR lists all the SRs in Parts 2 and 3 of the ASME/ANS Standard. For each SR in Part 2 (Internal events), two justifications for the proposed acceptable capability categories are proposed, one for the Traditional and one for the Streamlined analysis. In most SRs, the proposed acceptable category and justifications are identical. In some SRs, the proposed acceptable categories are the same but the justification varies between the Traditional versus the Streamlined methods. Only one SR, IE-A4, proposes a different acceptable SR category for the Traditional versus the Streamlined analysis.

For each SR in Part 3 (flooding), an acceptable capability is only proposed for the Streamlined analysis. The TR clarifies that RI-ISI applications using the Traditional analysis must perform an analysis as described in the EPRI TR-112657 instead of the flooding analysis described in Part 3 of the ASME/ANS Standard. The Traditional method requires a flooding analysis for each pipe segment in the scope of the proposed RI-ISI program and therefore does not need to be reviewed against the flooding requirements in the ASME/ANS Standard. Conversely, the Streamlined method relies on an appropriate screening flooding analysis which is described in Part 3 of the ASME/ANS Standard. Therefore the information contained in Appendix A in the TR provides the required guidance.

Each SR in Appendix A of the TR provides a column "assessment for RI-ISI Purposes." The proposed capability category that should be acceptable for the SR is both identified and justified in this column. Although the specific wording in the "assessment" column sometimes varies, inspection of the TR yields five general justifications for accepting the use of PRAs with SRs for which CCI or "Not-Met" (i.e., lower than general good practices) have been assigned.

1. The TR states a lower capability category should be acceptable for some SRs because, "applying conservatisms for this SR will at worst only add inspection." Lower capability categories in general are more conservative than high categories. Both the Streamlined and the Traditional methods' safety-significance ranking process rely on the absolute risk values and that excessive conservatism in one scenario will not mask any other scenario. Therefore, the staff finds that a capability category less than "II" is acceptable for SRs to which this assessment applies.

2. The TR states, using several different phrases, that the RI-ISI assessment of flood scenarios will correct or render unimportant any impact on the RI-ISI program associated with accepting the lower capability category for some internal event SRs. In general, the flooding analysis assumes a flood, then identifies all Structures, Systems and Components (SSCs) that fail because of the flood, and quantifies the scenarios caused by or made worse by these failures. For example, weaknesses in identifying all sources of internal initiating events (IE-A4 (IE-A5)) are unimportant for RI-ISI because the flooding analysis must identify every scenario arising from SSC failure following each flooding event. The NRC staff concurs that the focused flooding evaluation can correct or render unimportant weaknesses in some internal events SRs. Therefore, the staff finds that a capability category less than "II" is acceptable for SRs to which this assessment applies.

3. The TR states that analyses or plant features addressed by some SRs are "not relevant" because, however it is modeled, it will not impact the results used to support the RI-ISI program evaluation. Not all analyses or plant features will affect the results used to support RI-ISI and changes to features that don't affect the results are unnecessary. Therefore, the staff finds that a capability category less than "II" is acceptable for SRs to which this assessment applies.

4. The TR states that the impact of using the lower capability category (or departure from realism) is not expected to substantively affect the risk-significance due to the "order of magnitude absolute ranking and grouping approach" used. Sometimes this assessment is modified for the "Streamlined" method to refer to the small Core Damage Frequency (CDF) / Large Early Release Frequency (LERF) threshold used for identifying plant specific HSS piping which is also an order of magnitude guideline. The NRC staff concurs that the methods are order of magnitude ranking and grouping which are relatively insensitive to small quantitative changes. Small changes in the input values that could result when a higher capability category is met for an SR are not expected to cause significant changes to the PRA results which would be needed to change the proposed RI-ISI program. Therefore, the staff finds that a capability category less than "II" is acceptable for SRs to which this assessment applies.

5. The TR states that the lower capability category "provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level." Both the Traditional and Streamlined methods are based on absolute risk results which are directly compared to a guideline value and used in a change in risk analysis. The staff finds that "resolution and specificity" is a vague term that is more related to precision than accuracy and does not address the potential impact that meeting the higher capability category could have on the PRA results. Therefore, the NRC staff finds that this assessment category cannot be used to justify a CCI or "Not-met" assignment.

In most SRs, the NRC staff has identified one of the four above justifications as applicable to the proposed capability category. In two SRs, the NRC did not identify any other applicable justifications and the general requirement in RG 1.200 for a capability category II or Met is retained. These changes are described in Table 1.

Table 1 attached to this SE includes the NRC staff position on specific items in the TR to reflect the staff positions described above. These positions are:

- **No objection**. The NRC staff has no objection to the requirement or to the basis.
- **Qualification**. The NRC staff has a technical concern with the requirement and has provided a qualification to resolve the concern.

In the qualification, stricken text does not comport with the NRC staff position while bolded text should be added to comport with the staff position. Italicized text, when included, clarifies the staff position.

3.2 ASME/ANS Standard Parts 4 through 9

RG 1.174 states that the assessment of the risk implications in light of the acceptance guidelines requires that all plant operating modes and initiating events be addressed. However, RG 1.174 further clarifies that it is not necessary to have a PRA that quantitatively treats all initiating events if a qualitative treatment demonstrates the acceptability of the proposed change would not be affected by the unmodeled initiators. The TR proposes a qualitative treatment of the risk from fire events and from events that impose extreme loads on piping systems.

Fire events

ISI examines welds in order to identify and, if necessary, initiate the repair of flaws. The TR states that fire events may challenge piping integrity by causing transients that must be mitigated, but such challenges are expected to be less frequent and not significantly different than challenges caused by the random occurrence of internal initiating events. The NRC staff concurs with this assessment.

Extreme loading events

Seismic and other external events such as high winds, tornados, and floods may subject piping systems to increased and, for severe events, catastrophic loads. The TR notes that well engineered systems and structures such as piping systems are mechanically rugged. The staff evaluated the affect of seismic loads on piping in NUREG 1903, *Seismic Considerations For the Transition Break Size.* The NUREG concludes that, for most sites, only large flaws (e.g., greater than 30 percent of the piping wall thickness for a flaw approximately 145 degrees around the piping circumference) could cause piping to fail after seismic events that may be more frequent than about 10^{-5}/year. Seismic and other increased load events are too infrequent to cause flaw growth and therefore some other degradation mechanism is needed to grow flaws to such large sizes. The RI-ISI process already re-directs inspections to piping with degradation mechanisms that could cause flaw growth and with the greatest impact on risk. Conversely, catastrophic loads will fail piping with or without flaws that might have been removed as a result of inspections and therefore including these catastrophic loads could misdirect the selection of locations. In its letter dated June 2, 2011 (Reference 7), EPRI noted that plant-specific service experience (e.g., accepted or repaired flaws/indications) is included in the RI-ISI element selection process. The staff concludes that additional analyses of extreme loading events are not needed because the relevant information (pipe rupture safety-significant and plant-specific service experience) is addressed and additional evaluation will not change the conclusions derived from the RI-ISI program.

3.3 New Build Fleet (Part 50 & Part 52)

When proposing an alternative RI-ISI program under 10 CFR 50.55a(a)(3)(i) to a conventional ISI program, licensees will use a plant-specific PRA as an input. New plants licensed under part 50 must have a PRA capable of satisfying the quality requirements in the TR. New plants licensed under Part 52 must have a PRA that meets the requirements of 10 CFR 50.71(h). These plant-specific PRAs should reflect the as-built, as-operated plant, in that they represent the current plant design, configuration, and operating practices to the extent required to support

the RI-ISI program. Since the plant-specific PRA cannot be completed until the plant is constructed, it is anticipated that the RI-ISI program could be implemented during the operational phase after initial fuel load.

The RI-ISI RGs and the RI-ISI SRP are written based on the premise that a conventional ISI Program exists and is modified in part to an RI-ISI program. The Part 52 design certification (DC) and combined license (COL) application submittals have been based on generating a conventional ISI Program, and the acceptance review has been predicated on the development of a conventional ISI Program. Similarly, the licensing process under Part 50 has been based on generating a conventional ISI program. The current RI-ISI process is based, in part, on comparison to a conventional ISI program. New build licensees may propose alternative RI-ISI methods that are not compared to a conventional program but that would still provide an acceptable level of quality and safety.

For individual new build licensees developing RI-ISI programs after sufficient plant-specific data and operating experience become available, the licensees should address the technical adequacy of PRAs used to develop an RI-ISI program by complying with the guidance of Section 3.1, Section 3.2, and Table 1 of this SE.

The staff finds that the PRA when used in support of a Traditional RI-ISI program for the new build fleet should be of sufficient technical adequacy 1) consistent with the requirements for currently operating reactors specified in Section 3.0 of this SE and 2) as modified in the following discussion. Use of the Streamlined methodology requires that the new build reactor has sufficiently similar characteristics of the operating fleet and that the generic HSS piping segments developed for the operating fleet are applicable. For some plant designs, the NRC staff may have insufficient information to reach this conclusion for new build reactors and therefore only approves referencing the TR requirements as demonstration of PRA technical adequacy for proposed RI-ISI programs developed using the Traditional method. Individual new build licensees developing RI-ISI programs using the Streamlined method may request to reference the TR by providing justification of sufficiently similar characteristics in the submittal to the NRC.

The ASME/ANS-PRA Standard referenced in the TR, as endorsed by RG 1.200, has been developed to support risk-informed activities at operating reactors. As such, many SRs do not specify the variable degree of achievability by a plant-specific PRA at initial fuel load as compared to a PRA for a plant with operational experience. Specifically, some SRs in the PRA standard may not be fully achieved until after plant operation due to the lack of industry or plant-specific operating data. The staff finds that it is necessary to identify those SRs that have a variable degree of achievability and to clarify their acceptability for use in demonstrating PRA technical adequacy to support the development of an RI-ISI program for new build reactors.

Table 2-3 "Assessment for New Build" of the TR identifies 75 SRs that have some variable degree of achievability before a plant acquires operating experience. Of the SRs listed in the table, 6 SRs are identified as "need not be met" for operating plants implementing an RI-ISI program and therefore are also similar for new build. Of the remaining SRs listed in Table 2-3, 17 require no plant specific input for the capability category required by the TR and may be met before initial fuel load, 28 can be fully met at initial fuel load, and 24 can be fully met by the first

inspection period.

The staff has reviewed Table 2-3 of the TR and EPRI's responses dated January 19, 2011 (Reference 6) and June 2, 2011 (Reference 7) to the RAIs and reached the following conclusions.

Since the RI-ISI program is an alternative to the ASME Section XI ISI requirements which would be requested under 10 CFR 50.55a(a)(3), the ASME Section XI ISI program should have been developed prior to the RI-ISI implementation. Therefore, all important plant-specific operating procedures should be developed in support of the conventional ISI program and will be completed prior to initial fuel load. Other than normal plant changes reflecting lessons learned, these procedures and systems information are not expected to change as the plant transitions to full operation. Therefore, the SRs relevant to the use of assumptions about the "as anticipated" to be operated plant versus plant-specific procedures/systems should all meet the assigned capability category at initial fuel load.

Regarding the issue of plant-specific versus generic experience/data, it is acceptable for new plants to initially use only generic experience/data in some areas in support of the RI-ISI program, because the EPRI methodologies have been developed such that only large changes in a large amount of data would be expected to have a significant impact on the results. Furthermore, the RI-ISI program is a living program, so that new information (e.g., plant-specific data) is incorporated into the program on a periodic basis. This new information may result in an increase or decrease in the inspection population. From a practical perspective, the inspections themselves are allocated over a 10-year interval. As such, if incorporating plant-specific experience/data into the program results in additional inspections at the end of the first inspection period, then there would still be two inspection periods available to incorporate this impact into the program prior to closing out the inspection interval.

Accumulating operating experience in all SRs that require as-built, as-operated data would only have a significant impact on the RI-ISI program, if the as-built, as-operated plant experience is radically different than that assumed in the PRA. Although the as-built, as-operated data, when incorporated, may increase the inspection population, since the inspections are allocated over a ten year interval, there should be time available to incorporate this impact into the program, thereby completing 100 percent of the inspection population prior to closing out the inspection interval.

Table 2 attached to this SE provides the NRC staff position on specific items in Table 2-3 of the proposed TR. Similar to Table 1 of this SE, Table 2 reflects the staff positions including "No objection" and "Qualification." In the qualification, stricken text does not comport with the NRC staff position while bolded text should be added to comport with the staff position. Since the SRs stated in the TR are established for the Level 1 and Level 2 internal events PRA, it is important to note that, for new reactors, if the fire, seismic, and other external events PRAs are to be used to support the RI-ISI program, the licensees must demonstrate compliance with the PRA technical adequacy requirements, and that these PRAs are of sufficient technical adequacy to support the application.

Regarding the risk-informed pre-service inspection (RI-PSI) program proposed in the TR,

currently, RI-PSI is not programmatically acceptable for new reactors. Therefore, the staff concludes that, at this point, it is premature to discuss specific PRA technical adequacy guidance relevant to the RI-PSI program. The staff does not endorse any of the discussions in the TR related to the RI-PSI program.

4.0 CONDITIONS AND LIMITATIONS AND APPLICANT/LICENSEE PLANT-SPECIFIC ACTION ITEMS

Based on its review, the NRC staff identified some issues and concerns in Section 3.0 of this SE that were not adequately resolved regarding the implementation of EPRI TR 1021467. Some of the staff's issues that are not adequately resolved and remaining concerns are related to conditions and limitations on the use of the tables contained within the TR. These conditions and limitations address deficiencies in the TR and are identified in this Section. In addition, some of the staff's issues and concerns that were not adequately resolved are related to applicant/licensee action items related to the use of EPRI TR 1021467. These plant-specific action items address topics related to the implementation of EPRI TR 1021467 that could not be effectively addressed on a generic basis. Although Section 4.1 and 4.2 describe the conditions and limitations and the plant-specific action items identified by the NRC staff, Section 3 more fully describes all concerns and shall be considered during any update to EPRI TR 1021467 to comport with this SE.

4.1 Limitations and Conditions

1. The justification that a lower capability category "provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level" cannot be used to justify a CCI or "Not-met" assignment. The final TR shall be modified to clearly reflect this limitation. **This is Topical Report Condition 1.**

2. The NRC staff does not find the methods and results in the July 2010 version of the TR acceptable but, instead, would endorse the methods and results that would be described after modifying the TR by incorporating the specific changes identified in Tables 1 and 2 of this SE, and by appropriately reflecting the other limitations and conditions in this SE. The final TR shall be modified to clearly reflect this condition and limitation. **This is Topical Report Condition 2.**

3. For new build nuclear power plants, the NRC staff only approves referencing the TR requirements as demonstration of PRA technical adequacy for proposed RI-ISI programs developed using the Traditional method. The final TR shall be modified to clearly reflect this limitation. **This is Topical Report Condition 3.**

4. RI-PSI for new reactors is not programmatically acceptable. The final TR shall be modified to clearly reflect this limitation. **This is Topical Report Condition 4.**

4.2 Plant-Specific Action Items

1. For a supporting requirement to be considered met at the capability category required in the TR, all relevant peer and other independent review findings shall have been

addressed and, as necessary, applicable changes made to PRA models, methods, and documentation. This is **Applicant/Licensee Action Item 1.**

2. An approved, conventional ISI program should be in place before the NRC will consider an alternative to the requirements of 10 CFR 50.55a to use RI-ISI. **This is Applicant/Licensee Action Item 2.**

3. Any new build licensee developing an RI-ISI program using the Streamlined method must provide to the NRC, in a request for relief, justification of sufficiently similar characteristics in the submittal. **This is Applicant/Licensee Action Item 3.**

4. Plant specific operating experience and data should be incorporated into the RI-ISI program consistent with the schedule laid out in the TR. **This is Applicant/Licensee Action Item 4.**

5.0 CONCLUSIONS

The NRC staff has reviewed EPRI TR 1021467 and concludes that the TR, as modified by the conditions and limitations and applicant/licensee action items summarized in Section 4.0 of this SE and further described in Section 3, provides reasonable assurance that the PRA has sufficient quality to support the development of an RI-ISI program.

The NRC staff finds that the methodology in the TR identifying what capability categories are needed for all SRs is acceptable because it is capable of justifying differences between current good practice (i.e., Capability Category II or "Met") and the capability category required to support an RI-ISI program developed according to the Traditional or the Streamlined methods. As described in Section 3 of this SE, the staff concurs with 4 of the 5 justifications for accepting a lower than the current good practice Capability Category II (or "Met") identified in RG 1.200. The staff finds that the proposed justifications, as endorsed in Table 1 of this SE (Attachment 1), appropriately reflect the potential impact of each "less than current" good practice SR on RI-ISI programs. Therefore, a PRA that meets or exceeds the guidelines in the NRC approved version of the TR has sufficient quality to support a proposed RI-ISI program.

The NRC staff finds that the TR appropriately identifies the SRs that have variable degree of achievability during the transition from a plant-specific PRA before initial fuel load to a PRA for a plant with operational experience. For these SRs, the level and timing of achievability to support an RI-ISI program is appropriately identified and characterized in the TR with the modifications identified in Table 2 (Attachment 2) of this SE. For individual new build licensees developing RI-ISI programs after sufficient plant-specific data and operating experience become available, the licensees should address the technical adequacy of PRAs used to develop an RI-ISI program by complying with the guidance of Section 3.1, Section 3.2, and Table 1 of this SE.

When a licensee references the NRC approved version of the TR in an RI-ISI program, the licensee should have resolved all peer review findings and made all changes to the PRA models, methods, and documentation such that the PRA meets the supporting requirements at or greater than the capability category identified in the TR. The NRC staff is not required to repeat its review of the matters described in the TR conditioned upon the changes described in

this SE (Sections 3 and 4) to be incorporated when the report appears as a reference which was complied within a request for relief to implement an RI-ISI program, or as part of the adoption of a code case approved for use as endorsed in RG 1.146, or other related licensing actions.

A conventional ISI program should be in place before the licensee submits a request for relief to implement an RI-ISI program. For operating power reactors licensed after January 1, 2011, the RI-ISI program can evolve after operation which infers that submittal/approval prior to initial fuel load is not schedule critical.

Concerning RI-PSI, the staff does not endorse any risk-informed pre-service inspection programs for new reactors.

Before endorsement by the NRC, the TR must be updated to reflect the correction of the issues described in Sections 3 and 4, including incorporation of the additions and strikeout provided by the NRC staff in Tables 1 and 2 into the body of the TR. The updated or final TR shall be identified by a "-A" following the TR identification. The NRC expects the "-A" version to be issued by EPRI within three months of receipt of this final SE. The "-A" version of the TR should incorporate the transmittal letter, the final SE, and all RAIs with responses after the title page of the TR. Upon receipt of the "-A" version, the NRC staff will review the updated TR and, if accepted, will respond with an endorsement letter.

6.0 REFERENCES

1. Christian B. Larsen (Electric Power Research Institute) to U. S. Nuclear Regulatory Commission Report Transmittal; "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed In-service Inspection Programs," EPRI, Palo Alto, CA: 2008. 1018427, February 18, 2009. Agencywide Documents Access and Management System (ADAMS) Accession No. ML090700594)

2. Tuan Nguyen, (Electric Power Research Institute) to U. S. Nuclear Regulatory Commission, Transmittal of RAI Responses on Report; Nondestructive Evaluation.-Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed In-service Inspection Programs. EPRI, Palo Alto, CA: 2008. 1018427, December 15, 2009. (ADAMS Accession No. ML093520080)

3. Neil Wilmshurst (Electric Power Research Institute) to U. S. Nuclear Regulatory Commission, Transmittal of RAI Responses on Report; Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed In-service Inspection Programs. EPRI, Palo Alto, CA: 2008.1018427 (Ref. EPRI Project Number 669), May 12, 2010. (ADAMS Accession No. ML11229A675)

4. Neil Wilmshurst (Electric Power Research Institute) to U. S. Nuclear Regulatory Commission, Transmittal of Report; Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed In-service Inspection Programs. EPRI, Palo Alto, CA: 2010. 1021467 (Ref. EPRI Project Number 669), July 8, 2010. (ADAMS Accession No. ML101930535)

5. Neil Wilmshurst (Electric Power Research Institute) to U. S. Nuclear Regulatory Commission, Additional Clarification with Respect to EPRI Report; Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed In-service Inspection Programs. EPRI, Palo Alto, CA: 2010. 1021467, October 12, 2010. (ADAMS Accession No. ML102920275)

6. Neil Wilmshurst (Electric Power Research Institute) to U. S. Nuclear Regulatory Commission, Transmittal of RAI Response on Report; Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed In-service Inspection Programs. EPRI, Palo Alto, CA: 1021467, January 19, 2011. (ADAMS Accession No. ML110250354)

7. Neil Wilmshurst (Electric Power Research Institute) to U. S. Nuclear Regulatory Commission, Additional clarification with respect to EPRI report: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed In-service Inspection Programs. EPRI, Palo Alto, CA: 1021467, June 2, 2011. (ADAMS Accession No. ML11158A014)

8. Jeffrey Mitman (Electric Power Research Institute) to U. S. Nuclear Regulatory Commission, EPRI Topical Report TR-112657 Revision B-A, Revised Risk Informed Inservice Inspection Procedure. EPRI, Palo Alto, CA: 1021467, February 10, 2000. (ADAMS Accession No. ML013470102)

9. U. S. Nuclear Regulatory Commission to Neil Wilmshurst (Electric Power Research Institute), draft NRC safety evaluation for 30-day comment period, September 30, 2011. (ADAMS ADAMS Accession No. ML11262A206)

Attachments: 1. Table 1
2. Table 2

Principal Contributor: Stephen Dinsmore

Date:

Attachment 1:
Table 1

Note 1, Table 2-1 as modified by letter dated June 2, 2011.	For a supporting requirement to be considered met, all relevant peer **and other independent** review findings shall have been addressed and as necessary applicable changes made to PRA models, ~~and~~ methods, **and documentation.** ~~As the capability category assignment for each supporting requirement relates to the technical aspects of the plant PRA, peer *review* findings and/or gaps related to documentation that do not impact the RI-PSI / RI-ISI results would allow the capability category to still be considered met. A documented basis for this conclusion should be prepared and available. This documented basis could, for example, include the use of supplemental analyses, comparison to similar plants and/or *review* of the impact of similar *review* findings on RI-PSI / RI-ISI results to confirm the RI-PSI / RI-ISI results would not be significantly impacted.~~ *Referencing this Topical Report is intended to clearly define the minimal quality of the PRA. The evaluation of possible impacts of deviations from the TR permitted by the stricken text may be acceptable but requires a prior submittal to the NRC for review and therefore is not acceptable as part of the TR.*
Supporting Requirement: 2005 Version (2009 Version)	
IE-A1 (IE-A1) through AS-A8 (AS-A8)	*No objection*
AS-A9 (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.~~ **CCII because difference in success criteria caused by more use of applicable (instead of generic) thermal hydraulic analysis could result in significant differences in the PRA results in some scenarios.** *See Note 1*

ATTACHMENT 1

AS-A10 (AS-A10) through SC-A1 (SC-A1)	*No objection*
SC-A2 (SC-A2)	~~EPRI traditional—Per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the relative 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.~~ **CCI because CCI definition of core damage is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
SC-A3 (SC-A3) through SC-B1 (SC-B1)	*No objection*
SC-B2 (SC-B2)	~~EPRI traditional CCI—Per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the relative 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 relative 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).~~ **CCII because the difference in PRA results caused by using expert panels instead of available information could result in significant differences in the PRA results in some scenarios..** *See Note 1*
SC-B3 (SC-B3) through SY-B1 (SY-B1)	*No objection*

Page - 2 - of 14

SY-B1 (SY-B1)	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the relative 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 relative 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). **CCI because the probabilities from missing CCFs would have been screened out at the system level and therefore are expected to be small and would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
SY-B2 (SY-B2) through SY-B10 (SY-B9)	*No objection*
SY-B11 (SY-B10)	EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the relative 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 relative 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). **CCI because the probabilities of missing actuation or lockout events would have been screened out at the system level and therefore are expected to be small and would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
SY-B12 (SY-B11) through HR-A3 (HR-A3)	*No objection*

HR-B1 (HR-B1)	~~EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the relative 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 relative 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).~~ **CCI because the probabilities from any maintenance related failure modes that may have been screened out are expected to be small compared to random failures and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-B2 (HR-B2) through HR-D2 (HR-D2)	*No objection*
HR-D3 (HR-D3)	~~EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the relative 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 relative 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).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-D4 (HR-D4) through HR-E2 (HR-E2)	*No objection*

HR-E3 (HR-E3) and HR-E4 (HR-E4)	~~EPRI traditional CCI because per Table 1.3-1 of the RA-2005, CCI provides resolution and specificity sufficient to identify the relative 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 relative 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).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-F1 (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).~~ **CC I/II because it is generally acknowledged that CCII is adequate for all but the most challenging of PRA applications.**

HR-F2 (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).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-G1 (HR-G1) and HR-G2 (HR-H2)	*No objection*
HR-G3 (HR-G3) through HR-G5 (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).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-G6 (HR-G6) through DA-A3 (DA-A4)	*No objection*

DA-B1 (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).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-B2 (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, CII 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).~~ **CC I/II because it is generally acknowledged that CCII is adequate for all but the most challenging of PRA applications.**
DA-C1 (DA-C1) through DA-C6 (DA-C6)	*No objection*

DA-C7 (DA-C7) and DA-C8 (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 [a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-C9 (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).~~ **CC I/II because it is generally acknowledged that CCII is adequate for all but the most challenging of PRA applications.**

DA-C10 (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).~~ **CCI because changes to the component failure probabilities due *to the process specified in CCII of this SR are expected to be* small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-C11 (DA-C11) through DA-C15 (DA-C16)	*No objection*
DA-D1 (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).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-D2 (DA-D2)	*No objection*

DA-D3 (DA-D3) through DA-D6 (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 [a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-D6a (DA-D7)	*No objection*
DA-D7 (DA-D8)	~~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 [a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-E1 (DA-E1) through QU-D4 (QU-D5)	*No objection*

QU-D5a (QU-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).~~ **CCI because application specific flooding assessment will review (or supplement) any impact associated with accepting the lower capability category.**
QU-D5b (QU-D7) through LE-A5 (LE-A5)	*No objection*
LE-B1 (LE-B1) and LE-B2 (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 [a][5] of case).~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-B3 (LE-B3)	*No objection*

LE-C1 (LE-C1) through LE-C2a (LE- C2)	~~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).~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-C2b (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).~~ **CCI because not crediting repair is conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**

LE-C3 (LE-C4)	~~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).~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-C4 (LE-C5) through LE-D1a (LE-D1)	*No objection*
LE-D1b (LE-D2)	~~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).~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-D2 (LE-D3) through LE-G6 (LE-G6)	*No objection*

Notes to Table 1

In its October 12, 2010, submittal, EPRI proposed changing the assessment to become an assertion that non-conservative result will be identified or not produced if the lower capability category was accepted because of interactions between these SRs and others. In its June 2, 2011, submittal, EPRI further argued that a Capability Category I should be sufficient for this SR. The NRC staff has not identified guidance on success criteria or expert judgment or plant comparison process that can systematically identify non-conservative results, and finds no support for arguing that interactions between SRs will provide this identification. Therefore the

NRC staff retains the requirement that these be Capability Category II in order to claim compliance with the Topical Report.

Table 2

Staff Position on Table 2-3 of ERPI TR 1021467

Sec ID 2008 (2009)	**TR1018427 Assessment**
IE-A3 (IE-A3)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
IE-A3a (IE-A4)	~~CCI/II can be met partially as some components may be unique~~ CCI/II will be met partially at initial fuel load if some components are unique **CCI/II** will be completely met **at 1st inspection period** via the RI-ISI living program component
IE-A4a (IE-A6)	~~CC I can be met~~ **CCI will be met before initial fuel load**
IE-A6 (IE-A8)	~~CCI can be met~~ **CCI will be met before initial fuel load**
IE-A7 (IE-A9)	~~CCI can be met~~ **CCI will be met before initial fuel load**
IE-C1 (IE-C1)	*No objection*
IE-C1a (IE-C2)	*No objection*
IE-C1b (IE-C3)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
IE-C2 (IE-C4)	*No objection*
IE-C3 (IE-C5)	*No objection*

ATTACHMENT 2

IE-C5 (IE-C7)	*No objection*
IE-C9 (IE-C11)	Procedures may not be available Can be met at Fuel Load **Will be met at initial fuel load**
IE-C12 (IE-C14)	Procedures may not be available Can be met at Fuel Load **CCI/II will be met at initial fuel load**
AS-A5 (AS-5)	Procedures may not be available Can be met at Fuel Load **Will be met at initial fuel load**
AS-B5a (AS-B6)	Procedures may not be available Can be met at Fuel Load **Will be met at initial fuel load**
SC-A6	Procedures may not be available. Can be met at Fuel Load **Will be met at initial fuel load**
SY-A2 (SY-A2)	Procedures may not be available Can be met at Fuel Load **Will be met at initial fuel load**
SY-A3 (SY-A3)	Procedures may not be available Can be met at Fuel Load **Will be met at initial fuel load**
SY-A4 (SY-A4)	Plant staff / Operating data may not be available Can be mostly met at Fuel Load and completely met at 1st Period **CCI will be completely met at 1st inspection period**
SY-A5 (SY-A5)	Procedures may not be available

	~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
SY-A7 (SY-A7)	~~Detailed design information may not be available~~ ~~Can be met at Fuel Load~~ **CCI/II will be met at initial fuel load**
SY-A18 (SY-A19)	Operating experience may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
SY-A18a (SY-A20)	Operating experience ~~and Procedures~~ may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
HR-A1 (HR-A1)	Operating experience ~~and procedures~~ may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
HR-A2 (HR-A2)	Operating experience ~~and procedures~~ may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
HR-A3 (HR-A3)	Operating experience ~~and procedures~~ may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
HR-C3 (HR-D3)	Operating experience ~~and procedures~~ may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
HR-D3 (HR-D3)	~~CCI can be met~~ **CCI will be met before initial fuel load**

HR-D4 (HR-D4)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **Will be met at initial fuel load** Note: SR is only relevant if applicable
HR-D7 (HR-D7)	~~CCI/II can be met~~ **CCI/II will be met before initial fuel load**
HR-E1 (HR-E1)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
HR-E2 (HR-E2)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
HR-E3 (HE-E3)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **CCI will be met at initial fuel load**
HR-E4 (HR-E4)	~~CCI can be met~~ **CCI will be met before initial fuel load**
HR-F2 (HR-F2)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **CCI will be met at initial fuel load**
HR-G3 (HR-G3)	~~CCI can be met~~ **CCI will be met before initial fuel load**
HR-G5 (HR-G5)	~~CCI can be met~~ **CCI will be met before initial fuel load**
HR-G6 (HR-G6)	~~Procedures and~~ Operating experience may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**

HR-G7 (HR-G7)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
HR-H2 (HR-H2)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
DA-B2 (DA-B2)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **CCI/II will be met at initial fuel load**
DA-C2 (DA-C2)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
DA-C3 (DA-C3)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
DA-C4 (DA-C4)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
DA-C5 (DA-C5)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
DA-C6 (DA-C6)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
DA-C7 (DA-C7)	~~CCI can be met~~ **CCI will be met before initial fuel load**
DA-C8 (DA-C8)	~~CCI can be met~~ **CCI will be met before initial fuel load**

DA-C9 (DA-C9)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **CCI/II will be met at 1st inspection period**
DA-C10 (DA-C10)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **CCI will be met at 1st inspection period**
DA-C11 (DA-C11)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
DA-C12 (DA-C13)	Plant-specific data may not be available. ~~Can be met at 1st Period~~ **CCI will be met at 1st inspection period**
DA-C13 (DA-C14)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
DA-C14 (DA-C15)	Plant-specific data may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
DA-D1 (DA-D1)	~~CCI can be met~~ **CCI will be met before initial fuel load**
DA-D2 (DA-D2)	~~Can be met.~~ **Will be met before initial fuel load** This SR also shows that other Data SRs may be supplemented by this approach
DA-D4 (DA-D4)	~~CCI can be met~~ **CCI will be met before initial fuel load**

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~~ **Will be met at 1st inspection period**
IF-A4 (IFPP-A5)	Final walkdowns may not be possible ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
IF-B3a (IFSO-A6)	Final walkdowns may not be possible ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
IF-C6 (IFSN-A14)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **CCII will be met at initial fuel load**
IF-C8 (IFSN-A16)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **CCII will be met at initial fuel load**
IF-C9 (IFSN-A17)	Final walkdowns may not be possible ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
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~~ **CCII/III will be met at 1st inspection period**
IF-D6 (IFEV-A7)	*No objection*
IF-E5a (IFQU-A6)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**

IF-E8 (IFQU-A11)	Final walkdowns may not be possible ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
QU-D1b (QU-D2)	~~Procedures and~~ Operating experience may not be available ~~Can be met at 1st Period~~ **Will be met at 1st inspection period**
QU-D3 (QU-D4)	~~CCI can be met~~ **CCI will be met before fuel load**
LE-C2a (LE-C2)	~~CCI can be met~~ **CCI will be met before fuel load**
LE-C2b (LE-C3)	~~CCI can be met~~ **CCI will be met before fuel load**
LE-C3 (LE-C4)	~~CCI can be met~~ **CCI will be met before fuel load**
LE-C6 (LE-C7)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**
LE-D5 (LE-D6)	~~Procedures may not be available~~ BWR – Not applicable PWR – ~~Can be met at Fuel Load~~ **CCI will be met at initial fuel load**
LE-E1 (LE-E1)	~~Procedures may not be available~~ ~~Can be met at Fuel Load~~ **Will be met at initial fuel load**

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PRODUCT DESCRIPTION

Risk-informed methodologies have been developed in order to establish alternative in-service inspection (ISI) 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 (for example, 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. Therefore, 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 of the ASME PRA Standard as clarified in NRC RG 1.200. Most but not all of these technical elements and supporting requirements relate to the technical aspects of the plant PRA; therefore, 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 ISI 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 (that is, ASME RA-Sb-2005), and 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 and 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

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

Approach

The vast majority of U.S. plants that implemented RI-ISI programs have used methodologies (for example, EPRI report TR-112657, *Revision B-A, Revised Risk-Informed Inservice Inspection Evaluation Procedure,* and ASME Code Case N716) developed by the Electric Power Research Institute (EPRI). This report reviews these methodologies against the ASME PRA Standard and NRC RG 1.200. This report will support industry implementation and maintenance of these tools and products.

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

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

Revisions

Original Report (1021467)

Report 1021467 was revised to incorporate the NRC Safety Evaluation (SE) and editorial revisions identified since the last issuance of the report. This report has been reviewed by the NRC and a safety evaluation (SE) report issued. Changes have been made to this report so that it comports with the safety evaluation. In particular, stricken text identifies original language that does not comport with the NRC staff position while bolded text shows text that was added to comport with the NRC staff position. Italicized text, when included, clarifies the NRC staff position. Also, a new Chapter 3 was added to highlight "conditions and limitations' contained in section 4.0 of the SE. Finally, Appendices C, D, E, F and G contain the NRC-issued requests for additional information (RAIs) on this report and responses to those RAIs. In accordance with NRC's request, the NRC cover letter and SE are included after the title page and the report number includes an "A" indicating the version of the report accepted by the NRC staff.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

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 U.S. Nuclear Regulatory Commission (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 risk-informed in-service inspection (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.

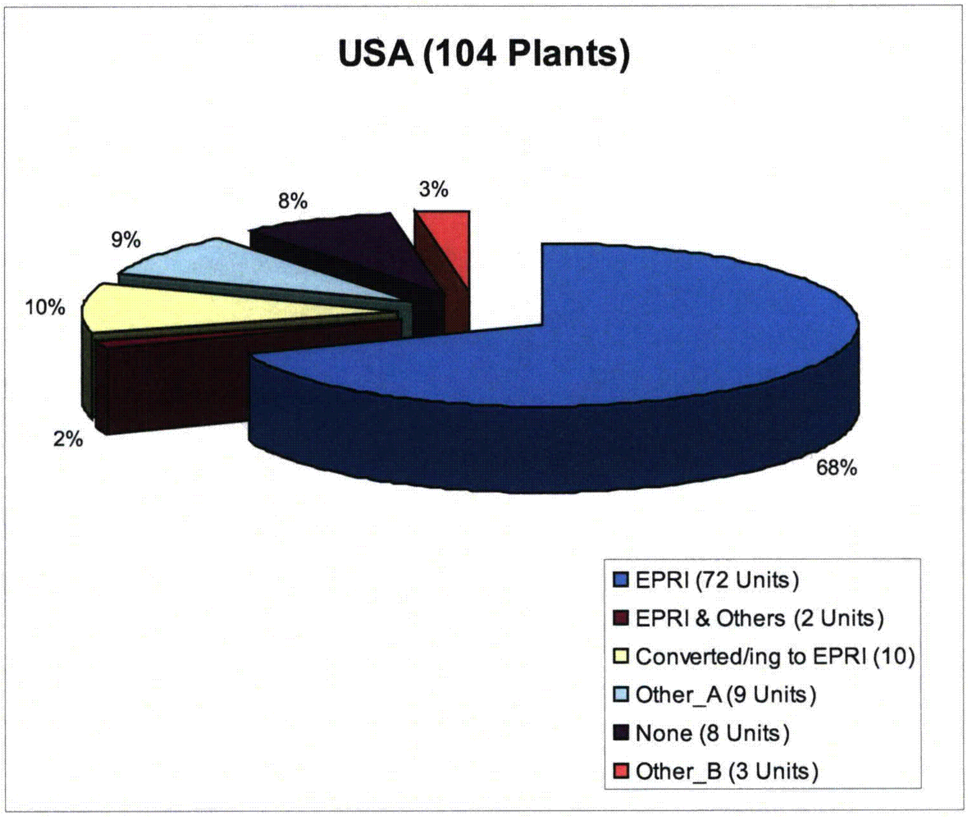

Figure 1-1
Status of RI-ISI Applications in the United States

These risk-informed methodologies use plant-specific probabilistic risk assessments (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 large, early-release frequency (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 revisions 1 and 2 to Regulatory Guide (RG) 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 the 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 described in RG 1.200 and other related documents (for example, RG 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. In addition, 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 in this report are the same, whether the intended application is to develop a pre-service inspection (PSI) plan or an in-service inspection (ISI) plan. 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 inspections, testing, analysis, and acceptance criteria (ITAAC) implementation.

Finally, this report has been reviewed by the NRC and a safety evaluation (SE) report issued. The SE can be found directly after the title page of this report. Changes have been made to this report so that it comports with the safety evaluation. In particular, stricken text identifies original language that does not comport with the NRC staff position while bolded text shows text that was added to comport with the NRC staff position. Italicized text, when included, clarifies the NRC staff position.

Also, a new Chapter 3 was added to highlight "conditions and limitations' contained in section 4.0 of the SE. Finally, Appendices C, D, E, F and G contain the NRC-issued requests for additional information (RAIs) on this report and responses to those RAIs.

2 PROBABILISTIC RISK ASSESSMENTS TECHNICAL ADEQUACY GUIDANCE FOR RISK-INFORMED IN-SERVICE INSPECTION APPLICATIONS

2.1 Regulatory Guide 1.200 Revision 1

Risk-informed methodologies have been developed in order to establish alternative ISI 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 (that is, ASME RA-Sb-2005), and the NRC 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 have a conservative bias, whereas Capability Category III supporting requirements 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.

In some supporting requirements, 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 described in detail in EPRI report 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 regarding 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, internal flooding 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; therefore, peer review findings and/or gaps related to documentation that do not impact the results would still allow the capability category to be considered met.

Tables 2-1 and 2-2 summarize the results of this review. As can be seen in these 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. In addition, 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. Therefore, Appendix A should be used when comparing an existing plant PRA to the guidelines contained in this report.

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 internal flooding (IF) SR
II and I	11 non-IF SRs	11 non-IF SRs + 2 IF SRs = 13 SRs
II	2 non IF SRs	3 non-IF SR + 3 IF SRs = 6 SRs
I	65 non-IF SRs	67 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 a supporting requirement to be considered met, all relevant peer review **and other independent** findings shall have been addressed and as necessary applicable changes made to PRA models ~~and~~ methods, **and documentation.** ~~As the capability category assignment for each supporting requirement relates to the technical aspects of the plant PRA, peer review findings and/or gaps related to documentation that do not impact the RI-PSI/RI-ISI results would allow the capability category to still be considered met. A documented basis for this conclusion should be prepared and available. This documented basis could, for example, include the use of supplemental analyses, comparison to similar plants, and/or review of the impact of similar review findings on RI-PSI/RI-ISI results to confirm that the RI-PSI/RI-ISI results would not be significantly impacted.~~

Referencing this Topical Report is intended to clearly define the minimal quality of the PRA. The evaluation of possible impacts of deviations from the TR permitted by the stricken text may be acceptable but requires a prior submittal to the NRC for review and therefore is not acceptable as part of the TR.

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 [1,2]	EPRI Streamlined RI-ISI [1,2,3]
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	AS-A9, SC-B2	IE-A4, IF-C3, IF-C6, IF-C8, AS-A9, SC-B2
I	IE-A4, IE-E4a, IE-A6, IE-A7, IE-B3, AS-A10, SC-A2, SC-A5, SC-B1, 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-A10, SC-A2, SC-A5, SC-B1, 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 [1,2,3]
Spans all three categories and needs to be 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 a supporting requirement to be considered met, all relevant peer review **and other independent** findings shall have been addressed and as necessary applicable changes made to PRA models ~~and~~ methods, **and documentation.** ~~As the capability category assignment for each supporting requirement relates to the technical aspects of the plant PRA, peer review findings and/or gaps related to documentation that do not impact the RI-PSI/RI-ISI results would allow the capability category to still be considered met. A documented basis for this conclusion should be prepared and available. This documented basis could, for example, include the use of supplemental analyses, comparison to similar plants, and/or review of the impact of similar review findings on RI-PSI/RI-ISI results to confirm that the RI-PSI/RI-ISI results would not be significantly impacted.~~

Referencing this Topical Report is intended to clearly define the minimal quality of the PRA. The evaluation of possible impacts of deviations from the TR permitted by the stricken text may be acceptable but requires a prior submittal to the NRC for review and therefore is not acceptable as part of the TR.

2. The EPRI streamlined RI-ISI methodology has been codified in ASME Code Case N716.

2.2 Regulatory Guide 1.200 Revision 2

With respect to the influence of RG 1.200 revision 2 (that is, hazards groups) on RI-ISI program development, it is important to note that the RI-ISI supporting analyses (for example, consequence assessment) are based on the internal events PRA. The purpose of developing a RI-ISI program is to define an alternative ISI strategy for piping systems (for example, nondestructive examination [NDE] of a piping weld). The use of only the internal events PRA can be justified by the following:

- The very small changes in the potential for piping failure because of changes in ISI, when augmented inspection programs such flow-accelerated corrosion (FAC), intergranular stress corrosion cracking (IGSCC) BWR categories B through G, localized corrosion (for example, microbial corrosion [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

Therefore, 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 described, for example, in RG 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 U.S. fleet has shown that these hazard groups do not impact the RI-ISI conclusions.

With respect to RG 1.200, revision 2, please note that RG 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 described next, is the basis for not needing to quantify other hazards in the future.

Consider the following (Note 1: Language from Draft RG 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 italics.):

> 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 next.

Internal Fire Events: The potential contribution of piping failure to internal fire risk is insignificant because the failure probability of piping is insignificant compared to the failure probability of other systems, structures, and components (SSC), 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 (that is, identifying and repairing flaws) and therefore provide reasonable assurance of an ongoing substantive assessment of piping condition. In addition, there are no changes to design basis events and therefore safety margins are maintained.

Seismic Events: Well-engineered systems and structures (for example, piping systems) are seismically rugged. Individual plant examination of external events (IPEEE) and other industry and NRC studies (for example, EPRI report 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 SSC. 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 (that is, identifying and repairing flaws) and therefore provide reasonable assurance of an ongoing substantive assessment of piping condition. In addition, there are no changes to design basis events and, therefore, safety margins are maintained.

High Winds, External Floods, and Other External Hazards: As described previously, the purpose of developing an RI-ISI program is to define an alternative ISI strategy for piping systems. Other hazards (for example, high wind or external floods) are not considered in the development of an ISI program for piping. The reasons include the structural ruggedness of the piping systems, location (because 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 on insight from the evaluation of these other external hazards. The small potential impact on the potential for piping failure of an RI-ISI process, and the approaches to maintaining defense in depth and safety margins summarized previously, 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 report 1018427 guidance on meeting RG 1.200, revision 1 and RG 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 (for example, pre-service inspection and in-service inspection 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). In addition, 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.)

Regarding the PRA itself, the ASME PRA standard was originally developed in response to operating reactors. As such, some supporting requirements are not achievable early in the plant design while others can be achieved as the plant approaches operation, and finally, some others cannot be fully achieved until after plant operation. In recognition of this situation, an ASME advanced light water reactor (ALWR) working group is 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 that have a variable degree of achievability during the transition from a design certification (DC) PRA to a combined license (COL) PRA and finally to a fully operational plant PRA. In addition, Table 2-4 provides guidance on interim actions that can be taken while the plant transitions from the DC PRA to a fully operational PRA. Of the supporting requirements listed in Table 2-3, six need not be met in order to support the development of an RI-ISI/RI-PSI program. Of the remaining supporting requirements 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 (for example, obtaining operating and maintenance data).

Table 2-3
Assessment for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	TR-1018427 Assessment	TR-1018427 Requirement
IE-A3 (IE-A3)	Plant-specific data may not be available. Can be met at the first period.	Plant-specific data may not be available. ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	Capability category (CC) I/II/III
IE-A3a (IE-A4)	CC I/II can be partially met because some components may be unique.	~~CCI/II can be met partially as some components may be unique~~ **CCI/II will be met partially at initial fuel load if some components are unique** **CCI/II** will be **completely met at 1st inspection period** via the RI-ISI living program component	CC I/II
IE-A4a (IE-A6)	CC II and III need routine alignment information that may not be available until plant operation.	~~CC I can be met~~ **CCI will be met before initial fuel load**	CC I
IE-A6 (IE-A8)	CC II and III require interviews of plant personnel who may not be assigned until post-DC PRA.	~~CCI can be met~~ **CCI will be met before initial fuel load**	CC I
IE-A7 (IE-A9)	CC II and III require review of plant-specific operating experience that may not be available until the first period.	~~CCI can be met~~ **CCI will be met before initial fuel load**	CC I
IE-C1 (IE-C1)	Plant-specific data may not be available until the first 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 the first 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.~~ **Will be met at initial fuel load**	CC I/II/III
IE-C2 (IE-C4)	Plant-specific data may not be available until the first period.	Need not be met.	Need not be met
IE-C3 (IE-C5)	CC I/II could be met by using an assumption. CC III cannot be met until first period.	Need not be met.	Need not be met

IE-C5 (IE-C7)	CC III cannot be met until the first 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.~~ **Will be met at initial fuel load**	CC I/II/III

Table 2-3 (continued)
Assessment for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
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.~~ **CCI/II will be met at initial fuel load**	CC I/II
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.~~ **Will be met at initial 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.~~ **Will be met at initial 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.~~ **Will be met at initial 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.~~ **Will be met at initial 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.~~ **Will be met at initial fuel load**	CC I/II/III
SY-A4 (SY-A4)	Plant staff and/or operating data staff may not be available. Can be mostly met at fuel load and completely met at the first period.	~~Plant staff /~~ Operating data may not be available. ~~Can be mostly met at fuel load and completely met at the first period.~~ **CCI will be completely met at 1st inspection 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.~~ **Will be met at initial 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.~~ **CCI/II will be met at initial fuel load**	CC I/II

SY-A18 (SY-A19)	Operating experience may not be available. Can be met at the first period.	~~Operating experience may not be available.~~ ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
SY-A18a (SY-A20)	Operating experience and procedures may not be available. Can be met at the first period.	~~Operating experience and procedures may not be available.~~ ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
HR-A1 (HR-A1)	Operating experience and procedures may not be available. Can be met at the first period.	~~Operating experience and procedures may not be available.~~ ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
HR-A2 (HR-A2)	Operating experience and procedures may not be available. Can be met at the first period.	~~Operating experience and procedures may not be available.~~ ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III

Table 2-3 (continued)
Assessment for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
HR-A3 (HR-A3)	Operating experience and procedures may not be available. Can be met at the first period.	~~Operating experience and procedures may not be available.~~ ~~Can be met at the first period~~. **Will be met at 1st inspection period**	CC I/II/III
HR-C3 (HR-D3)	Operating experience and procedures may not be available. Can be met at the first period.	~~Operating experience and procedures may not be available.~~ ~~Can be met at the first period.~~ **Will be met at 1st inspection 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 will be met before initial fuel load**	CC I
HR-D4 (HR-D4)	Procedures may not be available. Note: supporting requirement is relevant only if applicable. Can be met at fuel load.	~~Procedures may not be available. Can be met at fuel load.~~ **Will be met at initial fuel load** Note: supporting requirement is relevant only if applicable.	CC I/II/III
HR-D7 (HR-D7)	CC I/II can be met.	~~CC I/II can be met.~~ **CCI/II will be met before initial fuel load**	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.~~ **Will be met at initial 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.~~ **Will be met at initial 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.~~ **CCI will be met at initial fuel load**	CC I
HR-E4 (HR-E4)	CC II/III require use of "simulator observations or talk-throughs..." that may not be possible until post-DC PRA.	~~CC I can be met.~~ **CCI will be met before initial fuel load**	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.~~ **CCI will be met at initial 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. **CCI will be met before initial fuel load**	CC I
HR-G5 (HR-G5)	For CC II and III, plant procedures may not be available or walkdowns and/or talk-throughs may not be possible. Can be met at fuel load.	~~CC I can be met.~~ **CCI will be met before initial fuel load**	CC I

Table 2-3 (continued)
Assessment for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
HR-G6 (HR-G6)	Procedures and operating experience may not be available. Can be met at the first period.	~~Procedures and operating experience may not be available.~~ ~~Can be met at the first period.~~ **Will be met at 1st inspection 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.~~ **Will be met at initial fuel load**	CC I/II/III
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.~~ **Will be met at initial 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.~~ **CCI/II will be met at initial fuel load**	CC I/II
DA-C2 (DA-C2)	Plant-specific data may not be available. Can be met at the first period.	Plant-specific data may not be available. ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
DA-C3 (DA-C3)	Plant-specific data may not be available. Can be met at the first period.	Plant-specific data may not be available. ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
DA-C4 (DA-C4)	Plant-specific data may not be available. Can be met at the first period.	Plant-specific data may not be available. ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
DA-C5 (DA-C5)	Plant-specific data may not be available. Can be met at the first period.	Plant-specific data may not be available. ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
DA-C6 (DA-C6)	Plant-specific data may not be available. Can be met at the first period.	Plant-specific data may not be available. ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III

DA-C7 (DA-C7)	Plant-specific data may not be available. Can be met at the first period.	~~CC I can be met.~~ **CCI will be met before initial fuel load**	CC I
DA-C8 (DA-C8)	CC II/III require review of plant-specific operating experience. Can be met at the first period.	~~CC I can be met.~~ **CCI will be met before initial fuel load**	CC I
DA-C9 (DA-C9)	Plant-specific data may not be available. Can be met at the first period.	~~Plant-specific data may not be available.~~ ~~Can be met at the first period.~~ **CCI/II will be met at 1st inspection period**	CC I/II

Table 2-3 (continued)
Assessment for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
DA-C10 (DA-C10)	Plant-specific data may not be available. Can be met at the first period.	~~Plant-specific data may not be available.~~ ~~Can be met at the first period.~~ **CCI will be met at 1st inspection period**	CC I
DA-C11 (DA-C11)	Plant-specific data may not be available. Can be met at the first period.	~~Plant-specific data may not be available.~~ ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
DA-C12 (DA-C13)	Plant-specific data may not be available. Can be met at the first period.	~~Plant-specific data may not be available.~~ ~~Can be met at the first period.~~ **CCI will be met at 1st inspection period**	CC I
DA-C13 (DA-C14)	Plant-specific data may not be available. Can be met at the first period.	~~Plant-specific data may not be available.~~ ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
DA-C14 (DA-C15)	Plant-specific data may not be available. Can be met at the first period.	~~Plant-specific data may not be available.~~ ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
DA-D1 (DA-D1)	CC II and III require review of plant-specific operating experience. Can be met at the first period.	~~CC I can be met.~~ **CCI will be met before initial fuel load**	CC I
DA-D2 (DA-D2)	Can be met. This supporting requirement also shows that other data supporting requirements may be supplemented by this approach.	~~Can be met.~~ This supporting requirement also shows that other data supporting requirements may be supplemented by this approach. **Will be met before initial fuel load**	CC I/II/III
DA-D4 (DA-D4)	For CC II/III, plant-specific data may not be available. Can be met at the first period.	~~CC I can be met.~~ **CCI will be met before initial fuel load**	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 the first 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 the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
IF-A4 (IFPP-A5)	Walkdowns may not be possible. Can be met at fuel load.	**Final** walkdowns may not be possible. ~~Can be met at fuel load.~~ **Will be met at initial fuel load**	CC I/II/III
IF-B3a (IFSO-A6)	Walkdowns may not be possible. Can be met at fuel load.	**Final** walkdowns may not be possible. ~~Can be met at fuel load.~~ **Will be met at initial fuel load**	CC I/II/III

Table 2-3 (continued)
Assessment for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
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.~~ **CCII will be met at initial 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.~~ **CCII will be met at initial fuel load**	CC II
IF-C9 (IFSN-A17)	Walkdowns may not be possible. Can be met at fuel load.	**Final** walkdowns may not be possible. ~~Can be met at fuel load.~~ **Will be met at initial fuel load**	CC I/II/III
IF-D5a (IFEV-A6)	Noted information may not be fully available. Most can be met at fuel load; operating data can be met at the first period.	~~Noted information may not be fully available.~~ ~~Most can be met at fuel load. Operating data can be met at the first period.~~ **CCII/III will be met at 1st inspection 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 the first 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.~~ **Will be met at initial fuel load**	CC I/II/III
IF-E8 (IFQU-A11)	Walkdown may not be possible. Can be met at fuel load.	**Final** walkdown may not be possible. ~~Can be met at fuel load.~~ **Will be met at initial fuel load**	CC I/II/III
QU-D1b (QU-D2)	Procedures and operating experience may not be available. Can be met at the first period.	~~Procedures and~~ operating experience may not be available. ~~Can be met at the first period.~~ **Will be met at 1st inspection period**	CC I/II/III
QU-D3 (QU-D4)	CC II/III require review of similar plant results that may not be available.	~~CC I can be met.~~ **CCI will be met before fuel load**	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.~~ **CCI will be met before fuel load**	CC I
LE-C2b (LE-C3)	For CC II/III, applicability of available generic data needs to be confirmed.	~~CC I can be met~~. **CCI will be met before fuel load**	CC I
LE-C3 (LE-C4)	For CC II and III, applicability of available generic calculations needs to be confirmed.	~~CC I can be met.~~ **CCI will be met before fuel load**	CC I

Table 2-3 (continued)
Assessment for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
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.~~ **Will be met at initial 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.~~ **CCI will be met at initial 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.~~ **Will be met at initial fuel load**	CC I/II/III

Table 2-4
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
IE-A3 (IE-A3)	Plant-specific experience may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
IE-A3a (IE-A4)	CC I/II can be partially met because some components may be unique.	Initially use generic analyses and update "with generic analyses of similar plants" as it becomes available. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 2.
IE-C1b (IE-C3)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
IE-C9 (IE-C11)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
IE-C12 (IE-C14)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
AS-A5 (AS-5)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
AS-B5a (AS-B6)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
SC-A6	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
SY-A2 (SY-A2)	"As-built" and "as-operated" information and procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See notes 3 and 4.
SY-A3 (SY-A3)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
SY-A4 (SY-A4)	Plant staff and/or operating experience may not be available. Can be met mostly at fuel load and completely met at the first period.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 4.
SY-A5 (SY-A5)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
SY-A7 (SY-A7)	Detailed design information may not be available. Can be met at fuel load.	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2 this supporting requirement should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 4.
SY-A18 (SY-A19)	Operating experience may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
SY-A18a (SY-A20)	Operating experience and procedures may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
HR-A1 (HR-A1)	Operating experience and procedures may not be available. Can be met at the first period.	Initially use generic data/analysis using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See notes 1 and 3.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
HR-A2 (HR-A2)	Operating experience and procedures may not be available. Can be met at the first period.	Initially use generic data/analysis using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See notes 1 and 3.
HR-A3 (HR-A3)	Operating experience and procedures may not be available. Can be met at the first period.	Initially use generic data/analysis using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See notes 1 and 3.
HR-C3 (HR-C3)	Operating experience and procedures may not be available. Can be met at the first period.	Initially use generic data/analysis using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See notes 1 and 3.
HR-D4 (HR-D4)	Procedures may not be available. Note: supporting requirement is relevant only if applicable. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
HR-E1 (HR-E1)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
HR-E2 (HR-E2)	Procedures may not be available. Can be met at fuel load.	Initially, analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
HR-E3 (HE-E3)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
HR-F2 (HR-F2)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
HR-G6 (HR-G6)	Procedures and operating experience may not be available. Can be met at the first period.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant and generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See notes 1 and 3.
HR-G7 (HR-G7)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
HR-H2 (HR-H2)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
DA-B2 (DA-B2)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
DA-C2 (DA-C2)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
DA-C3 (DA-C3)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
DA-C4 (DA-C4)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
DA-C5 (DA-C5)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
DA-C6 (DA-C6)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
DA-C9 (DA-C9)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
DA-C10 (DA-C10)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
DA-C11 (DA-C11)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
DA-C12 (DA-C13)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
DA-C13 (DA-C14)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
DA-C14 (DA-C15)	Plant-specific data may not be available. Can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 1.
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 the first period.	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2, this supporting requirement should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant and generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 4.
IF-A4 (IFPP-A5)	Walkdowns may not be possible. Can be met at fuel load.	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2, this supporting requirement should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 4.
IF-B3a (IFSO-A6)	Walkdowns may not be possible. Can be met at fuel load.	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2, this supporting requirement should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 4.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
IF-C6 (IFSN-A14)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
IF-C8 (IFSN-A16)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
IF-C9 (IFSN-A17)	Walkdowns may not be possible. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 4.
IF-D5a (IFEV-A6)	Noted information may not be fully available. Most can be met at fuel load; operating data can be met at the first period.	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 4.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
IF-E5a (IFQU-A6)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
IF-E8 (IFQU-A11)	Walkdown may not be possible. Can be met at fuel load.	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2, this supporting requirement should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 4.
QU-D1b (QU-D2)	Procedures and operating experience may not be available. Can be met at the first period.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant and generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See notes 1 and 3.
LE-C6 (LE-C7)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.

Table 2-4 (continued)
Interim Actions for New Build (for example, RI-PSI/IS)

Section ID 2008 (2009)	PRA Standard RG 1.200 Assessment	Action to Be Taken	Basis for the Reason That Difference Will Not Be Significant for RI-PSI/ISI Applications
LE-D5 (LE-D6)	Procedures may not be available. BWR: not applicable. PWR: can be met at fuel load.	BWR: not applicable PWRs: Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.
LE-E1 (LE-E1)	Procedures may not be available. Can be met at fuel load.	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See note 3.

Notes:

1. Use of plant-specific versus generic experience/data typically has localized effects on the plant PRA results. Because the PRA results are only one input into the development of the program, any impact caused by the initial use of generic experience/data is further minimized. Because of how the EPRI methodologies have been built (for example, absolute ranking, large thresholds for binning consequence ranking with the EPRI traditional methodology, and conservative identification of HSS piping for the EPRI streamlined method [for example, all Class 1, all large-bore BER, small core damage frequency {CDF}/LERF criteria for paragraph 2{a}{5}]), only large changes, in a large amount of data, would be expected to have an impact on the results; therefore, any significant changes to the inspection program are not expected.

   Further, the RI-ISI/PSI methodologies have a living program component (for example, subparagraphs 7[a], [b], and [e] of Code Case N716, EPRI streamlined methodology, and subparagraphs 7.1[a], [b], and [e] of Appendix R, EPRI traditional methodology), so that new information (for example, plant-specific data) is incorporated into the program on a periodic basis. This new information can increase or decrease the inspection population throughout plant lifetime. From a practical perspective, the inspections themselves are allocated over a 10-year interval. As an example, if the impact of incorporating plant-specific experience/data into the program at the end of the first inspection period increased the inspection population from 99 to 102 inspections, there would still be two inspection periods (~ 6 to 7 years) available to incorporate this impact into the program prior to closing out the inspection interval.

Notes (continued):

2. Generic analyses of similar plants, in particular experience with similar plant components, can be conducted throughout the PRA model development process, to ensure that the model accounts for industry experience. That is, many of the components to be used in the new-build fleet are identical to, or similar to, components used in the operating fleet, including plants located outside the United States. However, for the new-build fleet, there can be isolated components that are unique to that particular design or plant site. When these components are in use at other sites (for example, other new-build sites) the comparison can be done to account for industry experience. In the isolated cases when the component(s) is plant unique, plant-specific operating experience will serve as industry operating experience until additional units with the same type of component(s) reach the operational stage.

3. Using assumptions about the "as anticipated" to be operated plant versus plant-specific procedures/systems information would have an impact only if the plant-specific procedures/systems information were radically different than that assumed in the PRA. In addition, the availability of plant-specific procedures/systems information increases as the plant transitions from the DC stage through operation. That is, important procedures and training as well as systems information will be in place prior to fuel load. Other than normal plant practices of reflecting lessons learned, these procedures/systems information are not expected to change radically as the plant transitions to full operation.

   Because the PRA results are only one input into the development of the program, any impact caused by the initial use of generic procedures is further minimized. Because of how the EPRI methodologies have been built (for example, absolute ranking, large thresholds for binning consequence ranking with the EPRI traditional methodology and conservative identification of HSS piping for the EPRI streamlined method [for example, all Class 1, all large-bore BER, small CDF/LERF criteria for paragraph 2{a}{5}]), only substantial changes to multiple procedures would be expected to have an impact on the results; therefore, any significant changes to the inspection program are not expected. In addition, as stated previously, all important procedures are expected to be in place prior to fuel load.

   Further, the RI-PIS/PSI methodologies have a living program component (for example, subparagraphs 7[a], [b], and [e] of Code Case N716, EPRI streamlined methodology, and subparagraphs 7.1[a], [b], and [e] of Appendix R, EPRI traditional methodology), so that new information (for example, revised or new procedures) is incorporated into the program on a periodic basis. This new information can increase or decrease the inspection population throughout plant lifetime. From a practical perspective, the inspections themselves are allocated over a 10-year interval. As an example, if the impact of incorporating revised or new procedures into the program at the end of the first inspection period increased the inspection population from 99 to 102 inspections, there would still be two inspection periods (~ 6 to 7 years) available to incorporate this impact into the program prior to closing out the inspection interval.

Notes (continued):

4. Using generic data and assumptions about the "as anticipated" to be operated plant versus having as-built/as-operated data would have an impact only on the inspection program, if the as-built/as-operated plant was radically different than that assumed in the PRA. The ITAAC closure process ensures that the "as-designed" plant properly transitions to the "as-built/as-operated" plant in a documented and orderly manner.

   Because the PRA results are only one input into the development of the program, any impact caused by changes in the as-built/as-operated plant versus the as-designed plant is further minimized. Because of how the EPRI methodologies have been built (for example, absolute ranking, large thresholds for binning consequence ranking with the EPRI traditional methodology and conservative identification of HSS piping for the EPRI streamlined method [for example, all Class 1, all large-bore BER, small CDF/LERF criteria for paragraph 2{a}{5}]), only substantial plant changes would be expected to have an impact on the results; therefore, any significant changes to the inspection program are not expected. In addition, as stated previously, the ITAAC process provides for an orderly transition from the as-designed plant to the as-built/as-operated plant.

   Further, the RI-PIS/PSI methodologies have a living program component (for example, subparagraphs 7[a], [b], and [e] of Code Case N716, EPRI streamlined methodology, and subparagraphs 7.1[a], [b], and [e] of Appendix R, EPRI traditional methodology), so that new information (for example, revised or new procedures) is incorporated into the program on a periodic basis. This new information can increase or decrease the inspection population throughout plant lifetime. From a practical perspective, the inspections themselves are allocated over a 10-year interval. As an example, if the impact of incorporating as-built/as- operated information into the program increased the inspection population from 99 to 102 inspections, there would still be significant time available to incorporate this impact into the program prior to closing out the inspection interval.

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 resubmittal 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 U.S. industry) that has implemented a RI-ISI program has done so on piping that was not subjected to PSI according to 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 that a volumetric PSI examination be conducted on larger bore piping (for example, ≥4 nominal pipe size [NPS]). This examination is consistent with some, but not all, RI-ISI required examinations for large bore piping (for example, volumes may be different). In addition, 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. According to RI-ISI, if this piping is selected for inspection (for example, thermal fatigue), a volumetric examination is required. Therefore, similar to some large bore locations, the PSI provides no benefit.
- Class 1 and 2 RI-ISI applications: In addition to the previous discussion on Class 1 piping, only 7.5% of Class 2 piping receive any PSI at all. Therefore, many Class 2 locations selected for inspection according to the RI-ISI program were not previously subject to a PSI examination.
- Full-scope RI-ISI applications: Experience has shown that RI-ISI inspections were conducted on Code (for example, Class 3) and non-Code (for example, non-safety-related) piping that had not received a PSI examination.

Therefore, 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 other risk-informed initiatives. For example, the RI-ISI inspection population is spread out over a 10-year inspection interval. There are minimum and maximum requirements regarding how many inspections can be credited. That is, in the first inspection period, a minimum of 16% of the population must be inspected but no more than 50% can be credited. For the second inspection period, a minimum of 50% of the population must be inspected but no more than 75% can be credited, and for the third (final) period, all remaining inspections must be completed to reach 100% 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 (for example, 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% of the inspection population by the end of the first inspection interval.

Finally, because of how the EPRI RI-ISI methodologies have been built (for example, absolute ranking, large thresholds for binning consequence ranking with the traditional method, and conservative identification of HSS for the streamlined method [for example, all Class 1, all large bore break exclusion region [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 through 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 Part 52 plants (design certification documents [DCDs] and combined operating license applications [COLAs]) have committed to meeting Standard Review Plan (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.

Finally, according to **§ 50.71 Maintenance of records, making of reports,** the following requirements are used to update the plant-specific PRA:

> "(h)(1) No later than the scheduled date for initial loading of fuel, each holder of a combined license under subpart C of 10 CFR part 52 shall develop a level 1 and a level 2 probabilistic risk assessment (PRA). The PRA must cover those initiating events and modes for which NRC-endorsed consensus standards on PRA exist one year prior to the scheduled date for initial loading of fuel.
>
> (2) Each holder of a combined license shall maintain and upgrade the PRA required by paragraph (h)(1) of this section. The upgraded PRA must cover initiating events and modes of operation contained in NRC-endorsed consensus standards on PRA in effect one year prior to each required upgrade. The PRA must be upgraded every four years until the permanent cessation of operations under § 52.110(a) of this chapter."

Therefore, given this "upgrade" interval for the PRA, the RI-ISI program for the second inspection period and beyond will, as appropriate, meet the noted supporting requirements. In addition, as previously described, inspections added or deleted as a result of any update will be incorporated consistent with the RI-ISI process. As such, meeting the guidelines of this report will provide for the development of robust RI-PSI/ISI programs.

3
CONDITIONS AND LIMITATIONS

Based on its review, the NRC staff identified some issues and concerns in Section 3.0 of the SE such as conditions and limitations on the use of the tables contained within the TR and applicant/licensee action items related to the use of EPRI TR 1021467. These plant-specific action items address topics related to the implementation of EPRI TR 1021467 that could not be effectively addressed on a generic basis. These conditions and limitations are repeated below and more fully described in the SE that can be found inside the title page of this report. The plant specific items discussed below must be addressed by plants as part of their plant-specific RI-ISI submittal to the NRC.

Conditions and Limitations

1. The justification that a lower capability category "provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level" cannot be used to justify a CCI or "Not-met" assignment. The final TR shall be modified to clearly reflect this limitation. **This is Topical Report Condition 1.** ***The TR, specifically Appendix A, has been updated to reflect this condition.***

2. The NRC staff does not find the methods and results in the July 2010 version of the TR acceptable but, instead, would endorse the methods and results that would be described after modifying the TR by incorporating the specific changes identified in Tables 1 and 2 of this SE, and by appropriately reflecting the other limitations and conditions in this SE. The final TR shall be modified to clearly reflect this condition and limitation. **This is Topical Report Condition 2.** ***The TR has been updated to reflect this condition by adding this new Chapter 3 and revisions to Table 2-1, Table 2-2, Table 2-3 and Appendix A.***

3. For new build nuclear power plants, the NRC staff only approves referencing the TR requirements as demonstration of PRA technical adequacy for proposed RI-ISI programs developed using the Traditional method. The final TR shall be modified to clearly reflect this limitation. **This is Topical Report Condition 3.** ***The TR has been updated with this new chapter 3 to reflect this condition.***

4. RI-PSI for new reactors is not programmatically acceptable. The final TR shall be modified to clearly reflect this limitation. **This is Topical Report Condition 4.** ***The TR has been updated with this new chapter 3 to reflect this condition.***

Plant-Specific Action Items

1. For a supporting requirement to be considered met at the capability category required in the TR, all relevant peer and other independent review findings shall have been addressed and, as necessary, applicable changes made to PRA models, methods, and documentation. **This is Applicant/Licensee Action Item 1.**

2. An approved, conventional ISI program should be in place before the NRC will consider an alternative to the requirements of 10 CFR 50.55a to use RI-ISI. **This is Applicant/Licensee Action Item 2.**

3. Any new build licensee developing an RI-ISI program using the Streamlined method must provide to the NRC, in a request for relief, justification of sufficiently similar characteristics in the submittal. **This is Applicant/Licensee Action Item 3.**

4. Plant specific operating experience and data should be incorporated into the RI-ISI program consistent with the schedule laid out in the TR. **This is Applicant/Licensee Action Item 4.**

4

SUMMARY AND CONCLUSIONS

Risk-informed methodologies have been developed to establish alternative ISI 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 (for example, 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 provides guidance in determining which supporting requirements are applicable to RI-ISI programs. In addition, 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 PSI plan or an ISI plan. 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.

Finally, this report has been reviewed by the NRC and a safety evaluation (SE) report issued. The SE can be found directly after the title page of this report. Changes have been made to this report so that it comports with the safety evaluation. In particular, stricken text identifies original language that does not comport with the NRC staff position while bolded text shows text that was added to comport with the NRC staff position. Italicized text, when included, clarifies the NRC staff position.

Also, a new Chapter 3 was added to highlight "conditions and limitations' contained in section 4.0 of the SE. Finally, Appendices C, D, E, F and G contain the NRC-issued requests for additional information (RAIs) on this report and responses to those RAIs.

A

CAPABILITY CATEGORY ASSESSMENT AND ASSIGNMENT

This appendix provides the detailed breakdown of each supporting requirement and provides the basis for the capability category assignments (see Table A-1).

Table A-1
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection 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	Electric Power Research Institute (EPRI) traditional capability category (CC) I/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 CC I/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 CC I because the assessment will review the impact of system failures either through a specific consequence assessment of flood-induced events or the use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined CC II because this is captured by the internal flooding study for flood-induced events (see IF-A, IF-B, IF-C, and IF-E). Because the streamlined method relies on the plant probabilistic risk assessment (PRA) directly (that is, a consequence assessment according to TR-112657, Revision B-A is not performed), it was thought prudent to assign a higher capability category (that is, CC II) 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 CC I because the assessment will review the impact of system failures either through a specific consequence assessment of flood-induced events or the use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined CC I 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 CC I 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 the use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined CC I 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).

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1-2]
IE-A7	EPRI traditional CC I because the assessment will review the impact of system failures either through a specific consequence assessment of flood-induced events or the use of the internal flooding study (see IF-A, IF-B, IF-C, and IF-E). EPRI streamlined CC I 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.
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 the 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 CC I because the EPRI approach is an absolute risk ranking; therefore, applying conservatisms for this supporting requirement would potentially increase, but not reduce, inspections. EPRI streamlined CC I because applying conservatisms for this supporting requirement would increase the scope of high safety significant (HSS) segments according to 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 the 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 risk-informed in-service inspection (RI-ISI) applications. For plants that directly used the PRA results and did not benchmark the results against the methodology look-up tables, this supporting requirement is required. EPRI streamlined because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
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 supporting requirement 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 supporting requirement is required. EPRI streamlined because initiating event frequency for non-pressure boundary failures is not relevant to RI-ISI applications.
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, CC I/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 the 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. In addition, 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. In addition, 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.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1-2]
IE-C10	Spans all three capability categories.
IE-C11	EPRI traditional CC I/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 CC I/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 CC I/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 interfacing systems loss of coolant accident mitigation is used, the consequences of the break must be confirmed. EPRI streamlined CC I/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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined mean values are sufficient due to the conservative identification of predefined HSS piping and the small (core damage frequency [CDF])/large, early-release frequency (LERF) threshold used for plant-specific HSS piping.
IE-D1	Spans all three capability categories.
IE-D2	Spans all three capability categories.
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	CC I/II is sufficient because of the order of magnitude ranking and grouping approach used in the EPRI methodology. In addition, it is generally acknowledged that CC II is adequate for all but the most challenging of PRA applications.
AS-A8	Spans all three capability categories.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
AS-A9	~~EPRI traditional CC I 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 CC I 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, according to Section 2(a)(5) of case.~~ **CCII because difference in success criteria caused by more use of applicable (instead of generic) thermal hydraulic analysis could result in significant differences in the PRA results in some scenarios.** *See NRC Note at end of table*
AS-A10	EPRI traditional CC I: The EPRI approach is an absolute risk-ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to 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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Although helpful from a living program perspective, this is not necessary because of the conservative identification of predefined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
SC-A1	Spans all three capability categories.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1-2]
SC-A2	~~EPRI traditional: According to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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: CC I because applying conservatism for this supporting requirement would increase the scope of HSS segments, according to Section 2(a)(5) of case.~~ **CCI because CCI definition of core damage is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
SC-A3	Deleted.
SC-A4	Spans all three capability categories.
SC-A4a	Spans all three capability categories.
SC-A5	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
SC-A6	Spans all three capability categories.
SC-B1	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
SC-B2	~~EPRI traditional CC I: According to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I: According to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCII because difference in success criteria caused by more use of applicable (instead of generic) thermal hydraulic analysis could result in significant differences in the PRA results in some scenarios.** *See NRC Note at end of table*
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.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
SC-C3	Need not be met: EPRI traditional: Although helpful from a living program perspective, this is not necessary because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Although helpful from a living program perspective, this is not necessary because of the conservative identification of predefined 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.
SY-A4	EPRI traditional CC I because this supporting requirement will be supplemented by the RI-ISI consequence assessment or internal flooding analyses. EPRI streamlined CC I because this supporting requirement will be supplemented by supporting requirements in Section IF.
SY-A5	Spans all three capability categories.
SY-A6	Spans all three capability categories.
SY-A7	EPRI traditional CC I/II because according to Table 1.3-1 of the RA-2005, by meeting CC II, any departure from realism will have a small impact on the conclusions and risk insights. Therefore, any impact on the RI-ISI results would be minimal. EPRI streamlined CC I/II because according to Table 1.3-1 of the RA-2005, by meeting CC II, any departure from realism will have a small impact on the conclusions and risk insights. Therefore, 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 CC I/II: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I/II: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
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 CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
SY-A21	Spans all three capability categories.
SY-A22	Spans all three capability categories.
SY-B1	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because the probabilities from missing CCFs would have been screened out at the system level and therefore are expected to be small and would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
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.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
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 CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because the probabilities of missing actuation or lockout events would have been screened out at the system level and therefore are expected to be small and would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
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.
SY-C3	Need not be met: EPRI traditional: Although helpful from a living program perspective, this is not necessary because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Although helpful from a living program perspective, this is not necessary because of the conservative identification of predefined 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.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
HR-B1	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because the probabilities from any maintenance related failure modes that may have been screened out are expected to be small compared to random failures and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-B2	Spans all three capability categories.
HR-C1	Spans all three capability categories.
HR-C2	EPRI traditional CC I because this level of detail in the system models is not expected to impact the RI-ISI results, given that this supporting requirement requires that any unique design or operational features of the plant must be accounted for. EPRI streamlined CC I because this level of detail in the system models is not expected to impact the RI-ISI results, given that this supporting requirement requires that any unique design or operational features of the plant must be accounted for.
HR-C3	Spans all three capability categories.
HR-D1	Spans all three capability categories.
HR-D2	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
HR-D3	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-D4	Spans all three capability categories.
HR-D5	Spans all three capability categories.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
HR-D6	Spans all three capability categories.
HR-D7	EPRI traditional CC I/II because according to Table 1.3-1 of the RA-2005, by meeting CC II, any departure from realism will have a small impact on the conclusions and risk insights. Therefore, any impact on the RI-ISI results would be minimal. EPRI streamlined CC I/II because according to Table 1.3-1 of the RA-2005, by meeting CC II, any departure from realism will have a small impact on the conclusions and risk insights. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-E4	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
HR-F1	~~EPRI traditional CC I/II because according to Table 1.3-1 of the RA-2005, CC II provides resolution and specificity sufficient to identify the importance of significant contributors at the component level, including associated human actions. Therefore, 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 CC I/II because according to Table 1.3-1 of the RA-2005, CC II provides resolution and specificity sufficient to identify the importance of significant contributors at the component level, including associated human actions. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CC I/II because it is generally acknowledged that CCII is adequate for all but the most challenging of PRA applications.**
HR-F2	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-G1	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
HR-G2	Spans all three capability categories.
HR-G3	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments according to section 2[a][5] of case).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1, 2]
HR-G4	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments according to section 2[a][5] of case).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
HR-G5	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level, including associated human actions. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the probabilities of HEPs due to the process specified in CCII of this SR are expected to be small compared to the basic HEP values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
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 CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
HR-H2	Spans all three capability categories.
HR-H3	Spans all three capability categories.
HR-I1	Spans all three capability categories.
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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Although helpful from a living program perspective, this is not necessary because of the conservative identification of predefined 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-B2	~~EPRI traditional CC I/II because according to Table 1.3-1 of the RA-2005, CC II provides resolution and specificity sufficient to identify the importance of significant contributors at the component level. Therefore, 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 CC I/II because according to Table 1.3-1 of the RA-2005, CC II provides resolution and specificity sufficient to identify the importance of significant contributors at the component level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CC I/II because it is generally acknowledged that CCII is adequate for all but the most challenging of PRA applications.**
DA-C1	Spans all three capability categories.
DA-C2	Spans all three capability categories.
DA-C3	Spans all three capability categories.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-C8	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-C9	~~EPRI traditional CC I/II because according to Table 1.3-1 of the RA-2005, CC II provides resolution and specificity sufficient to identify the importance of significant contributors at the component level. Therefore, 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 CC I/II because according to Table 1.3-1 of the RA-2005, CC II provides resolution and specificity sufficient to identify the importance of significant contributors at the component level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CC I/II because it is generally acknowledged that CCII is adequate for all but the most challenging of PRA applications.**

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
DA-C10	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-C11	Spans all three capability categories.
DA-C11a	Spans all three capability categories.
DA-C12	EPRI traditional CC I because the EPRI approach uses an absolute risk ranking approach, so applying conservatism for this supporting requirement would only add inspections. EPRI streamlined CC I because applying conservatism for this supporting requirement would increase the scope of HSS segments, according to 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-D2	Spans all three capability categories.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
DA-D3	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-D4	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-D5	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
DA-D6	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-D6a	Spans all three capability categories.
DA-D7	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because changes to the component failure probabilities due to the process specified in CCII of this SR are expected to be small compared to the basic probability values and therefore would not affect the RI-ISI program due to the order of magnitude ranking and grouping approach used.**
DA-D8	Spans all three capability categories.
DA-E1	Spans all three capability categories.
DA-E2	Spans all three capability categories.
DA-E3	Need not be met: EPRI traditional: Although helpful from a living program perspective, this is not necessary because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Although helpful from a living program perspective, this is not necessary because of the conservative identification of predefined 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 CC I: The higher capability categories require further resolution of plants areas/rooms. CC I does not allow propagation outside of the defined area, including through drain lines or other paths. By not requiring higher resolution according to CC II/III, a conservative conditional core damage probabilities (CCDP) would be developed that would result in an increase in HSS scope only (per Section 2[a][5] or conservative CCDP/conditional large early release probabilities [CLERPs] for the delta risk evaluation).

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1, 2]
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 only to piping and NDE requirements; therefore, this supporting requirement 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 CC II: RG 1.200 R1 comment requires that CC II assess CC III mechanisms **by using conservative assumptions**. Therefore, CC II is conservative and could increase the scope of HSS piping and inspection population.
IF-C3a	Spans all three capability categories.
IF-C3b	EPRI streamlined CC I: Higher capability categories are not required because the flood areas are defined as independent according to supporting requirement IF-A1a. For CC I, supporting requirement (SR) IF-A1a does not allow propagation outside the defined area, including through drain lines or other paths. If areas are not independent (that is, individual rooms are defined), CC II 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.
IF-C4	Spans all three capability categories.
IF-C4a	Spans all three capability categories.
IF-C5	Spans all three capability categories.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1, 2]
IF-C5a	Spans all three capability categories.
IF-C6	EPRI streamlined CC II: Higher capability category is not required because the CC II requirements ensure 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 CC II: Higher capability category is not required because the CC II requirements ensure 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 CC I: The higher capability categories require further resolution. By not requiring higher resolution, a conservative CCDP would be developed that would result in an increase in HSS scope only, according to 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 CC II/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 can 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.
IF-E2	Moved to IF-C3c.
IF-E3	Spans all three capability categories.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
IF-E3a	EPRI streamlined because CC I/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 CC I 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 CC I because the conservative identification of predefined 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.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1, 2]
QU-C2	Spans all three capability categories.
QU-C3	Spans all three capability categories.
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 CC I 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, CC II/III is applicable. EPRI streamlined CC I because this level of detail has no impact on classification.
QU-D4	Spans all three capability categories.
QU-D5a	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because application specific flooding assessment will review (or supplement) any impact associated with accepting the lower capability category.**
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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Although helpful from a living program perspective, this is not necessary because of the conservative identification of predefined 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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Although helpful from a living program perspective, this is not necessary because of the conservative identification of predefined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1, 2]
QU-E3	EPRI traditional CC I 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 CC I because the conservative identification of predefined 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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Analyzing the impact from uncertainties on the PRA results is not necessary because of the conservative identification of predefined HSS piping and the small CDF/LERF threshold used for plant-specific HSS piping.
QU-F1	Spans all three capability categories.
QU-F2	Spans all three capability categories.
QU-F3	EPRI traditional CC I: Although potentially helpful, further level of detail is not required to support the RI-ISI applications. EPRI streamlined CC I: 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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Although helpful from a living program perspective, this is not necessary because of the conservative identification of predefined 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.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
LE-B1	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-B2	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-B3	Spans all three capability categories.
LE-C1	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-C2a	~~EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections.~~ ~~EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
LE-C2b	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because not crediting repair is conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-C3	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to Section 2[a][5] of case).~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-C4	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to 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 CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-C8b	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-C9a	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
LE-C9b	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-C10	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-D1a	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-D1b	~~EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to section 2[a][5] of case).~~ **CCI because the analysis in NUREG/CR-6595 is generally conservative and both the Streamlined and the Traditional methods rely on the absolute risk values so conservatism in one scenario will not mask any other scenario.**
LE-D2	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-D3	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-D4	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-D5	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,2]
LE-D6	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-E1	Spans all three capability categories.
LE-E2	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-E3	EPRI traditional CC I: The EPRI approach is an absolute risk ranking approach; therefore, applying conservatisms for this supporting requirement will at worst only add inspections. EPRI streamlined CC I: Applying conservatisms for this supporting requirement will at worst increase the scope of HSS segments, according to Section 2(a)(5) of case.
LE-E4	Spans all three capability categories.
LE-F1a	EPRI traditional CC I because it is consistent with conservative bias in supporting requirements; additional detail is not required. EPRI streamlined CC I 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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Analyzing the impact from uncertainties is not necessary because of the conservative identification of predefined 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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Analyzing the impact from uncertainties is not necessary because of the conservative identification of predefined 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.

Table A-1 (continued)
Applicability of Supporting Requirements to RI-ISI Programs

Supporting Requirements	Assessment for Risk-Informed In-Service Inspection Purposes [1,~~2~~]
LE-G3	EPRI traditional CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, 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 CC I because according to Table 1.3-1 of the RA-2005, CC I provides resolution and specificity sufficient to identify the importance of the contributors at the system or train level. Therefore, this level of detail is sufficient to support implementation of the EPRI RI-ISI methodology (for example, scope of HSS segments, according to 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 because of the order of magnitude ranking and grouping approach used. EPRI streamlined: Although helpful from a living program perspective, this is not necessary because of the conservative identification of predefined 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. For a supporting requirement to be considered met, all relevant peer review **and other independent** findings shall have been addressed and as necessary applicable changes made to PRA models ~~and~~ methods, **and documentation.** ~~As the capability category assignment for each supporting requirement relates to the technical aspects of the plant PRA, peer review findings and/or gaps related to documentation that do not impact the RI-PSI/RI-ISI results would allow the capability category to still be considered met. A documented basis for this conclusion should be prepared and available. This documented basis could, for example, include the use of supplemental analyses, comparison to similar plants, and/or review of the impact of similar review findings on RI-PSI/RI-ISI results to confirm that the RI-PSI/RI-ISI results would not be significantly impacted.~~

Referencing this Topical Report is intended to clearly define the minimal quality of the PRA. The evaluation of possible impacts of deviations from the TR permitted by the stricken text may be acceptable but requires a prior submittal to the NRC for review and therefore is not acceptable as part of the TR.

~~2. For purposes of RI-ISI, the capability category relates to technical aspects of the plant PRA; therefore, 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.~~

NRC Notes to Table 1

In its October 12, 2010, submittal, EPRI proposed changing the assessment to become an assertion that non-conservative result will be identified or not produced if the lower capability category was accepted because of interactions between these SRs and others. In its June 2, 2011, submittal, EPRI further argued that a Capability Category I should be sufficient for this SR. The NRC staff has not identified guidance on success criteria or expert judgment or plant comparison process that can systematically identify non-conservative results, and finds no support for arguing that interactions between SRs will provide this identification. Therefore the NRC staff retains the requirement that these be Capability Category II in order to claim compliance with the Topical Report.

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

Supporting requirements IF-C6 and IF-C8 pertain to screening of plant areas and sources. The intent of these supporting requirements 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 on which the PRA Standard is founded. That is, CC I supporting requirements typically have a conservative bias, while CC III supporting requirements 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 CC I for these supporting requirements is that 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**. In other words, if there is any realistic potential for failure to isolate the flood scenario and it is not modeled in the PRA, this supporting requirement would be considered "Not Met."

The use of the internal flooding study in the EPRI Streamlined RI-ISI approach (that is, 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. CC I and its conservative bias (for example, relative to Capability II and III), would act only to add piping to the HSS scope as compared to meeting a higher CC. Therefore, meeting CC I for these supporting requirements, for this application, is acceptable.

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

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

Therefore, an internal flooding PRA done to CC II for these supporting requirements 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 (for example, an N716 application). And, as described previously, CC I is also acceptable.

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

Upper bound plant piping failure rate of 1E-02/year is conservative for a variety of reasons, including the following:

- This value contains a number of failures because of 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 that tend to leak versus rupture (see Generic Letter 90-05).

- This value includes contributions from non-piping sources.

Therefore, a more realistic yet conservative value of 1E-03/year is proposed.

Plants typically have ~100 flood zones.

HEP for IF-C6/C8 CC II ~ 1E-03.

Therefore, if one were to quantitatively assess the screening allowed by CC II for supporting requirements 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 CC II) or CDF contribution <1E-08/year

Even taking into account that some flood zones may be more heavily weighted with sources (for example, more piping) than others, this simplified example illustrates that meeting CC II for these two supporting requirements will still ensure that any zones or sources screened out will have a negligible impact on plant risk.

From a broader perspective, one of the objectives of an internal flood PRA is to identify and quantify scenarios and sequences that contribute to CDF and LERF. In addition to supporting requirements IF-C-6 and IF-C-8, several internal flood supporting requirements 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, supporting requirements IFQU-A3, IFQU-A7, and QU-D6. Therefore, several supporting requirements 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 RISK-INFORMED IN-SERVICE INSPECTION METHODOLOGIES

Traditional Risk-Informed In-Service Inspection Methodology

The Electric Power Research Institute (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. Therefore, differences in segment definition or segment boundary definition will have no impact on the final results for applications using the EPRI risk-informed in-service inspection (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 Figure 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 (IE) (such as a loss of coolant accident).
- Indirect impacts: A failure results in a flood, spray, or pipe whip, spatially affecting neighboring structures, systems, and components; a failure can 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 or a closed isolation valve, or it could be automatically isolated by an isolation valve that closes on a given signal. If the break is not automatically isolated, it 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 described in EPRI report 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 IEs, flooding, or diversions of water sources. Typically, small breaks (minor leakage) would not render a train inoperable. They can, 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 probabilistic risk assessment (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.

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**

Figure B-1
EPRI Risk Matrix

The risk categories shown are combined into three risk regions for more robust and more efficient use. 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 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 to the higher whole number). Pressure and/or leakage testing requirements remain in effect regardless of the risk category (that is, risk Categories 1 through 7).

Streamlined Risk-Informed In-Service Inspection Methodology

This approach is a streamlined process for implementing and maintaining RI-ISI, based on lessons learned from several 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 (HSS) locations (for example,

reactor coolant system or 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 IE groups, whose pressure boundary failure contributions to core damage frequency (CDF) are greater than 1E-06 (or large, early-release frequency greater than 1E-07) based on 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 be equal to 10% of the HSS welds, plus augmented programs for flow accelerated corrosion, localized corrosion (for example, microbial corrosion), and intergranular stress corrosion cracking in BWRs. HSS welds are selected as follows:

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

C
DECEMBER 15, 2009 : RAI AND RESPONSES

ELECTRIC POWER RESEARCH INSTITUTE

December 15, 2009

Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Attention: Tanya Mensah

Subject: Transmittal of RAI Responses on Report; *Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs.* EPRI, Palo Alto, CA: 2008. 1018427

Reference: EPRI Project Number 669

Enclosed are responses to Request for Additional Information (RAIs) issued on EPRI Report "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-Informed Inservice Inspection Programs," 1018427. This report was 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 1018427 has been develop 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,

Tuan Nguyen
Acting Vice President, Nuclear

TN/bjr
Enclosure

c: Stephen Dinsmore (NRC)
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REQUEST FOR ADDITIONAL INFORMATION

NONDESTRUCTIVE EVALUATION: PROBABILISTIC RISK ASSESSMENT

TECHNICAL ADEQUACY GUIDELINES FOR RISK-INFORMED IN-SERVICE

INSPECTION PROGRAMS

The staff has reviewed the EPRI Report, "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidelines For Risk-Informed In-Service Inspection Programs," 1018427 (Topical), and finds that additional information is needed before we can complete the review. The Topical references the Probabilistic Risk Assessment (PRA) Standard (ASME RA-sb-2005) that was prepared by ASME in 2005 as endorsed by Regulatory Guide 1.200 Revision 1 in 2007, with respect to PRA technical adequacy.

1 The Topical fails to provide general guidelines which describe the overarching framework from which acceptable capability categories (CCs) for individual supporting requirement (SRs) for the internal events PRA can be determined. An example of a general guideline that is included is the Topical's explanation that SRs that solely address quantitative attributes are of limited importance. The risk ranking and change is risk estimates in EPRI's risk-informed inservice inspection (RI-ISI) methods use an order of magnitude approach which reduces the influence of PRA elements that might only change the quantitative results slightly. However, other general elements such as importance of logic modeling and human actions in the internal events PRA should be likewise generally characterized. For example, it would appear that the internal event PRA logic models need to be of relatively high quality (i.e., accurate and high resolution) because multiple consequential SSCs failures need to be evaluated using these logic models. Please identify general guidelines for the technical elements that compose an internal events Level 1/LERF PRA based on how EPRI's RI-ISI method relies on these elements.

Proposed Response:

Background

The Electric Power Research Institute (EPRI) alternative piping selection methodologies are 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). As previously determined by EPRI and NRC, when the risk-informed methods are used, changes to the number and the locations for inspection are accompanied with increases in plant safety or a negligible change in plant risk.

It is important to recognize that the RI-ISI programs are alternatives to deterministic ISI programs. That is, the deterministic ISI programs do not account for consequence of failure or failure potential in defining the number or location of inspection. Several examples are cited below:

Class 1 piping (exam Category B-J):

- 25 percent of the piping is required to be inspected
- No requirement to preferentially select piping whose failure would result in a LOCA (e.g. between the RPV and 1st isolation valve)
- No requirement to preferentially select piping whose failure would result in a LOCA outside containment (e.g. BWR feedwater piping penetrating containment)
- No requirement to preferentially select piping with higher susceptibility to degradation

Class 2 piping (exam Categories C-F-1 and C-F-2):

- 7.5 percent of the piping is required to be inspected
- No requirement to preferentially select piping whose failure would result in an initiating event (e.g. loss of feedwater)
- No requirement to assess the impact of spatial interactions

Class 3 and non Class piping:

- No inspection requirements

Additionally, augmented programs (e.g. FAC, MIC, IGSCC-BWR categories B-G) continue to be implemented.

Internal events plant-specific PRAs are used in 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), and identification of event sequences that provide the dominant contributors, are developed.
- PRA system and/or train unavailabilities are used to determine the equivalent train worth for each backup train.
- Conditional large early release probability (LERP), given pressure boundary failure, and identification of event sequences that provide the dominant contribution to LERF, are developed.
- Plant-specific failure data are used where potentially important to the methodology (e.g., for isolation valves).
- Internal flood results, when used, help define spatial effects associated with postulate piping failure.

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.

With respect to risk-informed applications, the PRA Standard provides a process for determining the capability of a PRA needed to support a particular risk-informed application. Key aspects, and comments related to RI ISI, of this process include the following:

- Role of the PRA in the application and extent of reliance of the decision on the PRA results

  In RI ISI, PRA results are used as summarized above. The categorization approach to determining potential risk significance reduces the influence of any bias in PRA results. This has been previously acknowledged in the SERs supporting the EPRI RI ISI methodology. This includes the consideration of uncertainties. As previously determined, the use of high, medium and low consequence categories adequately addresses uncertainties. Thus, in general, capability category 1 is sufficient. For the EPRI Streamlined approach, bounding generic criteria is used augmented with plant-specific criteria.

- Risk metrics to be used to support the application and associated decision criteria

  In RI ISI, CCDP and CLERP (and corresponding Delta CDF and Delta LERF) are used. These are established using categorization and screening approaches which again minimize the influence of any bias. Thus, in general, capability category 1 is sufficient.

- Significance of the risk contribution from the hazard group to the decision

  In RI ISI the internal events PRA is used. Please see response to RAIs for other hazards.

- 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

  In the RI ISI methodology, the categorization process minimizes the impact of bias. Conservative methods would increase the number of inspections. Thus, in general, capability category 1 is sufficient.

- Degree of accuracy and evaluation of uncertainties and sensitivities required of the PRA results

  The RI ISI methodology addresses uncertainties by developing and using categories (groups) with significant ranges (e.g. for CCDP) or uses bounding generic criteria. Thus the accuracy obtained from a capability category 1 PRA is in general sufficient and explicit consideration of uncertainties and sensitivities are not needed. Where additional accuracy is appropriate a higher capability category has been established and identified in EPRI Report 1018427.

- Degree of confidence in the results that are required to support the decision

  For RI ISI the potential impact on changes in risk attributable to implementation of RI ISI is extremely small as has been demonstrated on the numerous applications of the methodology. The acceptance criteria from RG 1.174 are addressed using a screening approach to provide this assurance and defense in depth and safety margin are explicitly addressed. Thus, in general, capability category 1 is sufficient. Additionally, important augmented inspections programs (e.g. FAC, IGSCC categories B through G) are not changed by the RI-ISI programs.

- Extent to which the decisions made in the application will impact the plant design basis

  RI ISI does not change the design basis.

General Guidelines

As noted in the RAI, an example of a general guideline that is included in the report is that SRs that solely address quantitative attributes are of limited importance because the risk ranking and change in risk estimates in EPRI's risk-informed in-service inspection (RI-ISI) methods use an order of magnitude approach which reduces the influence of PRA elements that might only change the quantitative results slightly. In the RAI, an example of other general elements is provided, such as the importance of logic modeling and human actions. The RAI notes "For example, it would appear that the internal event PRA logic models need to be of relatively high quality (i.e., accurate and high resolution) because multiple consequential SSCs failures need to be evaluated using these logic models."

As noted above in the background, in general a category 1 internal events PRA is sufficient. Overall, an internal events PRA meeting capability category 1 will provide high quality for areas such as logic modeling and HRA. Where a higher capability category PRA is appropriate the report provides a basis. The general guidelines are provided below.

General Guideline 1: SRs that solely address quantitative attributes are of limited importance because the risk ranking and change in risk estimates in EPRI's risk-informed in-service inspection (RI-ISI) methods use an order of magnitude approach which reduces the influence of PRA elements that might only change the quantitative results slightly.

General Guideline 2: Capability Category 1 is generally sufficient because, based on the PRA Standard:

- **Scope and Level of Detail:** For CC 1, the resolution and specificity are sufficient to establish the relative importance at the system and train level. The RI ISI approach further addresses relative importance by grouping as previously discussed.
- **Plant-specificity:** For CC 1, generic data and models are sufficient except where noted in the RI ISI methodology (e.g. failure rates of isolation valves, failure data for internal flooding analyses)
- **Realism:** For CC 1, where departures from realism could have a more than moderate impact the capability category has been increased or features of the methodology which compensate for the potential impact are addressed. Note that the RI ISI absolute ranking, grouping and / or bounding generic criteria further reduces the potential for influencing the conclusions. However, where appropriate, a higher capability category is identified.

General Guideline 3: Even if a PRA meets the requirements of the Standard at the specified capability categories, there will still be variability in the methods used by different licensees for dealing with certain issues, e.g., the assessment of human error probabilities. Some of this will not have a significant impact. However, there is a subset of issues that could have a direct and potentially significant impact on the RI ISI results. Of particular concern are those PRA features whose treatment may vary significantly from licensee to licensee. From the RI ISI perspective, the concern is with those issues that have the potential for inappropriate modeling that reduces the categorization from, e.g., high to low. Prior implementation of the RI ISI methodology to numerous plant sites and plant designs and the discussion provided above were considered in determining the capability category guidance of EPRI Report 1018427. This approach is consistent with prior evaluation of PRA adequacy such as for MSPI.

2 Due to the lack of general guidelines, many of the discussion on individual SR's appear to be simply conclusions with no justification. Based on the general guidelines developed for RAI 1, please revaluate target categories for the specific SR's in the internal events PRA and indentify which general guideline supports the selected category.

Proposed Response:

No changes to the guidance provided in EPRI Report 1018427 were identified that would substantially impact the results of the RI-ISI program.

3 The Topical only provides guidance in defining the applicable ASME PRA Standard supporting requirements (SRs) and the appropriate capability category (CC) for the Levels 1 and 2 analyses of internal events while at power. The EPRI report states that, "As future revisions to RG 1.200 occur, this work will be updated to support future RI-ISI application and maintenance."

a) It is acknowledged that ASME and ANS have issued a combined standard "ASME/ANS RA-Sa-2009" in February 2009 and endorsed in RG 1.200 Revision 2 in March 2009. EPRI should provide its position on this combined standard in support of the RI-ISI PRA technical adequacy including the following hazard groups:

- Internal Fires
- Seismic Events
- High Winds
- External Floods, and
- Other External Hazards

Proposed Response:

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 2 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.

The above discussion and conclusions will be incorporated into EPRI Report 1018427.

b) Discuss whether the guidance provided in the Topical would be treated differently for operating plants and plants licensed under Part 52.

Proposed Response:

The technical guidance provided in the Topical would not be treated differently for operating plants or plants licensed under Part 52. However, there is one difference between an operating plant and a plant licensed under Part 52. That is, the operating plant is currently built and operating while a Part 52 plant may be in varying stages of construction/operation. As such, some of the supporting requirements discussed in the topical can not met until the Part 52 plant is operational.

Development of a RI-ISI program for a Part 52 plant is still possible and desirable for the following reasons:

- Fundamental aspects of developing a PRA can be met at the design stage. As an example, success criteria are not expected to change when the Part 52 plant transitions from the construction phase to the operational phase.
- The two most important impacts identified during a RI-ISI consequence assessment are piping failures that cause an initiating event and piping failures that impact mitigative trains/systems.
    - Initiating events typically consists of LOCAs or transients. The importance of these events is a function of success criteria (as opposed to something like plant specific data) which is not expected to be impacted by the stage of construction. Additionally, determining the conditional core damage probability/conditional large early release probabilities (CCDP/CLERP) is straightforward for these events.
    - Based on experience with the operating fleet, other than success criteria, mitigative systems are typically impacted by indirect effects caused by the postulated piping failure, which are controlled by the level of spatial separation and redundancy. Each of the Part 52 plants is committing to meeting SRP Section 3.6.1 (Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment)

and 3.6.2 (Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping). Based upon the experience with the operating fleet, meeting the requirements of these two SRP sections provides a significant level of spatial separation.

- RI-ISI programs contain a living program component. As such, as the plant transitions to the operating phase and gains operating experience, the RI-ISI program will be updated to reflect the as-operated plant. The RI-ISI program contains means for adding or deleting inspections based upon current and future program updates (e.g. periodic and interval based updates).

Additionally, the PRA Technical Adequacy Guidelines provided in EPRI Report 1018427 are the same whether the application is to develop a pre-service inspection (PSI) plan or an inservice inspection plan (ISI). The following statement will be added to Section 1 and 3 of the report:

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.

4 Page V, second paragraph "Results and Findings," the second sentence states that "The technical adequacy of the PRA is determined by demonstrating that the PRA meets technical elements and associated supporting requirements (SRs) of NRC RG 1.200." It should be noted that RG 1.200 provides the NRC position on supporting requirements (including clarifications as needed), but does not provide supporting requirements as stated in the above statement. Clarify the above sentence.

Proposed Response:

The sentence will be revised as follows:

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.

5 Page V, last paragraph "EPRI Perspective" states that "The vast majority of U.S. plants that implement RI-ISI programs have used tools and products developed by the EPRI. This report reviews these tools and products against the ASME PRA Standard and the NRC RG 1.200." Define "tools and products" mentioned in this paragraph.

Proposed Response:

The sentence will be revised as follows:

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 EPRI. This report reviews these methodologies against the ASME PRA Standard and USNRC RG 1.200

6 Based on the review of previous RI-ISI submittals that are based, in part, on ASME Code Case N-716, the NRC staff believes that additional work may be needed beyond the CC recommended in the Topical in order too provide confidence that all high-safety-significant (HSS) segments will be identified and that an appropriate change in risk is estimated.

> The Topical proposes CC I/II as being sufficient for SR IF-D3a (IFEV-A3). Capability Category I/II permits grouping or subsuming flood initiated scenarios with existing plant initiating event (IE) groups. Capability category III does not permit subsuming flood IEs with other initiators. A RI-ISI analysis may be done long after the flooding analysis is completed and subsuming flood scenarios into existing plant IE groups would require an extra step in the RI-ISI analyses to retrieve any subsumed scenarios. This requirement is mentioned in the table in Appendix A in the Topical. Please propose changes to the N-716 methodology which clarifies this additional step or change the recommended CC to Category III.

Proposed Response:

Propose to revise 2.0(a)(5) of N716 as follows:

> "any piping segment, <u>including segments grouped or subsumed with existing plant initiating event (IE) groups</u>, whose contribution to core damage frequency is greater than 1E-06, or whose contribution to large early release frequency is greater than 1E-07, based upon a plant-specific probabilistic risk assessment (PRA) of pressure boundary failures (e.g., pipe whip, jet impingement, spray, and inventory losses). This may include exempt, Class 3, or Non-Class piping.

This change will be brought through the ASME consensus process as part of revision 1 to N716. Additionally, Appendix B to EPRI Report 1018427 will be revised to reflect this change.

> The Topical propose CC II as being sufficient for SR IF-C6 (IFSN-A14) and IF-C8 (IFSN-A16). Capability category II permits screening-out of flood areas and sources respectively based on, in part, the success of human actions to isolate and terminate the flood before equipment is damaged. Capability Category III does not permit screening out areas and sources based on reliance on operator actions. Qualitative screening of flood scenarios based on possible human intervention does not appear to be fully consistent with the CCDP/CLERP or significant determination. The Topical simply states that the qualitative screening provides confidence in the high reliability of the human actions. Please explain how the qualitative screening in CC II provides confidence that the quantitative guidelines will not be exceeded or change the recommended CC to Category III.

Proposed Response:

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.

The above discussion and conclusions will be added to EPRI Report 1018427.

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MAY 12, 2010 : RAI AND RESPONSES

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

NEIL WILMSHURST
Vice President and
Chief Nuclear Officer

May 12, 2010

Attention: Ms. Tanya Mensah
Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Subject: Transmittal of RAI Responses on Report; Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs. EPRI, Palo Alto, CA: 2008. 1018427 (Ref. EPRI Project Number 669)

Dear Tanya:

Enclosed are responses to the second set of Request for Additional Information (RAIs) issued on EPRI Report "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs." EPRI, Palo Alto, CA: 2008. 1018427. This report was 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 1018427 has been develop 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,

NMW/po/tw

Enclosure

c: R. Bradley (NEI)
J. Lindberg (EPRI)
P. O'Regan (EPRI)
A. Smith (Entergy)
S. Volk (Progress)

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RAI #1

In response to RAI 2, EPRI concluded that no changes were needed to the Table in Appendix A of the Topical that provides an assessment (i.e., a justification) for assigning acceptable capabilities categories for individual supporting requirements. In support of EPRI's proposal to accept Category I or Category Not-Met as sufficient for risk-informed inservice inspection (RI-ISI), EPRI's assessment states that the proposed capability category "provides resolution and specificity to identify the relative importance of the contributors at the system or train level, including associated human action." The two RI-ISI methods discussed in the topical report, one described in EPRI TR-112657, Revision B-A, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," (Traditional) and the other described in ASME Code Case N-716, "Alternative Piping Classification and Examination Requirements, Section XI Division 1," (Streamlined), are based on absolute risk results in which the quantitative results are directly compared to a guideline value. There is no relative measure involved. In contrast to the "relative importance" assessment, other assessments for other supporting requirements refer to the RI-ISI methods as "absolute risk ranking and grouping approach" as justification for accepting conservative results (e.g., AS-A9). The reference to system and train levels also appears misplaced because RI-ISI is based on segments.

The NRC staff believes that the assessment category "provides resolution and specificity to identify the relative importance" is inconsistent with the methodologies and therefore provides no justification for the proposed capability categories. Please provide further explanations on the applicability of the relative and train level discussions to RI-ISI. Reevaluate your table in Appendix A without this assessment.

EPRI Response:

After further consideration, it appears that the use of the phrase *"provides resolution and specificity to identify the relative importance of the contributors at the system or train level, including associated human actions"* causes unintended confusion. This phrase is taken directly from the ASME Standard RA-Sb-2005 (Table 1.3-1) and its intent is to confirm that from a Scope and Level of Detail perspective, Capability Category I is sufficient to identify important contributors from a plant risk perspective. That is, although the term "relative importance" is used in Table 1.3-1 its context is that of a system or train's relative contribution to plant risk rather than from a relative risk ranking perspective or its use in a relative risk ranking effort. For example, for the applicable supporting requirements (e.g. SY-B1, SY-B11), PRAs meeting Capability Category I are capable of determining a system or train's contribution to plant risk (i.e. CDF/LERF). Given this discussion, TR 1018427 will be updated by replacing the phrase "the relative importance of" with the phrase "the importance of".

With respect to the statement regarding systems/trains versus segment, it is true that the RI-ISI program is based upon segments. However, information provided at the system or train is usually sufficient to support the applicable portion of the RI-ISI analyses. For the Traditional method, the consequence assessment required by section 3.3 of TR-112657, Revision B-A "Revised Risk-Informed Inservice Inspection Evaluation Procedure" provides additional guidance and criteria needed to complete the RI-ISI analysis, including the definition of segment boundaries [Note: please also see response to RAI #3]. For the Streamlined method, while the user has the option to do more detailed analyses, limiting the requirements to system/train level would at worst add piping to the high safety significant scope and therefore add inspections.

RAI #2

The response to Question 3b states that "*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).*"

Describe in detail how the PRA is used to support PSI and explain how the design specific PRA and plant-specific PRA (during COL stage) are of sufficient quality to support the development of PSI plan.

[Note: the response below also addresses information requested by RAI #6]

EPRI Response:

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 RAI #2 – 1, 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, per TR-1018427, 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. ≥ 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.

RAI #3

EPRI has included proposed flooding supporting requirement capability categories (i.e., the IF supporting requirements) to support both the "Traditional" and the "Streamlined" methods. The Traditional and Streamlined methods are substantively different and it is unclear whether the screening approach as described in the ASME standard elements for flooding analysis (the IF elements) is acceptable when applied to the Traditional method. The Traditional method requires an estimated conditional core damage probability and conditional large early release probability of every segment within the scope of the proposed program, while the streamlined approach only relies on the flooding analysis to identify any high safety significant (HSS) segments beyond the generic set of HSS segments. The flooding analysis described in the ASME standard RA-Sb-2005 (particularly the screening and grouping steps) is applicable to the N-716 method but does not appear to be applicable to the Traditional method which evaluates every segment failure in the scope of the program (and excludes every segment failure outside of the scope). Please describe the flooding analysis that is done to support the Traditional method and use this description to explain how the ASME flooding analysis SRs represent a necessary and complete characterization of an acceptable analysis using the Traditional method. If this characterization is possible, then explain what capability categories are needed for the Traditional method.

Please clarify how EPRI envisions the Topical to be referenced in a Traditional RI-ISI relief request.

EPRI Response:

Guidance for conducting the assessment of pressure boundary failure for the Traditional method is contained in section 3.3 of EPRI Report TR-112657, Rev B-A "Revised Risk-Informed Inservice Inspection Evaluation Procedure." As noted in the PRA Standard, the requirements in the Standard need to be considered with respect to a specific risk-informed application, which in this case is RI ISI. The above EPRI report (TR-112657) provides the appropriate supplementary information needed to ensure that the risk-informed application is conducted in accordance with the PRA Standard for the traditional RI ISI method.

The Topical Report (TR 1018427) will be updated by deleting reference to IF supporting requirements for the Traditional method and by referencing the use of section 3.3 of EPRI Report TR-112657, Rev B-A "Revised Risk-Informed Inservice Inspection Evaluation Procedure", as appropriate.

RAI #4

Please confirm the flooding analysis described in RA-Sa-2009 is unchanged from that described in RA-Sb-2005.

EPRI Response:

The transition from RA-Sb-2005 to RA-Sa-2009 aimed to restructure RA-Sb-2005 to include fire, seismic events and other external hazards and to consider internal flooding as a distinct PRA rather than a part of the internal events PRA. For internal flooding, the changes involved separating the IF supporting requirements into technical elements and establishing documentation requirements for each technical element, adding a high level requirement (HLR) related to documentation for each technical element, changing the HLR and SR designators and numbering, deleting the word "key" as it applied to assumptions and sources of uncertainty and some editorial changes. The one language change (a verb change) was made in IFEV-A2 (formerly IF-D3) for Capability Category II, where the language "AVOID subsuming" was replaced with "DO NOT SUBSUME". This change does not affect the EPRI approach as our approach requires Capability Category I. In addition, the change is consistent with practices which implement the Standard.

RAI #5

It appears that the proposed capability categories required to support the Traditional versus the Streamlined RI-ISI methods differ for only one SR, IE-A4 in the Table in Attachment A in the Topical. In addition, the justification given for both the Traditional and the Streamlined capability category in supporting requirement IE-A4 is identical to the justification given for IE-A4a, however; IE-A4a concludes that the same capability category is required for the Traditional and the Streamlined analyses whereas IE-A4 concludes that different categories are required. Please clarify why there is a difference in capability categories between the traditional and streamlined approaches for these supporting requirements.

EPRI Response:

The proposed capability category for supporting requirement IE-A4 is different between the Traditional method and the Streamlined method. While it is certainly possible that capability category I (CCI) is sufficient for both approaches, it was felt prudent to increase the capability category for the Streamlined method. In the Traditional method, meeting CCI is sufficient as the consequence assessment conducted per section 3.3 of TR 112657, Revision B-A provides added assurance that all applicable initiating events are properly accounted for. 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 thereby providing added assurance that all applicable initiating events are properly accounted for when applying the Streamlined method.
The above rationale will be added to Appendix A of TR 1018427 for supporting requirement IE-A4.

As to supporting requirement IE-A4a, the Topical states that CCI is sufficient for both methods. In this case, CCII is not required for the Streamlined method (as was the case for IE-A4), because it was felt that the systematic approach conducted in IE-A4 coupled with the evaluation contained in the IF supporting requirements (e.g. IF-D) provides a robust assessment of possible initiating events.

RAI #6

By letter dated December 15, 2009, in EPRI's RAI 3b, the statement is made that the PRA Technical Adequacy Guidelines provided in EPRI TR 1018427 are the same whether the application is to develop a PSI plan or an inservice inspection (ISI) plan. EPRI proposed to modify Sections 1 and 3 of EPRI TR 1018427 to address this statement.

Please discuss why this statement is true, the statement appears to conflict with earlier statements in response RAI 3b. Earlier in the 3b response, the statement is made that some of the supporting requirements discussed in the topical cannot be met until the plant is operational. Pre-service inspection programs are performed before the plant is operating. Should EPRI TR 1018427 describe which supporting requirements are not required to be met for development of a pre-service inspection program? Also in response 3b, the living program component of a RI-ISI program is discussed. Could the living program component identify items that should have been part of the original PSI program that may not have been?

EPRI Response:

Please see response to RAI #2 above.

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TABLE: RAI #2-1

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	Procedures may not be available	Procedures may not be available	CCI/II/III

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
(IE-C11)	Can be met at Fuel Load	Can be met at Fuel Load	
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
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	Operating experience and procedures may not be available	Operating experience and procedures may not be available	CC I/II/III

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
(HR-A2)	Can be met at 1st Period	Can be met at 1st Period	
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
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

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
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
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	Plant-specific data may not be	Plant-specific data may not be	CC I/II

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
(DA-C9)	available Can be met at 1st Period	available Can be met at 1st Period	
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
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

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
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
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

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	TR1018427 Assessment	TR1018427 Requirement
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

E
OCTOBER 12, 2010 : RAI AND RESPONSES

ELECTRIC POWER RESEARCH INSTITUTE

NEIL WILMSHURST
Vice President and
Chief Nuclear Officer

October 12, 2010

Attention: Sheldon Stuchell
Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Subject: Additional Clarification with Respect to EPRI 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 Sheldon:

On July 8, 2010, EPRI submitted 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 1018427, which was previously submitted to NRC, and incorporated responses developed to Requests for Additional Information (RAIs) issued by the staff.

This report was 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.

During a conference call on September 15, 2010, NRC staff requested additional clarification. The attached provides this requested information.

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

Sincerely,

Enclosure

c: Art Smith (Entergy)
Sam Volk (Progress)
R. Bradley (NEI)
Patrick O'Regan (EPRI)
John Lindberg (EPRI)

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Issue: NRC has indicated that the basis provided in EPRI Report 1021467 for Capability Category I (CCI) assignments for certain supporting requirements (SRs) additional input is needed. These SRs are AS-A9, SC-B2, SY-B1 and SY-B11. Two issues have been identified:

1) Potential for the CCI requirements to be non-conservative (AS-A9, SC-B2),

2) Need for clarification or reconsideration of the CCI for potential flooding impacts (SY-B1, SY-B11).

The basis for the sufficiency of CCI for these SRs is provided in EPRI report 1021467 as follows:

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."

SC-B2, SY-B1, SY-B11

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).

Clarification: As discussed in EPRI report 1021467 "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"

The PRA Standard provides the following discussion for CCI:

> "**Scope and Level of Detail:** The degree to which the scope and level of detail of the plant design, operation, and maintenance are modeled.
>
> Resolution and specificity sufficient to identify the relative importance of the contributors at the system or train level.
>
> **Plant-specificity:** The degree to which plant-specific information is incorporated such that the as-built and as-operated plant is addressed.
>
> Use of generic data/models acceptable except for the need to account for the unique design and operational features of the plant.
>
> **Realism:** The degree to which realism is incorporated such that the expected response of the plant is addressed.
>
> Departures from realism will have moderate impact on the conclusions and risk insights as supported by good practices [Note (2)].
>
> [Note (2)] Differentiation from moderate, to small, to negligible is determined by the extent to which the impact on the conclusions and risk insights could affect a decision under consideration. This differentiation recognizes that the PRA would generally not be the sole input to a decision. A moderate impact

implies that the impact (of the departure from realism) is of sufficient size that it is likely that a decision could be affected; a small impact implies that it is unlikely that a decision could be affected, and a negligible impact implies that a decision would not be affected."

The key term in the above bases is "**moderate**". As noted above "substantial" differences would be needed in results and insights to potentially impact the EPRI RI ISI approaches. Thus, potentially non-conservative impacts of CCI (AS-A9, SC-B2), or clarifications for potential flooding impacts (SY-B1, SY-B11) are addressed next.

AS-A9: CCI allows for the use of generic thermal hydraulic analyses to determine accident progression parameters that could potentially affect the operability of mitigating systems, whereas CCII uses realistic, applicable analyses. The only potential issue with using CCI versus CCII or CCIII for this SR, in an EPRI RI-ISI application, is if its use would result in an un-conservative risk assignment (e.g. risk category 6 versus risk category 4 in the EPRI traditional approach and LSS versus HSS in the EPRI streamlined approach). That is, provided that the generic analyses are conservative or realistic for the plant-specific RI-ISI application, then conservative or RI-ISI results are assured. This SR is one of twenty-one AS SRs. In particular, AS-5 through AS-A10 address modeling details (i.e. what is to be included in the model) which taken together assure that un-conservative results are not produced. Further, the bases for using generic analyses would be included in the documentation, and as discussed in EPRI·TR-1021467, documentation issues that impact the results would need to be clearly identified and therefore there is no reason to conclude that the use of such analyses would substantially impact the results of RI ISI application in a negative manner. Finally, the RI ISI approaches themselves use a robust categorization process which would address potential non-conservatism in this single SR where the potential impact could be "moderate" such that a potentially substantial impact would be effectively mitigated.

SC-B2: CCI does not restrict the use of expert judgment whereas CCII/III provides language to constrain the use of expert judgment. This SR is one of fourteen SRs for the SC technical element. The bases for using expert judgment is required to be included in the documentation (i.e. SC-C2 must be met) and per EPRI TR-1021467 any impact on the results would also need to be identified. As discussed above for AS-A9, given that only un-conservative application of this SR is of potential importance, taken together with the other thirteen SRs for this technical element and that the RI ISI approaches use a robust categorization process which would address potential non-conservatism in this single SR where the potential impact could be "moderate" a potentially substantial impact would

be effectively mitigated.

SY-B1: The CCI requirement is to "model intrasystem common cause failures when supported by generic or plant-specific data (an acceptable model is the screening approach of NUREG/CR-5485 [Note (1)], which is consistent with DA-D5), or SHOW that they do not impact the results." This is the same wording as CCII/CCIII except that it is allowed to not model intrasystem common cause if it can be shown to not impact the results. In the EPRI traditional approach, an explicit consequence of failure assessment is required for each piping segment. That is, each piping segment is postulated to fail with a probability of 1.0 and the complete impact on the plant (i.e. direct and indirect effects) is determined. EPRI TR-112657, section 3, contains a detailed description of the consequence assessment process. For the EPRI streamlined approach, explicit requirements are identified in the IF technical element to assure a robust determination of the impact (failure of a component, system, multiple components and systems) of an individual piping segment failure. As such, there is no reason to believe that meeting CCI for this SR would impact the RI ISI application in a negative manner.

SY-B11: CCI allows development of a technical basis for not modeling initiation and control of a system, whereas CCII/III requires modeling. In the EPRI traditional approach, an explicit consequence of failure assessment is required for each piping segment. That is, each piping segment is postulated to fail with a probability of 1.0 and the complete impact on the plant (i.e. direct and indirect effects) is determined. EPRI TR-112657, section 3, contains a detailed description of the consequence assessment process. For the EPRI streamlined approach, explicit requirements are identified in the IF technical elements (e.g. IF-D) to assure a robust determination of the impact (failure of a component, system, multiple components and systems) of an individual piping segment failure. As such, there is no reason to believe that meeting CCI for this SR would impact the RI ISI application in a negative manner.

Based upon the above, assignment of Capability Category I for AS-A9, SC-B2, SY-B1 and SY-B11 remains appropriate.

F
JANUARY 19, 2011 : RAI AND RESPONSES

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NEIL WILMSHURST
Vice President and
Chief Nuclear Officer

January 19, 2011

Attention: Sheldon Stuchell
Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Dear Sheldon:

Subject: Transmittal of RAI Response on Report; *Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs. EPRI, Palo Alto, CA: 1021467*

Ref. EPRI Project Number 669

Enclosed are responses to a Request for Additional Information (RAIs) issued on EPRI Report "Nondestructive Evaluation: Probabilistic Risk Assessment Technical Adequacy Guidance for Risk-informed Inservice Inspection Programs." EPRI, Palo Alto, CA: 1021467. This report was 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 develop 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,

Neil W.

D035
NRR

Additional Clarification for Table 2-3 of EPRI Report 1021467

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
IE-A3 (IE-A3)	Plant-specific experience may not be available Can be met at 1st Period	Initially use generic experience and update as part of the RI-ISI living program requirement	See Note 1
IE-A3a (IE-A4)	CCI/II can be met partially as some components may be unique	Initially use generic analyses and update as part of the RI-ISI living program requirement	See Note 2
IE-C1b (IE-C3)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
IE-C9 (IE-C11)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
IE-C12 (IE-C14)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
AS-A5 (AS-5)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
AS-B5a (AS-B6)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
SC-A6	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
SY-A2 (SY-A2)	"As-built and as-operated information" and Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Notes 3 and 4
SY-A3 (SY-A3)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
SY-A4 (SY-A4)	Plant staff / operating data may not be available Can be mostly met at Fuel Load and completely met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 4
SY-A5 (SY-A5)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
SY-A7 (SY-A7)	Detailed design information may not be available Can be met at Fuel Load	Given Part 52 plants will meet SRP3.6.1 and 3.6.2, should not be an issue. Also, analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 4
SY-A18 (SY-A19)	Operating experience may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
SY-A18a (SY-A20)	Operating experience and Procedures may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
HR-A1 (HR-A1)	Operating experience and procedures may not be available Can be met at 1st Period	Initially use generic data / analysis can be done using assumptions about the "as anticipated" to be operated plant and update as part of the RI-ISI living program requirement	See Notes 1 and 3
HR-A2 (HR-A2)	Operating experience and procedures may not be available Can be met at 1st Period	Initially use generic data / analysis can be done using assumptions about the "as anticipated" to be operated plant and update as part of the RI-ISI living program requirement	See Notes 1 and 3
HR-A3 (HR-A3)	Operating experience and procedures may not be available Can be met at 1st Period	Initially use generic data / analysis can be done using assumptions about the "as anticipated" to be operated plant and update as part of the RI-ISI living program requirement	See Notes 1 and 3
HR-C3 (HR-C3)	Operating experience and procedures may not be available Can be met at 1st Period	Initially use generic data / analysis can be done using assumptions about the "as anticipated" to be operated plant and update as part of the RI-ISI living program requirement	See Notes 1 and 3
HR-D4 (HR-D4)	Procedures may not be available Note: SR is only relevant if applicable Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
HR-E1	Procedures may not be available	Analysis can be done using assumptions	See Note 3

3 of 10

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
(HR-E1)	Can be met at Fuel Load	about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	
HR-E2 (HR-E2)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
HR-E3 (HE-E3)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
HR-F2 (HR-F2)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
HR-G6 (HR-G6)	Procedures and operating experience may not be available Can be met at 1st Period	Initially use generic data / analysis can be done using assumptions about the "as anticipated" to be operated plant and update as part of the RI-ISI living program requirement	See Notes 1 and 3
HR-G7 (HR-G7)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
HR-H2 (HR-H2)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
DA-B2	Procedures may not be available	Analysis can be done using assumptions	See Note 3

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
(DA-B2)	Can be met at Fuel Load	about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	
DA-C2 (DA-C2)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
DA-C3 (DA-C3)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
DA-C4 (DA-C4)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
DA-C5 (DA-C5)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
DA-C6 (DA-C6)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
DA-C9 (DA-C9)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
DA-C10 (DA-C10)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
DA-C11 (DA-C11)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
DA-C12 (DA-C13)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
DA-C13	Plant-specific data may not be available	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
(DA-C14)	Can be met at 1st Period		
DA-C14 (DA-C15)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 1
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	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2, should not be an issue. Also, analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 4
IF-A4 (IFPP-A5)	Walkdowns may not be possible Can be met at Fuel Load	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2, should not be an issue. Also, analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 4
IF-B3a (IFSO-A6)	Walkdowns may not be possible Can be met at Fuel Load	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2, should not be an issue. Also, analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 4
IF-C6 (IFSN-A14)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
IF-C8 (IFSN-A16)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living	See Note 3

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
		program requirement	
IF-C9 (IFSN-A17)	Walkdowns may not be possible Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement t	See Note 4
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	Initially use generic data and update as part of the RI-ISI living program requirement	See Note 4
IF-E5a (IFQU-A6)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
IF-E8 (IFQU-A11)	Walkdown may not be possible Can be met at Fuel Load	Given Part52 plants will meet SRP3.6.1 and 3.6.1, should not be an issue. Also, analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 4
QU-D1b (QU-D2)	Procedures and operating experience may not be available Can be met at 1st Period	Initially use generic data / analysis can be done using assumptions about the "as anticipated" to be operated plant and update as part of the RI-ISI living program requirement	See Notes 1 and 3
LE-C6 (LE-C7)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3
LE-D5	Procedures may not be available	BWR – Not applicable and for PWRs:	See Note 3

7 of 10

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
(LE-D6)	BWR – Not applicable PWR – Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	
LE-E1 (LE-E1)	Procedures may not be available Can be met at Fuel Load	Analysis can be done using assumptions about the "as anticipated" to be operated plant and updated as part of the RI-ISI living program requirement	See Note 3

Notes:

1) Use of plant-specific versus generic experience/data typically has localized effects on the plant PRA results. As the PRA results are only one input into the development of the program, any impact caused by the initial use of generic experience/data is further minimized. Because of how the EPRI methodologies have been built (e.g. absolute ranking, large thresholds for binning consequence ranking with the EPRI traditional methodology and conservative identification of high safety significant (HSS) piping for the EPRI streamlined method (e.g. all Class 1, all large bore BER, small CDF/LERF criteria for paragraph 2(a)(5))) only large changes, in a large amount of data, would be expected to have an impact on the results and therefore any significant changes to the inspection program are not expected.

Further, the RI-ISI/PSI methodologies have a living program component (e.g. subparagraphs 7(a), (b) and (e) of Code Case N716, EPRI Streamlined methodology, and subparagraphs 7.1(a), (b) and (e) of Appendix R, EPRI traditional methodology, so that new information (e.g. plant-specific data) is incorporated into the program on a periodic basis. This new information may increase or decrease the inspection population throughout plant lifetime. From a practical perspective, the inspection themselves are allocated over a ten year interval. As such, if the impact of incorporating plant-specific experience/data into the program at the end of the first inspection period increased the inspection population from 99 inspections to 102 inspection, there would still be two inspection periods (~ 6 to 7 years) available to incorporate this impact into the program prior to closing out the inspection interval.

2) Generic analyses of similar plants, in particular experience with similar plant components, can be conducted throughout the PRA model development process, to assure that the model accounts for industry experience. That is, many of the components to be used in the New Build fleet are identical to, or similar to, components used in the operating fleet, including plants located outside the USA. However, for the New Build fleet there may be isolated components that are unique to that particular design or plant site. When these components are in use at other sites (e.g. other New Build sites) the comparison can be done to account for industry experience. In the isolated cases when

the component(s) is plant unique, plant-specific operating experience will serve as industry operating experience until additional units with the same type of component(s) reach the operational stage.

3) Using assumptions about the "as anticipated" to be operated plant versus plant-specific procedures/systems information would only have an impact, if the plant-specific procedures/systems information were radically different than that assumed in the PRA. And it should be noted that the availability of plant-specific procedures/systems information increases as the plant transitions from the DC stage through operation. That is, important procedures and training, and systems information, will be in place prior to fuel load. Other than normal plant practices of reflecting lessons learned, these procedures/systems information are not expected to change radically as the plant transitions to full operation.

As the PRA results are only one input into the development of the program, any impact caused by the initial use of generic procedures is further minimized. Because of how the EPRI methodologies have been built (e.g. absolute ranking, large thresholds for binning consequence ranking with the EPRI traditional methodology and conservative identification of high safety significant (HSS) piping for the EPRI streamlined method (e.g. all Class 1, all large bore BER, small CDF/LERF criteria for paragraph 2(a)(5))) only substantial changes to multiple procedures would be expected to have an impact on the results and therefore any significant changes to the inspection program are not expected. And as stated above, all important procedure are expected to be in place prior to fuel load.

Further, the RI-PIS/PSI methodologies have a living program component (e.g. subparagraphs 7(a), (b) and (e) of Code Case N716, EPRI Streamlined methodology, and subparagraphs 7.1(a), (b) and (e) of Appendix R, EPRI traditional methodology, so that new information (e.g. revised or new procedures) is incorporated into the program on a periodic basis. This new information may increase or decrease the inspection population throughout plant lifetime. From a practical perspective, the inspection themselves are allocated over a ten year interval. As such, if the impact of incorporating revised or new procedures into the program at the end of the first inspection period increased the inspection population from 99 inspections to 102 inspection, there would still be two inspection periods (~ 6 to 7 years) available to incorporate this impact into the program prior to closing out the inspection interval.

4) Using generic data and assumptions about the "as anticipated" to be operated plant versus having as-built / as operated data would only have an impact on the inspection program, if the as built / as operated plant was radically different than that assumed in the PRA. The ITAAC closure process assures the "as designed" plant properly transitions to the "as built / as operated " plant in a documented and orderly manner.

As the PRA results are only one input into the development of the program, any impact caused by changes in the as built / as operated plant versus the as designed plant is further minimized. Because of how the EPRI methodologies have been built (e.g. absolute ranking, large thresholds for binning consequence ranking with the EPRI traditional methodology and conservative identification of high safety significant (HSS) piping for the EPRI streamlined method (e.g. all Class 1, all large bore BER, small CDF/LERF criteria for paragraph 2(a)(5))) only substantial plant changes would be expected to have an impact on the results and therefore any significant changes to the inspection program are not expected. And as stated above, the ITAAC process provides for an orderly transition from the as designed plant to the as built / as operated plant.

Further, the RI-PIS/PSI methodologies have a living program component (e.g. subparagraphs 7(a), (b) and (e) of Code Case N716, EPRI Streamlined methodology, and subparagraphs 7.1(a), (b) and (e) of Appendix R, EPRI traditional methodology, so that new information (e.g. revised or new procedures) is incorporated into the program on a periodic basis. This new information may increase or decrease the inspection population throughout plant lifetime. From a practical perspective, the inspection themselves are allocated over a ten year interval. As such, if the impact of incorporating as built / as operated information into the program increased the inspection population from 99 inspections to 102 inspection, there would still be significant time available to incorporate this impact into the program prior to closing out the inspection interval.

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JUNE 2, 2011 : RAI AND RESPONSES

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

NEIL WILMSHURST
Vice President and
Chief Nuclear Officer

June 2, 2011

Attention: Sheldon Stuchell
Document Control Desk
U. S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD 20852

Subject: Additional Clarification with Respect to EPRI 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

On July 8, 2010 EPRI submitted 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 1018427, which was previously submitted to NRC, and incorporated responses developed to Requests for Additional Information (RAIs) issued by the staff.

This report was 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.

During a meeting with NRC staff on February 24, 2011, NRC staff requested additional clarification. The attached provides this requested information.

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

Sincerely,

NWM/po/tw

Enclosure

c: Art Smith (Entergy)
Sam Volk (Progress)
R. Bradley (NEI)
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RAI #1 NRC Slide # 2 – Reword footnote 1 of Table 2-1

Response The current wording will be replaced with the wording below:

1. For a supporting requirement to be considered met, all relevant peer review findings shall have been addressed and as necessary applicable changes made to PRA models and methods. As the capability category assignment for each supporting requirement relates to the technical aspects of the plant PRA, peer review findings and/or gaps related to documentation that do not impact the RI-PSI / RI-ISI results would allow the capability category to still be considered met. A documented basis for this conclusion should be prepared and available. This documented basis could, for example, include the use of supplemental analyses, comparison to similar plants and/or review of the impact of similar review findings on RI-PSI / RI-ISI results to confirm the RI-PSI / RI-ISI results would not be significantly impacted.

RAI #2 NRC Slide # 3 – Additional information is required with respect to Seismic Events (e.g. NUREG-1903 *"Seismic Considerations for the Transition Break Size,"* and previous NDE results)

Response In response to this RAI, a review of NUREG-1903 and NUREG-1839 has been conducted and this review indicates that the conclusions drawn in the EPRI Topical Report (i.e. 1021467) are consistent with these NUREGs and this supports the conclusion that the seismic considerations contained in Regulatory Guide 1.200 revision 2 will not impact the decision making process or criteria reached by implementing a RI-PSI / RI-ISI program.

The issue of seismic response of nuclear piping systems has been studied domestically and internationally over many years from various perspectives such as establishing design rules, developing and validating analytical models, assessing the behavior of flawed and unflawed piping, leak-versus-break behavior, and failure modes under various types of loadings. These studies, which included testing, analysis, evaluation of piping system performance in earthquakes (eastern, central, and western US as well as international experience) and probabilistic risk assessment (PRA), include the following examples:

- "Seismic Analysis of Piping," NUREG/CR-5361 [Jaquay, 1998]
- "International Piping Integrity Research Group (IPIRG) Program, Final Report"
- NUREG/CR-6233, Vol. 4 [Wilkowski et al., 1997]
- "Review of Seismic Response Data for Piping" [Slagis, 1995]
- "Methodology for Developing Seismic Fragilities" [Reed and Kennedy, 1994]
- "Individual Plant Examination of External Events (IPEEE) Seismic Insights" [EPRI, 2000]
- "Survey of Strong Motion Earthquake Effects on Thermal Power Plants in California with Emphasis on Piping Systems," Main Report, Vol. 1, NUREG/CR-6239 [Stevenson, 1995]
- "Fatigue Strength for Pipes with Allowable Flaws and Design Fatigue Curve," International Journal Of Pressure Vessels and Piping [Hasegawa, 2002]
- "Analysis of JNES Seismic Tests on Degraded Piping," NUREG/CR-7015, July 2010.
- "Test Programs for Degraded Core Shroud and PLR System Piping (Seismic Test Results and Discussion on JSME Rules Application)," K. Suzuki and H. Kawauchi, 2008 ASME PVP Conference, July 2008.
- "Load Bearing Capacity of a Degraded Piping System under Simulated Earthquake Loads and Operating Condition," H. Diem, et al, SMIRT10, 1989.

Insights from the above studies conclude that the past seismic design of piping systems is thought to be conservative with ample margins. The actual earthquake experience of non-nuclear power plant piping (eastern, central and western US and international experience), tests, and PRA studies also supports this position for both unflawed and flawed piping. Examples in the above studies include testing of flawed piping up to 6 – 8 times the SSE level earthquake with only limited leakage occurring (SMIRT10).

It is also noted that many of the above studies took no credit for ISI. Thus, application of RI-ISI would make the conclusions drawn by many of the above studies additionally conservative. And, finally, the RI-ISI methodologies contain guidance that requires that plant specific service experience (e.g. accepted or repaired flaws/indications) be considered in identifying which locations are selected for inspection (e.g. section 3.6.5 of TR-112657 and paragraph 4(f) of N716)).

In summary, based upon a review of the studies cited above (e.g. inputs, assumptions, analyses, referenced reports/studies, supporting programs) and the inclusion of plant-specific service experience (e.g. accepted or repaired flaws/indications) in the RI-ISI element selection process, the position put forth in EPRI Topical Report 1021467 relative to Regulatory Guide 1.200 revision 2, that quantification of other hazards groups (e.g. seismic events) will not change the conclusions derived from the RI-ISI process remains valid.

RAI #3 Supporting Requirement AS-A9 requires additional input

Response AS-A9 addresses the use of thermal hydraulic analyses in the development of accident sequence modeling of plant and operator response to initiating events. Capability Category I recognizes that generic analyses by vendors for a class of plants (e.g., BWR2) can be used where as Capability Category II requires the use of realistic, applicable analyses from similar plants. Note that even Capability Category II does not require "plant-specific" analyses (see Capability Category III) and the difference between Capability Category I and II is not significant because generic analyses of a class of plants would also be from similar plants. Capability Category I does not require "realistic" and sometimes analyses for a class of plant is conservative so as to bound the group of similar plants. As noted in Regulatory Guide 1.200, supporting requirement SC-B4 is also relevant to this SR. Supporting requirement SC-B4, which spans all three capability categories says:

> *USE analysis models and computer codes that have sufficient capability to model the conditions of interest in the determination of success criteria for CDF, and that provide results representative of the plant. A qualitative evaluation of relevant application codes, models, or analyses that has been used for a similar class of plant (e.g., Owner's Group generic studies) may be used. USE computer codes and models only within known limits of applicability.*

The use of potentially conservative analyses developed for a class of plants is generally not significant to the accident sequence development and would have an insignificant impact to RI-PSI / RI-ISI applications. Finally, applying conservatisms for this SR will at worst only add inspections to the RI-PSI / RI-ISI population.

RAI #4 Supporting Requirement SC-B2 requires additional input

Response SC-B2 addresses the use of expert judgment where Capability Category I has no restrictions regarding the use of expert judgment and Capability Category II limits its use to situations where there is a lack of available information. Capability Category I also requires that SC-C2 be met with regard to documentation and the need to provide a basis for when expert judgment is used, if it is used at all. It is therefore very difficult to conceive of a significant misuse of this supporting requirement at Capability Category I without peer reviewers labeling it as "not met." [Note: there are other SRs that require that appropriate success criteria be applicable to the plant (SC-B1), applicable to the event being analyzed (SC-B3), analysis provide results representative of the plant (SC-B4) and comparisons with other plants to check reasonableness, etc. (SC-B5).]

RAI #5 Supporting Requirement SY-B1 requires additional input

Response **Category I**, requires "*MODEL intrasystem common cause failures when supported by generic or plant-specific data*" or "*SHOW that they do not impact the results*". In this system SR, "no impact to the results" refers to the specific system unavailability results, and therefore, this conclusion would not change if the system's importance increases due to the flooding impacts on the other systems. In other words, if intra-system common cause is evaluated not to be an important contributor to the system unavailability (for example, it contributes less than 1% to the system unavailability), this conclusion is not likely to be affected by flooding events. Based on this, it can be concluded that "Any minor quantitative impact is not expected to affect risk-significance due to order of magnitude absolute ranking and grouping approach", and we propose that the conclusion in EPRI TR 1021467, for the EPRI traditional and streamline methodologies (i.e. CCI), stays unchanged.

RAI #6 Supporting Requirement SY-B11 requires additional input

Response **Category I**, requires "*IDENTIFY those systems that are required for initiation and actuation of a system. MODEL them unless a justification is provided (e.g., the initiation and actuation system can be argued to be highly reliable and is only used for that system, so that there are no intersystem dependencies arising from failure of the system)*." Similarly to SY-B1 above, if a justification is provided to exclude actuation of the system from the model, it will have to show that the actuation has no impact on the specific system unavailability results and therefore it will have no significant impact on the overall results. Based on this, it can be concluded that "Any minor quantitative impact is not expected to affect risk-significance due to order of magnitude absolute ranking and grouping approach", and we propose that the conclusion in EPRI TR 1021467, for the EPRI traditional and streamline methodologies (i.e.CCI), stays unchanged.

RAI #7 NRC Slide # 13 – Rewording of several entries in the Table provided in the January 19, 2011 submittal

Response The following Table is an update to the table provided in the January 19, 2011 submittal. This table will be incorporated as Table 2-4 into EPRI Report 1021467

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Proposed New Table 2-4 of EPRI Report 1021467

General statement: "Per § **50.71 Maintenance of records, making of reports,** the following requirements are used to update the plant-specific PRA:

"(h)(1) No later than the scheduled date for initial loading of fuel, each holder of a combined license under subpart C of 10 CFR part 52 shall develop a level 1 and a level 2 probabilistic risk assessment (PRA). The PRA must cover those initiating events and modes for which NRC-endorsed consensus standards on PRA exist one year prior to the scheduled date for initial loading of fuel.

(2) Each holder of a combined license shall maintain and upgrade the PRA required by paragraph (h)(1) of this section. The upgraded PRA must cover initiating events and modes of operation contained in NRC-endorsed consensus standards on PRA in effect one year prior to each required upgrade. The PRA must be upgraded every four years until the permanent cessation of operations under § 52.110(a) of this chapter."

In addition, the RI-ISI is a living program. Thus, given the above "upgrade" interval for the PRA, the RI ISI program for the second inspection period and beyond shall, as appropriate, meet the noted SRs. Inspections added or deleted as a result of any update will be incorporated consistent with the RI-ISI process.

Sec ID 2008 (2009)	**PRA Std / RG 1.200 Assessment**	**Action to be taken**	**Basis for why difference will not be significant for RI-PSI/ISI Applications**
IE-A3 (IE-A3)	Plant-specific experience may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
IE-A3a (IE-A4)	CCI/II can be met partially as some components may be unique	Initially use generic analyses and update "with generic analyses of similar plants" as it becomes available. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 2
IE-C1b (IE-C3)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
IE-C9 (IE-C11)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
IE-C12 (IE-C14)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
AS-A5 (AS-5)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
AS-B5a (AS-B6)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
SC-A6	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
SY-A2 (SY-A2)	"As-built and as-operated information" and Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Notes 3 and 4
SY-A3 (SY-A3)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3

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Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
SY-A4 (SY-A4)	Plant staff / operating experience may not be available Can be mostly met at Fuel Load and completely met at 1st Period	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 4
SY-A5 (SY-A5)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
SY-A7 (SY-A7)	Detailed design information may not be available Can be met at Fuel Load	Given Part 52 plants will meet SRP3.6.1 and 3.6.2 this SR should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 4
SY-A18 (SY-A19)	Operating experience may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
SY-A18a (SY-A20)	Operating experience and Procedures may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
HR-A1 (HR-A1)	Operating experience and procedures may not be available Can be met at 1st Period	Initially use generic data/analysis using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Notes 1 and 3

ELECTRIC POWER RESEARCH INSTITUTE

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
HR-A2 (HR-A2)	Operating experience and procedures may not be available Can be met at 1st Period	Initially use generic data/analysis using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Notes 1 and 3
HR-A3 (HR-A3)	Operating experience and procedures may not be available Can be met at 1st Period	Initially use generic data/analysis using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Notes 1 and 3
HR-C3 (HR-C3)	Operating experience and procedures may not be available Can be met at 1st Period	Initially use generic data/analysis using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Notes 1 and 3
HR-D4 (HR-D4)	Procedures may not be available Note: SR is only relevant if applicable Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
HR-E1 (HR-E1)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
HR-E2 (HR-E2)	Procedures may not be available Can be met at Fuel Load	Initially, analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3

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Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
HR-E3 (HE-E3)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
HR-F2 (HR-F2)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
HR-G6 (HR-G6)	Procedures and operating experience may not be available Can be met at 1st Period	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant and generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Notes 1 and 3
HR-G7 (HR-G7)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
HR-H2 (HR-H2)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
DA-B2 (DA-B2)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3

ELECTRIC POWER RESEARCH INSTITUTE

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
DA-C2 (DA-C2)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
DA-C3 (DA-C3)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
DA-C4 (DA-C4)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
DA-C5 (DA-C5)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
DA-C6 (DA-C6)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
DA-C9 (DA-C9)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
DA-C10 (DA-C10)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
DA-C11 (DA-C11)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
DA-C13 (DA-C14)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
DA-C14 (DA-C15)	Plant-specific data may not be available Can be met at 1st Period	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 1
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	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2 this SR should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant and generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 4
IF-A4 (IFPP-A5)	Walkdowns may not be possible Can be met at Fuel Load	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2 this SR should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 4
IF-B3a (IFSO-A6)	Walkdowns may not be possible Can be met at Fuel Load	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2 this SR should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 4
IF-C6 (IFSN-A14)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3

ELECTRIC POWER RESEARCH INSTITUTE

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
IF-C9 (IFSN-A17)	Walkdowns may not be possible Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 4
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	Initially use generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 4
IF-E5a (IFQU-A6)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
IF-E8 (IFQU-A11)	Walkdown may not be possible Can be met at Fuel Load	Given Part 52 plants will meet SRP 3.6.1 and 3.6.2 this SR should not be an issue. Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 4
QU-D1b (QU-D2)	Procedures and operating experience may not be available Can be met at 1st Period	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant and generic experience. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Notes 1 and 3
LE-C6 (LE-C7)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3

Sec ID 2008 (2009)	PRA Std / RG 1.200 Assessment	Action to be taken	Basis for why difference will not be significant for RI-PSI/ISI Applications
LE-D5 (LE-D6)	Procedures may not be available BWR – Not applicable PWR – Can be met at Fuel Load	BWR – Not applicable and for PWRs: Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3
LE-E1 (LE-E1)	Procedures may not be available Can be met at Fuel Load	Initially analysis can be done using assumptions about the "as anticipated" to be operated plant. This shall be incorporated into the PRA model consistent with the requirements contained in 10CFR50.71h and consistent with the RI-ISI living program requirement.	See Note 3

Notes:

1) Use of plant-specific versus generic experience/data typically has localized effects on the plant PRA results. As the PRA results are only one input into the development of the program, any impact caused by the initial use of generic experience/data is further minimized. Because of how the EPRI methodologies have been built (e.g. absolute ranking, large thresholds for binning consequence ranking with the EPRI traditional methodology and conservative identification of high safety significant (HSS) piping for the EPRI streamlined method (e.g. all Class 1, all large bore BER, small CDF/LERF criteria for paragraph 2(a)(5))) only large changes, in a large amount of data, would be expected to have an impact on the results and therefore any significant changes to the inspection program are not expected.

Further, the RI-ISI/PSI methodologies have a living program component (e.g. subparagraphs 7(a), (b) and (e) of Code Case N716, EPRI Streamlined methodology, and subparagraphs 7.1(a), (b) and (e) of Appendix R, EPRI traditional methodology), so that new information (e.g. plant-specific data) is incorporated into the program on a periodic basis. This new information may increase or decrease the inspection population throughout plant lifetime. From a practical perspective, the inspections themselves are allocated over a ten year interval. As an example, if the impact of incorporating plant-specific experience/data into the program at the end of the first inspection period increased the inspection population from 99 inspections to 102 inspection, there would still be two inspection periods (~ 6 to 7 years) available to incorporate this impact into the program prior to closing out the inspection interval.

2) Generic analyses of similar plants, in particular experience with similar plant components, can be conducted throughout the PRA model development process, to assure that the model accounts for industry experience. That is, many of the components to be used in the New Build fleet are identical to, or similar to, components used in the operating fleet, including plants located outside the USA. However, for the New Build fleet there may be isolated components that are unique to that particular design or plant site. When these components are in use at other sites (e.g. other New Build sites) the comparison can be done to account for industry experience. In the isolated cases when the component(s) is plant unique, plant-specific operating experience will serve as industry operating experience until additional units with the same type of component(s) reach the operational stage.

3) Using assumptions about the "as anticipated" to be operated plant versus plant-specific procedures/systems information would only have an impact if the plant-specific procedures/systems information were radically different than that assumed in the PRA. And it should be noted that the availability of plant-specific procedures/systems information increases as the plant transitions from the DC stage through operation. That is, important procedures and training, and systems information, will be in place prior to fuel load. Other than normal plant practices of reflecting lessons learned, these procedures/systems information are not expected to change radically as the plant transitions to full operation.

As the PRA results are only one input into the development of the program, any impact caused by the initial use of generic procedures is further minimized. Because of how the EPRI methodologies have been built (e.g. absolute ranking, large thresholds for binning consequence ranking with the EPRI traditional methodology and conservative identification of high safety significant (HSS) piping for the EPRI streamlined method (e.g. all Class 1, all large bore BER, small CDF/LERF criteria for paragraph 2(a)(5))) only substantial changes to multiple procedures would be expected to have an impact on the results and therefore any significant changes to the inspection program are not expected. And, as stated above, all important procedures are expected to be in place prior to fuel load.

Further, the RI-PIS/PSI methodologies have a living program component (e.g. subparagraphs 7(a), (b) and (e) of Code Case N716, EPRI Streamlined methodology, and subparagraphs 7.1(a), (b) and (e) of Appendix R, EPRI traditional methodology), so that new information (e.g. revised or new procedures) is incorporated into the program on a periodic basis. This new information may increase or decrease the inspection population throughout plant lifetime. From a practical perspective, the inspections themselves are allocated over a ten year interval. As an example, if the impact of incorporating revised or new procedures into the program at the end of the first inspection period increased the inspection population from 99 inspections to 102 inspection, there would still be two inspection periods (~ 6 to 7 years) available to incorporate this impact into the program prior to closing out the inspection interval.

4) Using generic data and assumptions about the "as anticipated" to be operated plant versus having as-built / as operated data would only have an impact on the inspection program, if the as built / as operated plant was radically different than that assumed in the PRA. The ITAAC closure process assures the "as designed" plant properly transitions to the "as built / as operated" plant in a documented and orderly manner.

As the PRA results are only one input into the development of the program, any impact caused by changes in the as built / as operated plant versus the as designed plant is further minimized. Because of how the EPRI methodologies have been built (e.g. absolute ranking, large thresholds for binning consequence ranking with the EPRI traditional methodology and conservative identification of high safety significant (HSS) piping for the EPRI streamlined method (e.g. all Class 1, all large bore BER, small CDF/LERF criteria for paragraph 2(a)(5))) only substantial plant changes would be expected to have an impact on the results and therefore any significant changes to the inspection program are not expected. And as stated above, the ITAAC process provides for an orderly transition from the as designed plant to the as built / as operated plant.

Further, the RI-PIS/PSI methodologies have a living program component (e.g. subparagraphs 7(a), (b) and (e) of Code Case N716, EPRI Streamlined methodology, and subparagraphs 7.1(a), (b) and (e) of Appendix R, EPRI traditional methodology), so that new information (e.g. revised or new procedures) is incorporated into the program on a periodic basis. This new information may increase or decrease the inspection population throughout plant lifetime. From a practical perspective, the inspections themselves are allocated over a ten year interval. As an example, if the impact of incorporating as built / as operated information into the program increased the inspection population from 99 inspections to 102 inspection, there would still be significant time available to incorporate this impact into the program prior to closing out the inspection interval.

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