



UNITED STATES NUCLEAR REGULATORY COMMISSION
STANDARD REVIEW PLAN
OFFICE OF NUCLEAR REACTOR REGULATION

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Standard Review Plan
For The Review Of
Risk-Informed Inservice Testing Applications

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FOREWORD

The NRC's Policy Statement on the use of probabilistic risk analysis (PRA) in nuclear regulatory activities encourages greater use of this analysis technique to improve safety decision making, reduce unnecessary burden and improve regulatory efficiency. A number of NRC staff and industry activities are in progress to consider approaches for expanding the scope of PRA applications in regulatory activities.

Several activities are ongoing which consider appropriate uses of PRA in support of the modification of individual plant's current licensing basis (CLB) and a number of pilot applications with proposed CLB changes are now under staff review.

This Standard Review Plan (SRP) chapter describes review procedures and acceptance guidelines for NRC staff reviews of proposed plant-specific, risk-informed changes to a licensee's inservice testing (IST) program. The review procedures contained in this SRP are consistent with the acceptable methods for implementing a risk-informed IST (RI-IST) program described in DG-1062 (reference 2). Licensees may propose RI-IST programs consistent with the guidance provided in DG-1062, propose an alternative approach for implementing a RI-IST program (which must be demonstrated to be consistent with the fundamental principles identified in Section II.A.9), or maintain their IST programs in accordance with the ASME Code as referenced in 10 CFR 50.55a.

It is the NRC staff's intention to initiate rulemaking as necessary to permit licensees to implement RI-IST programs, consistent with this SRP chapter, without having to get NRC approval of an alternative to the ASME Code requirements pursuant to 10 CFR 50.55a(a)(3). Until the completion of such rulemaking, the staff anticipates reviewing and approving each licensee's RI-IST program as an alternative to the current Code required IST program (e.g., including alternative test frequency, test methods, and program scope requirements). As such, the licensee's RI-IST program will be enforceable under 10 CFR 50.55a.

The current ASME Code inservice testing requirements, as endorsed in 10 CFR 50.55a, have been determined to provide reasonable assurance that public health and safety will be maintained. The individual ASME Code committees

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concerned with inservice testing of pumps and valves continually review these testing strategies to develop improvements to the existing Code requirements. Changes to the ASME Code, either as new Code editions or Code Cases, are subject to review and approval by the NRC to ensure that the new testing requirements maintain an adequate level public health and safety. A risk-informed inservice testing program, if properly constructed, will also provide an acceptable level of quality and safety by evaluating and possibly improving the test effectiveness for the high safety significant components (as identified by the licensee's PRA and integrated decision making process) in conjunction with the relaxation of testing requirements (e.g., test frequency) for the low safety significant components.

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3.9.7 RISK-INFORMED INSERVICE TESTING

REVIEW RESPONSIBILITIES

Primary - Mechanical Engineering Branch (EMEB)

Secondary - Probabilistic Safety Assessment Branch (SPSB)

I. DEFINE THE PROPOSED CHANGES TO THE IST PROGRAM

The licensee's risk-informed inservice testing (RI-IST) submittal should have defined the proposed changes to the IST program in general terms. The licensee should have confirmed that the plant is designed and operated in accordance with the current licensing basis (CLB)¹ and that the PRA used in support of their RI-IST program submittal reflects the actual plant. The licensee should have identified the particular components that would be affected by the proposed changes in IST strategy. This should include all of the components currently in the licensee's IST program as well as any other

¹ This regulatory guide adopts the 10 CFR Part 54 definition of current licensing basis. That is, "Current Licensing Basis (CLB) is the set of NRC requirements applicable to a specific plant and a licensee's written commitments for ensuring compliance with and operation with in applicable NRC requirements and the plant-specific design basis (including all modifications and additions to such commitments over the life of the license) that are docketed and in effect. The CLB includes the NRC regulations contained in 10 CFR Parts 2, 19, 20, 21, 26, 30, 40, 51, 54, 55, 70, 72, 73, 100 and appendices thereto; orders; license conditions; exemptions; and technical specifications. It also includes the plant-specific design-basis information defined in 10 CFR 50.2 as documented in the most recent final safety analysis report (FSAR) as required by 10 CFR 50.71 and the licensee's commitments remaining in effect that were made in docketed licensing correspondence such as licensee responses to NRC bulletins, generic letters, and enforcement actions, as well as licensee commitments documented in NRC safety evaluations or licensee event reports."

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components that the licensee's integrated decision making process categorized as being highly safety significant. The method used by the licensee to categorize components should be described. There should also be a detailed description of how the proposed RI-IST program affects the CLB of the plant and why these proposed changes are acceptable. If exemptions from specific regulations, technical specification amendments, or relief requests are required to implement the licensee's proposed RI-IST program, the appropriate requests should accompany the licensee's submittal. Specific revisions to testing schedules and methods should be described as well as implementation plans and schedules.

The licensee should also have described the proposed IST program change in terms of how it meets the objectives of the Commission's PRA Policy Statement, including enhanced decision making, more efficient use of resources, and reduction of unnecessary burden. The description may consider benefits from the CLB change such as reduced fiscal and personnel resources and radiation exposure, as well as improvements in reactor safety.

The reviewer should familiarize himself or herself with the licensee's entire submittal before initiating the detailed review described in the following sections. In short, the reviewer should first develop an understanding of the proposed change in terms of:

- the particular components that would be affected by the proposed changes in IST strategy,
- the plant systems involved with the proposed changes in IST strategy,
- the change in testing strategy (i.e., test frequency and methods) proposed for each component or group of components,
- its affect on the current licensing basis, and
- its overall effect on plant risk.

Section 6 of reference 2 contains a more detailed description of the documentation that should have been submitted by the licensee in conjunction with its proposed RI-IST program.

II. AREA OF REVIEW

A. ENGINEERING EVALUATION

1. Evaluation of Proposed Changes to the Current Licensing Basis

After the licensee determined which components are candidates for having their inservice test requirements relaxed and which components should be subjected

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to more focused inservice tests, the licensee should have conducted an engineering evaluation of proposed changes to the IST program. The purpose of this engineering evaluation is to determine the acceptability of the proposed IST program changes in light of the current licensing basis of the plant and risk impact of the changes. In particular, the status of license commitments that would be changed as a result of the proposed RI-IST program should have been clarified explicitly and formally. Either commitments were not affected by the proposed changes, or the alterations in commitment status were identified, described, and revised commitments were made.

2. IST Program Scope

In developing RI-IST programs, licensees will likely identify structures, systems, and components (SSCs) with high risk significance which are not currently subject to traditional Code requirements or subject to a level of regulation which is commensurate with their risk significance. It is expected that licensees will propose RI-IST programs that will subject these SSCs to the appropriate level of regulation, consistent with the risk significance of the SSC. Specifically, licensee's RI-IST program scope should include, in addition to components in the current Code prescribed IST program (e.g., components required to perform a specific function in shutting down a reactor to a cold shutdown condition, in maintaining the cold shutdown condition, or in mitigating the consequences of an accident), those ASME Code Class 1, 2, & 3 and non-Code components that the licensee's integrated decision-making process categorized as highly safety significant and determined to be appropriate candidates for IST.

The staff's basis for reaching its conclusion that the licensee's proposed RI-IST program "provides an acceptable level of quality and safety" will be predicated, in part, on the licensee's use of PRA to identify the appropriate scope of components that should be included in a RI-IST program as well as to evaluate test requirements (i.e., test methods and frequency) to ensure the validity of PRA assumptions. In other words, if the PRA is to be used as the basis for categorizing components and for evaluating the acceptability of the overall change in plant risk associated with the proposed RI-IST program (e.g., Δ CDF, Δ LERF) then the PRA assumptions relative to component reliability and availability must be preserved. Consequently, for IST components within the scope of the licensee's proposed RI-IST program, we would expect the licensee to examine the test strategies currently in place and, where appropriate, modify the test strategy (See Section III.A.3).

To preserve the PRA assumptions which form the basis for the acceptability of the IST program changes, certain non-Code components may need to be included in the RI-IST program. The justification for inclusion of non-code components into the IST program can be derived from the role these components play in justifying the acceptability of changes to the IST program for components currently within the code. PRA systematically takes credits for non-code structures, systems, and components (SSCs) as: 1) providing support to, or 2) alternatives to, and 3) back-ups for SSCs within the current code. Thus, the

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relaxation of requirements for safety-related SSCs depends upon the proper operation and reliability attributed to high-safety-significant yet non-code SSCs.

3. IST Program Changes

The licensee's submittal should describe the considerations (e.g., component performance, service condition, risk significance) that went into establishing the proposed RI-IST frequencies and methods.

4. Relief Requests and Technical Specification Amendments

While implementation of the licensee's overall RI-IST program may be authorized by a change to the regulations or via NRC authorizing an alternative pursuant to 10 CFR 50.55(a)(3), specific details of the licensee's RI-IST program may require exemptions from other regulations, technical specification changes, or require relief from provisions of NRC approved Codes or Code cases. The licensee should have included in their RI-IST program submittal the necessary exemption requests, technical specification amendment requests, relief requests, and relief requests necessary to implement their RI-IST program (See Section III.A.4).

5. Quality of the PRA for IST Application

Since the quantitative results of the PRA are to play a major and direct role in decision-making, there is a need to ensure that they are derived from "quality" analyses. Review guidance in quality issues for the licensee's baseline PRA is provided in the general regulatory guide for risk informed decision making (Reg Guide DG-1061) and in the general SRP for risk informed regulation (Chapter 19 of the SRP). The required scope and level of detail of the PRA are also discussed in the general Reg Guide and SRP. The review of IST-specific issues, i.e., those pertaining to areas most directly related to IST, are discussed in this IST SRP.

6. Modeling of the Effects of IST on PRA Basic Events

One of the requirements for the acceptability of a risk informed IST program is a quantitative demonstration by use of a PRA of sufficient quality that changes to plant risk caused by the proposed extension in testing intervals or changes in test methods for selected components are small or are reductions and should not cause the NRC Safety Goals to be exceeded (See reference 1). In order to establish this demonstration, it is necessary that the PRA include models which appropriately account for the change in reliability of the components as a function of testing interval. For many purposes, it is also desirable to model the effects of enhanced testing methods. Components not modeled in the PRA should be evaluated and categorized with appropriate basis.

7. Categorization of Components

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The identification of components as potential candidates for changes in IST intervals or test methods can be done in many ways. Component categorization using PRA importance measures to classify structures, systems, and components (SSCs) into high and low risk contributors is one of the acceptable methods. The results from this importance analysis can then be one of the inputs to the licensee's integrated decision-making process (e.g., expert panel) to help determine the safety significance of the IST components.

In addition to the determination of risk importance contribution for input to the licensee's integrated decision-making process, the determination of potential risk contribution from SSCs by PRA importance determination can be useful for the following reasons:

- When performed with a series of sensitivity evaluations, it can identify potential risk outliers by identifying components which could dominate risk for various plant configurations and operational modes, PRA model assumptions, and data and model uncertainties.
- Importance categorization can provide a useful means to identify improvements to current IST practices during the risk-informed application process by identifying components that are high risk contributors which may benefit from more frequent tests or enhanced testing methods.

8. Other Technical Issues

a. Initiating Events

While completely new initiating events are not expected from proposed changes to IST programs, it is necessary to review whether initiating events previously screened out in the PRA, on grounds of low frequency, might now be above the screening threshold as a result of an IST program change. Examples would be events that are (a) relatively infrequent to begin with, (b) mitigated satisfactorily by closure of an isolation valve, and (c) not analyzed because of a combination of low frequency of event "AND-ed" with a low probability of valve failure. If such events increased in frequency as a result of an IST program change, then the scope of consideration would need to change to reflect this.

b. Dependencies and Common Cause Failures (CCFs)

Common cause failures (component hardware failure dependencies) cover the failure of usually identical components that are usually caused by design, manufacturing, installation, calibration, maintenance, or operational deficiencies. Because they can fail more than one component at the same time, CCFs can dominate plant risk.

A change in IST has the potential of affecting the CCF probabilities since similar test methods and frequencies are being proposed for pumps or valves as

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a group. For these components, CCF probabilities could be low or might not even be included in the baseline PRA models based on the historical and engineering evidence driven by current requirements. With proposed changes in IST frequencies and methods, there should be assurance that the CCF contribution will not become so significant that it could affect satisfying the acceptance criteria (See reference 1).

c. Uncertainty and Sensitivity Analyses

This issue consists of two parts. The first part deals with uncertainties in the baseline PRA that is used as the basis for the IST risk evaluation. A discussion for the need and criteria for an evaluation of uncertainties in the base PRA is provided in the general Reg Guide and SRP.

The second part of this issue is the matter of uncertainties in the estimates of the change in risk resulting from implementation of the risk informed IST program. If the licensee provides a best estimate indication of the change in risk, then an estimate of uncertainties is necessary in order to make a rational decision on the acceptability of the change. On the other hand, if the licensee provides an upper bound estimate of the change in risk based on a demonstrably conservative analysis, then an uncertainty analysis is not required.

d. Human Reliability Analysis

The results of a PRA, and therefore the decisions that are influenced by it, can be influenced by modeling of human reliability. Plant safety depends significantly on human performance, so it is essential that PRAs treat it carefully. However, the modeling of human performance is a relatively difficult area; significant variations in approach continue to be encountered, and these can significantly influence the results. In addition to the variability issue, there are, in the IST area, questions related to what kind of human actions can appropriately be credited in the context of a particular regulatory finding. As an example, suppose that PRA results appear to support relaxation of a test interval based on the argument that even if the component fails, its failure can be recovered with high probability by operator actions outside the control room. The issues of concern here are whether the modeling of the operator action and the evaluation of the failure probability is appropriate, and whether this kind of credit is an appropriate measure to support justification of a relaxation. Consistent with maintenance of defense in depth, operator action should not be the sole basis for determining that a testing interval can be extended.

e. Use of Plant-Specific Data

In selecting appropriate failure rate data to use in the risk informed IST program, the analyst is frequently faced with the question of whether to use plant specific or generic data, or some combination of the two. For newer plants with little operating history, the only choice is use of generic data,

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in which case the only decision is which generic data base to use. For those cases where significant plant specific data are available, usually it is most appropriate to combine plant specific and generic data with a method that gives appropriate weight to each. Since several generic data bases are available, and they do not always agree, a further issue is which of these is most appropriate. Sections III.A.8.e and IV.A.8.e provides guidance.

Finally, in considering plant-specific failure data, it is important to be able to recognize poorly-performing individual components, rather than allowing poor performance of a single component to be averaged over all components of that type. Poor performance may arise because of inherent characteristics of one member of would otherwise be considered a uniform population. This would result in a higher than expected failure rate for the population and lead to less relaxation than might be anticipated. Of more concern is poor performance of components that arise because they are operating in a more demanding environment for example. If, for reasons of expediency, these components are grouped together with others for which the operating conditions are more favorable, then their failure rates could become artificially lowered, and, if requirements are relaxed based on the group failure rate, this could lead to a significant probability of experiencing an inservice failure of the poor performers.

9. Evaluating the Overall Effect of Proposed Changes on Plant Risk

The acceptance of risk-informed IST changes should depend on how the proposed changes affects the CLB in light of the following key principles:

- a. The proposed change meets the current regulations. [This principle applies unless the proposed change is explicitly related to a requested exemption or rule change.]
- b. The defense in depth philosophy is maintained.
- c. Sufficient safety margins are maintained.
- d. Proposed increases in risk, and their cumulative effect, are small and do not cause the NRC Safety Goals to be exceeded.
- e. Performance-based implementation and monitoring strategies are proposed that address uncertainties in analysis models and data and provide for timely feedback and corrective action.

10. Integrated Decision Making

The reviewer should evaluate the acceptability of the licensee's proposed RI-IST program using the proposed procedures outlined in Section IV of this SRP and the proposed acceptance guidelines specified Section III of this SRP. Each of the key principles specified in Section II.A.9 above should have been addressed in the licensee's submittal. In implementing these principles, the

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reviewer should ensure that:

- All safety impacts of the proposed changes were evaluated on a component-specific basis as well as in an integrated manner as part of an overall risk management approach in which the licensee uses risk analysis to improve operational and engineering decisions broadly and not just to eliminate requirements that the licensee sees as undesirable. The approach used to identify changes in requirements should be used to identify areas where requirements should be increased as well as where they could be reduced.
- The acceptability of proposed changes should be evaluated by the licensee in an integrated fashion that ensures that all principles are met.²
- Core damage frequency (CDF) and large early release frequency (LERF) can be used as suitable metrics for making risk-informed regulatory decisions.
- Increases in estimated CDF and LERF resulting from proposed CLB changes will be limited to small increments.
- The scope and quality of the engineering analyses (including traditional and probabilistic analyses) conducted to justify the proposed CLB change should be appropriate for the nature and scope of the changes proposed and should be based on the as-built and as-operated and maintained plant.
- Appropriate consideration of uncertainty is given in analyses and interpretation of findings.
- The plant-specific PRA supporting decisions has been subjected to quality controls such as an independent peer review.
- Data, methods, and assessment criteria used to support the proposed IST program changes (e.g., those used by the licensee's expert panel) must be available for public review.

Acceptability of the proposed change should be determined using an integrated decision making process that addresses three major areas: (1) an evaluation of the proposed change in light of the plant's current licensing basis, (2) an evaluation of the proposed change relative to the key principles and the

² One important element of integrated decision making can be the use of an "expert panel." Such a panel is not a necessary component of risk-informed decision making; but when it is used, the key principles and associated decision criteria presented in this regulatory guide still apply and must be shown to have been met or to be irrelevant to the issue at hand.

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acceptance criteria, and (3) the proposed plans for implementation, performance monitoring, and corrective action.

B. IMPLEMENTATION, PERFORMANCE MONITORING, AND CORRECTIVE ACTION

1. Program Implementation

The licensee should have an implementation plan and schedule for testing all high and low safety significant components identified in their program. Prior to the staff's approval of a RI-IST program, the NRC should review licensee's implementation plan and schedule. This plan should include test strategies (i.e., frequencies and methods) for high and low safety significant components that are within the scope of the licensee's RI-IST program, including components identified as high safety significant components that are not currently in the IST program. The composition of the component groupings (i.e., components of the same type, size, manufacturer, model, and that experience the same service conditions) should be identified. Components whose test interval is to be extended via staggering should be identified along with their staggered frequency over the test interval. Components should also be identified that are to have their test frequency extended using some other step-wise approach. The final test interval of these components should also be included in the submittal. [Section III.B.1 describes an acceptable method for extending test intervals in greater detail.]

2. Performance Monitoring of IST Equipment

Performance monitoring of IST equipment refers to the monitoring of test data for equipment that has been placed on an revised test strategy (e.g., extended test interval). The purpose of the performance monitoring is to help confirm that the failure rates assumed for this equipment remain valid, and that no unexpected failure mechanisms which are related to revised test strategy become important enough to alter the failure rate assumed in the evaluation models. Two important aspects of performance monitoring are whether the test frequency is sufficient to provide meaningful data, and whether the testing methods, procedures, and analysis provide assurance that performance degradation is detected. Component failure rates cannot be allowed to rise to unacceptable levels before detection and corrective action takes place.

3. Feedback and Corrective Action Program

A performance-based corrective action program should be a part of the licensee's proposed implementation and monitoring plan.

4. Periodic Reassessment

The reviewer should evaluate the licensee's RI-IST program to ensure that it contains explicit provisions whereby the overall program is periodically evaluated and component performance data gets fed back into both the component

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grouping and component test strategy determination (i.e., test frequency and methods) process, and that changes will be made as appropriate. Reassessments should be performed at a frequency consistent with the availability of new data from the monitoring programs. This periodic reassessment should not be confused with the 120-month program updates required by 10 CFR 50.55a(f)(4)(ii) whereby the licensee's IST program must comply with later versions of the ASME Code that have been endorsed by the NRC.

5. Formal Interactions With the NRC

The reviewer should evaluate the licensee's proposed risk-informed IST program to determine if it appropriately describes the types of changes that can be made without prior NRC approval and the types of changes that require NRC approval prior to implementation (See Section III.A.1 and III.B.5).

III. ACCEPTANCE GUIDELINES

A. ENGINEERING EVALUATION

1. Evaluation of Proposed Changes to the Current Licensing Basis

The acceptance guidelines for evaluating proposed changes to the current licensing basis are contained in licensing basis documents as well as in other regulatory documents (e.g., regulations, regulatory guides, standard review plans, branch technical positions). The rules governing such changes are described in 10 CFR 50.59, 50.90, 50.109, and other regulations. Each proposed change must be evaluated on a case-by-case basis for acceptability. On a component-specific basis, the licensee should identify each instance where the proposed IST program change will affect the CLB of the plant and document the basis for the acceptability of the proposed change by explicitly addressing each of the key safety principles.

A broad evaluation of proposed changes to the CLB of the plant is appropriate because proposed IST program changes could affect requirements or commitments that are not explicitly described in the licensee's safety analysis report. Furthermore, staff approval of the design, operation, and maintenance of SSC at the facility may have been granted in terms other than probability, consequences, or margin of safety. Therefore, it may be more appropriate to evaluate proposed IST program changes against other more explicit criteria (e.g., design basis criteria used in either the licensing process or to determine the acceptability of SSC design, operation, and maintenance).

2. IST Program Scope

In order to be acceptable, the RI-IST program scope should include, in addition to components in the current Code prescribed program, any other components (e.g., pumps, valves, or snubbers) categorized as highly safety significant that were so identified as part of the PRA or licensee's integrated decision-making process (e.g., expert panel).

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3. IST Program Changes

a. General

The licensee's RI-IST program should reevaluate the testing frequency (and methods as applicable) for high safety significant components that were the subject of a deferred test justification, an approved relief request, or an NRC authorized alternative test. The licensee should resubmit relief requests and proposed alternatives, along with risk-related insights, for NRC staff review and approval (see Section 4.1.4 of reference 2).

In establishing the test interval for low safety significant components, the licensee should consider component design, service condition, and performance as well as risk insights. The proposed test interval should be supported by both generic and plant-specific failure rate data and the test interval should be significantly less than the expected time to failure of the component in question (e.g., an order of magnitude less). Alternatively, the licensee could ensure that adequate component capability (i.e., margin) exists, above that required during design basis conditions, such that component operating characteristics over time do not result in reaching a point of insufficient margin before the next scheduled test activity. The inservice test interval should generally not be extended beyond once every 5 years or 3 refueling outages (whichever is longer) without specific compelling documented justification.

IST components (i.e. with the exception of check valves) should, at a minimum, be exercised or operated (i.e., via testing of other components in the system, routine maintenance, normal plant operations, etc.) at least once every refueling cycle. If practical, more frequent exercising should be considered for components in any of the following categories:

- a) Components with high safety significance;
- b) Components in adverse or harsh environmental conditions; or
- c) Components with any abnormal characteristics (operational, design, or maintenance conditions).

b. Changes to Test Interval (Only)

A RI-IST program that proposes to only adjust IST intervals should have provisions to:

- a) identify components whose test interval should be decreased as well as components whose test interval might be extended.
- b) assess the effectiveness of the current IST program in determining the ability of the component to carry out its intended function. Test intervals should only be extended for components that are tested using methods that have the capability to detect component degradation associated with the important failure modes and causes identified in the

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plant's PRA.

If the licensee chooses the alternative described in reference 2 for implementing a RI-IST program, the licensee should make a commitment to adopt enhanced test strategies as described in risk-based IST Code cases developed by ASME as endorsed by the NRC or obtain staff authorization for an alternative test strategy.

c. Changes to Test Interval and Methods

A RI-IST program that adjusts IST intervals as well as IST methods is acceptable if it identifies components whose test strategy should be more focused as well as components whose test strategy might be relaxed.

4. Relief Requests and Technical Specification Amendments

The licensee should address the following issues:

- For low safety significant components, are there any component test methods that are not in accordance with the Code requirements or any NRC guidance? If so, relief is required for these test methods.
- For high safety significant components, are there any component test methods that are not in accordance with the Code requirements or any NRC guidance? If so, relief is required for these test methods.
- For high safety significant components, are there any component test frequencies that are not in accordance with the Code requirements or any NRC guidance? If so, relief is required for these test frequencies.
- For any components, are there changes in technical specification requirements? If so, the licensee is required to submit and have approval of a technical specification amendment prior to implementing the RI-IST program. Similarly, if a proposed IST program change requires a change to the updated Final Safety Analysis Report (USAR) change, the licensee should have performed an evaluation pursuant to 10 CFR 50.59.

5. Quality of the PRA for IST Application

In order to be acceptable for application to IST, the PRA models must reflect the dependence of core damage frequency (CDF) and large early release frequency (LERF) on basic events whose probabilities are affected by IST. This means that IST-related events and events that are logically in parallel with IST events must be quantified properly.

Modeling of IST events should:

- satisfactorily reflect dependence of basic event probability on fault

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exposure time,

- consider effects of staggering of tests,
- use defensible failure rate parameters (λ), and if better-than-generic λ 's are used, special justification may be warranted,
- consider the effect on λ of aging, environmental stresses, and frequency of testing (either as part of the PRA, or as part of the licensee's integrated decision making process), and

In addition, common cause failure (CCF) modeling of failures potentially addressed by IST must be performed.

6. Modeling of the Effects of IST on PRA Basic Events

The PRA should include a model which can provide an appropriate measure of the change in risk as a result of extending the test interval on selected components. This requires that the model directly addresses the change in component availability as a function of test interval. The model must include:

- an explicit quantitative consideration of the degradation of the component failure rate as a function of time, supported by appropriate data and analysis,

OR

- arguments need to be presented which convincingly support the conclusion that no significant degradation will occur,

7. Categorization of Components

When using risk importance measures to identify components that are low risk contributors, potential limitations of these measures have to be addressed. Therefore, information to be provided to the licensee's integrated decision-making process (e.g., expert panel) must include sensitivity studies and/or other evaluations to demonstrate the insensitivity of the risk importance results to the important PRA modeling techniques, assumptions, and data. Issues that have to be considered and addressed when determining low risk contributors include the following: truncation limit, different risk metrics, component failure modes, different maintenance states and plant configurations, multiple component considerations, defense in depth, binning criteria, and analysis of uncertainties (including sensitivity studies to component data uncertainties, common cause failures, and recovery actions).

8. Other Technical Issues

a. Initiating Events

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Other than for IST interval extensions argued on the basis of IST-induced risk, the acceptance guideline in this area is that there should be positive evidence that the licensee process considered the effect of the IST program on initiating event frequency.

In the area of IST-induced risk, licensees are encouraged, to analyze the potential for adverse effects due to the tests themselves, and to look for ways to reduce these effects, either through changes in interval or changes in test protocols. If licensees advance the argument that there are significant adverse effects associated with testing as a reason for reducing or eliminating test frequency, then it will be necessary to review

- the causal model relating IST activity to the occurrence of an initiating event,
- the probability of core damage conditional on this event,
- the causal model relating reduction of IST or change in protocol to the subsequent behavior of the IST component.

Acceptance criteria for these causal models are the same as for causal models of IST basic events, and the acceptance criterion for core damage probability is covered by acceptance criteria for general PRA issues presented in the general SRP.

b. Dependencies and Common Cause Failures

Common cause failure (CCF) modeling of failures potentially addressed by IST should be performed. This includes the modeling of CCF groups of similar components that are mutually redundant and all being relaxed.

To reduce fault exposure times for potential common cause failures, staggered testing should be implemented as part of the RI-IST change process.

c. Uncertainty and Sensitivity Analyses

The criteria for the analysis of uncertainties in the comparison to acceptance guidelines is provided in the Regulatory Guide DG-1061 (reference 1).

d. Human Reliability Analysis

Justification of IST relaxations should not be based on credit for post-accident recovery of failed components (repair or ad hoc manual actions, such as manually forcing stuck valves to open). However, credit may be taken for proceduralized implementation of alternative success strategies.

For each human action that compensates for a basic event probability increasing as a result of IST relaxation, there should be an explicit licensee commitment to ensure performance of the function at the level credited in the

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quantification. Excessively low human failure probabilities (less than $1E-3$) cannot be accepted unless there is supporting analyses that justifies the use of the low human failure probability and there are adequate training programs, personnel practices, staff policies, etc. to ensure continued staff performance at this level.

e. Use of Plant-Specific Data

The acceptance guidelines for this issue are as follows:

- For those cases where statistically significant plant specific data are available, it is acceptable to use such data if they are appropriately combined with generic data. For those licensees who propose to use plant specific data only, the data used should be consistent with the generally accepted values in other PRAs for CCFs and initiating event frequencies, or any significant deviations should be justified.
- As part of the performance monitoring, there should be an evaluation to determine if components that have experienced repeated failures are especially poor performers. An extreme example of such evidence would be multiple failures experienced by a single component in a class whose other members have experienced no failures over the same interval. Components that have experienced failures should be reviewed to see whether the testing strategy (interval and methods) would be considered adequate to support the performance credited of them in the risk analysis.

9. Evaluating the Overall Effect of Proposed Changes on Plant Risk

The general Regulatory Guide on Risk-Informed Decision Making (DG-1061) provides guidance for the acceptance of RI-IST changes and consideration in context with other RI initiatives.

10. Integrated Decision Making

The licensee's proposed RI-IST program should be supported by an engineering evaluation (reviewed in accordance with RI-IST SRP section IV.A). It is expected that the categorization developed by the PRA process and the traditional engineering approach will be considered by the licensee's integrated decision-making process (e.g., expert panel) to categorize components and in making decisions regarding each component's test strategy. The licensee's RI-IST program submittal should meet the acceptance guidelines contained in Section III. A.1 through 8 or justify why an alternative approach is acceptable.

Defense in depth has traditionally been applied in reactor design and operation to provide multiple means to accomplish safety functions and prevent the release of radioactive material. It has been and continues to be an effective way to account for uncertainties in equipment and human performance.

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In some cases risk analysis can help quantify the range of uncertainty; however, there will likely remain areas of large uncertainty or areas not covered by the risk analysis. Where a comprehensive risk analysis can be done, it can be used to help determine the appropriate extent of defense in depth (e.g., balance among core damage prevention, containment failure, and consequence mitigation) to ensure protection of public health and safety. Where a comprehensive risk analysis is not or cannot be done, traditional defense in depth considerations should be used or maintained to account for uncertainties. Proposed RI-IST programs should be assessed to ensure that the defense in depth is maintained. Defense in depth is preserved if, for example:

- a reasonable balance is maintained between prevention of core damage, prevention of containment failure, and consequence mitigation;
- there is not an over-reliance on programmatic activities to compensate for weaknesses in plant design;
- system redundancy, independence, and diversity are maintained commensurate with the expected frequency and consequences of challenges to the system;
- defenses against potential common cause failures are maintained and the introduction of new common cause failure mechanisms are avoided;
- independence of barriers is not degraded
- defenses against human errors are maintained

Sufficient safety margins are maintained if, for example:

- ASME codes and standards or alternatives approved for use by the NRC are met;
- safety analysis acceptance criteria in the current licensing basis (e.g., USAR, supporting analyses) are met, or proposed revisions provide sufficient margin to account for analysis and data uncertainties;

Defense in depth and safety margin may be evaluated, as feasible, using risk techniques (PRA) provided Code-required margins are preserved.

Other acceptance guidelines may be proposed by the licensee. However, alternative guidelines would require more detailed consideration by the reviewer on a case by case basis.

After the components have been categorized, RI-IST program implementation, performance monitoring, and corrective action (Section III.B) acceptance guidelines should be satisfied and the overall effect of the proposed changes should be acceptable (ref. Section III.A.9) before the reviewer concludes that the proposed RI-IST program provides "an acceptable level of quality and

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safety" [ref. 10 CFR 50.55a (a)(3)(i)].

If the licensee's proposed RI-IST program is unacceptable based on either traditional engineering analyses or the probabilistic analyses, the reviewer should deny the licensee's proposed RI-IST program.

In evaluating the overall effect of the proposed RI-IST program, the licensee should specifically evaluate the effect of the proposed relaxations of requirements (e.g., test interval extensions) for components considered singly and when grouped together. Where these relaxations are offset by alternative measures (e.g., additional monitoring, different tests, procedures, training), the licensee should identify, and quantify to the extent practicable, the effects of these alternative measures. Similarly, if there are benefits associated with proposed relaxations (e.g., reduction in initiating event frequency, reduction in system misalignment, reduction in radiation exposure), the licensee should identify, and quantify to the extent practicable, the effects of these benefits. As a general rule, the alternative measures and benefits should be directly linked to the systems or components associated with proposed relaxations. On a case by case basis, the staff may assess the licensee's proposed improvements made to the test strategy for a group of components against proposed relaxations in test requirements for another group of components in assessing the overall acceptability of a proposed RI-IST program. For example, the risk increase associated with relaxation of requirements for a group of low safety significant components may be deemed acceptable in light of improvements made to a group of more high safety significant components, even if all of the factors contributing to the overall change in risk are not quantified. However, the vulnerability associated with the relaxation of requirements for the low safety significant components must be acceptably low (See DG-1061 criteria). The licensee's integrated decision-making process should have explicitly considered all such situations. The factors considered by the licensee's integrated decision-making process, as well as the basis for the licensee's integrated decision-making process conclusion, should be clearly documented. The reviewer should evaluate this documentation to see if there is adequate technical justification for the licensee's decisions.

Specific acceptance guidelines for use of Expert Panels are contained in Appendix B of reference 3.

B. IMPLEMENTATION, PERFORMANCE MONITORING, AND CORRECTIVE ACTION

1. Program Implementation

For either high or low safety significant components that will be tested in accordance with the current NRC-approved Code test frequency and method requirements, no specific implementation schedule is required. The test frequency should be included in the licensee's RI-IST program.

For either high or low safety significant components that will employ NRC-

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endorsed ASME Code cases, implementation of the revised test strategies should be documented in the licensee's RI-IST program.

For any alternate test strategies proposed by the licensee, the licensee should submit a relief request to the NRC (reference Section III.A.4).

For low safety significant components that will be tested at a frequency less than the Code test frequency which are exercised as a result of testing, routine maintenance, or normal plant operation and have acceptable performance histories, the licensee should group these components and test them on a staggered basis. Grouping is acceptable provided it complies, for example, with the guidance contained in NRC Generic Letter 89-04, Position 2 for check valves; Supplement 6 to NRC Generic Letter 89-10 and Section 3.5 of ASME Code Case OMN-1 for motor-operated valves; or other documents endorsed by the NRC.

Component monitoring that is performed as part of the Maintenance Rule implementation can be used to satisfy monitoring as described in the RI-IST program guidance. In these cases, the performance criteria chosen have to be compatible with the RI-IST guidance provided in Reference 2.

For low safety significant components that will be tested at a frequency less than the licensee's current Code test frequency which are not exercised as a result of non-Code required system or component testing, routine maintenance, or normal plant operation and have acceptable performance histories, the licensee should increase the test interval in a step-wise manner. If no time-dependent failures occur, then the interval can be gradually extended until the component, or group of components if tested on a staggered basis, is tested at the maximum proposed extended test interval.

2. Performance Monitoring of IST Equipment

The acceptance guidelines for this item consists of evaluating the licensee's proposed performance monitoring process to ensure that it has the following attributes:

- enough tests are included to provide meaningful data;
- the test is devised such that incipient degradation can reasonably expected to be detected; and
- the licensee trends appropriate parameters as required by the ASME Code or ASME Code case and as necessary to provide validation of the PRA.

Assurance must be established that degradation is not significant for components that are placed on an extended test interval, and that failure rate

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assumptions for these components are not compromised. It must be clearly established that the test procedures and evaluation methods are implemented which provide reasonable assurance that degradation will be detected and corrective action taken.

3. Feedback and Corrective Action Program

The licensee's corrective action program for this application is acceptable if it contains a performance-based feedback mechanism to ensure that if a particular component's test strategy is adjusted in a way that is ineffective in detecting component degradation and failure, the IST program weakness is promptly detected and corrected.

The licensee's corrective action program should evaluate RI-IST components that either fail to meet the test acceptance criteria or are otherwise determined to be in a nonconforming condition (e.g., a failure or degraded condition discovered during normal plant operation).

The licensee's corrective action procedures should:

- (a) comply with 10 CFR 50, Appendix B, Criterion XVI, Corrective Action
- (b) determine the impact of the failure or nonconforming condition on system/train operability since the previous test,
- (c) determine and correct the root cause of the failure or nonconforming condition (e.g., improve testing practices, repair or replace the component),
- (d) assess the applicability of the failure or nonconforming condition to other components in the IST program (including any test sample expansion that may be required for grouped components such as relief valves),
- (e) correct other susceptible similar IST components as necessary,
- (f) assess the validity of the PRA failure rate and unavailability assumptions in light of the failure(s), and
- (g) consider the effectiveness of the component's test strategy in detecting the failure or nonconforming condition. Adjust the test frequency and/or methods, as appropriate, where the component (or group of components) experiences repeated failures or nonconforming conditions.

The corrective action evaluations should be provided to the licensee's PRA group so that any necessary model changes and re-grouping are done as might be appropriate. The effect of the failures on plant risk should be evaluated as well as a confirmation that the corrective actions taken will restore the plant risk to an acceptable level.

The RI-IST program documents should be periodically revised to document any RI-IST program changes resulting from corrective actions taken.

4. Periodic Reassessment

The test strategy for IST components should be periodically, at least once

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every two refueling outages, assessed to take into consideration results of inservice testing and new industry findings. Plant specific data by itself should not be the sole basis to determine component operability because the sample size will, in most cases, not be sufficient. Therefore, the IST PRA model should also reflect industry experience. (See Section III.A.8.e)

5. Formal Interactions With the NRC

The licensee can make changes to their RI-IST program that are consistent with the process and results that were reviewed and approved by the NRC staff. For example:

- Changes to component groupings, test intervals, and test methods that do not involve a change to the overall RI-IST approach (either traditional engineering or PRA analyses), where the overall RI-IST approach was reviewed and approved by the NRC do not require specific (i.e., additional) review and approval prior to implementation.
- Component test method changes involving the implementation of an NRC-endorsed ASME Code, NRC-endorsed Code case, or published NRC guidance which were approved as part of the RI-IST program, do not require prior NRC approval.
- Test method changes that involve deviation from the NRC-endorsed Code requirements require NRC approval prior to implementation.
- Changes to the risk-informed IST program that involve programmatic changes (e.g., changes to the plant probabilistic model assumptions, changes to the grouping criteria or figures of merit used to group components, changes in the Acceptance Guidelines used by the licensee's integrated decision-making process (e.g., expert panel)) require NRC approval prior to implementation.

Changes to a licensee's RI-IST program should also be evaluated using change mechanisms described in the regulations (e.g., 10 CFR 50.55a, 10 CFR 50.59), as appropriate, to determine if prior NRC staff review and approval is required prior to implementation. In addition, changes to a licensee's approved RI-IST program (e.g., a change to a component's categorization) that could affect the results that were reviewed and approved by the NRC staff (e.g., the change in risk associated with implementation of the RI-IST program), should be evaluated to ensure that the basis for the staff's approval has not been compromised.

The licensee is not required to submit regular IST program updates. The licensee may elect to submit program updates in situations that may help the staff evaluate pending requests for relief or authorization, or when there have been significant program changes that do not require review.

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IV. REVIEW PROCEDURES

A. REVIEW OF THE LICENSEE'S ENGINEERING EVALUATION

1. Evaluation of Proposed Changes to the Current Licensing Basis

Verify that the licensee reviewed licensing basis documents to identify proposed changes to the IST program that would alter the current licensing basis of the plant. On a component-specific basis, the licensee should have identified each instance where the proposed IST program change would affect the current licensing basis of the plant, identified the source and nature of the commitment (or requirement), and documented the basis for the acceptability of the proposed change. If the current licensing basis was not affected by the proposed IST program changes, the licensee should have so indicated in its risk-informed IST program description.

On a component-specific basis, the reviewer should evaluate the acceptability of each proposed change that impacts the CLB. Acceptability should consider the original acceptance conditions, criteria, and limits as well as the risk significance of the component. Ensure that the licensee explicitly and adequately addressed each of the key safety principles.

Verify that the licensee reviewed commitments related to outage planning and control to verify that they were appropriately reflected in the licensee's component grouping. Spot check to determine if components that play an integral role in the licensee's plans and procedures for maintaining the key shutdown safety functions are in the group of components that are candidates for more focused inservice tests (i.e., high safety significant component category).

2. IST Program Scope

Review the proposed IST program and verify the following:

- For selected systems, verify that components that perform a safety-related function(s) are in the proposed RI-IST program.
- Components categorized as "high safety significant" are included in the RI-IST program, regardless of their status in the licensee's current IST program.

3. IST Program Changes

a. General

Verify that the licensee reevaluated the test frequency (and methods as applicable) for high safety significant components that were the subject of a deferred test justification, approved relief request, or NRC authorized alternative test. Review resubmitted relief requests and requests that

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alternatives be authorized, along with risk-related insights.

On a sampling basis, verify that the licensee considered component design, service condition, and performance as well as risk insights, in establishing the technical basis for each component's (or group of components) test interval. The licensee's rationale for the proposed change in test interval and its relationship to expected time to failure should be reviewed. Verify that the proposed test intervals are supported by applicable generic or plant-specific failure rate data. Verify that proposed test intervals are significantly less than the expected time to failure of the components in question (e.g., an order of magnitude less). Alternatively, spot check the licensee's calculations to ensure that adequate component capability exists, above that required during design basis conditions, such that component operating characteristics over time do not result in reaching a point of insufficient margin before the next scheduled test activity. Verify that the inservice test intervals are not extended beyond once every 5 years or 3 refueling outages (whichever is longer) without specific compelling documented justification. Extensions beyond 5 years or 3 refueling outages should be considered as component performance data at extended test intervals is acquired and as PRA technology improves.

On a sampling basis, verify that IST components (i.e. with the exception of check valves) are exercised or operated at least once every refueling cycle. Check to see if components in the following categories are exercised more frequently than once per operating cycle, if practical:

- a) Components with high risk significance;
- b) Components in adverse or harsh environmental conditions; or
- c) Components with any abnormal characteristics (operational, design, or maintenance conditions).

If the licensee chooses to use the alternative described in reference 2 for implementing a RI-IST program, verify that the licensee made a commitment to adopt enhanced test strategies as described in risk-based IST Code cases developed by ASME, as endorsed by the NRC. If the licensee chooses not to adopt one or more of these Code cases, review the licensee's written technical justification outlining why it was impractical to implement the risk-informed Code Case strategy as well as the licensee's proposed alternative test strategy.

Verify that the licensee's RI-IST program identifies and tests components in the high safety significant category that are not in the licensee's current IST program commensurate with their safety significance or that the licensee has demonstrated that a suitable search for such components was conducted. These components should be tested in accordance with the ASME Code where practical, including compliance with all administrative requirements. Where ASME Section XI or O&M testing is not practical, alternative test methods to ensure operational readiness and to detect component degradation (i.e., degradation associated with failure modes identified as being important in the

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licensee's PRA) should be proposed by the licensee. These alternative test strategies should be reviewed and approved by the NRC prior to implementation of the RI-IST program at the plant (see SRP section V. D.).

On a sampling basis, confirm that changed test strategies do not result in violating TS requirements, or that an appropriate amendment request is submitted.

b. Changes to Test Interval (Only)

Verify that the process used by the licensee to group components [i.e., components that are candidates for having their inservice test requirements relaxed and components that should be subjected to more frequent (e.g., quarterly) and effective inservice tests] is consistent with the acceptance guidelines specified in Section III.A.3.b and that appropriate commitments to adopt enhanced test strategies have been made (i.e., if the alternative described in reference 2 for implementing a RI-IST program is proposed by the licensee).

c. Changes to Test Interval and Methods

Verify that tests performed for the components within the scope of the RI-IST program meet the enhanced ASME Code test strategies (i.e., test method and frequency) as endorsed by the NRC, except where NRC has either granted relief or authorized an alternative test strategy.

4. Relief Requests and Technical Specification Amendments

The regulation (or alternative that was authorized by the NRC) that permitted the licensee to implement the overall RI-IST program will, in part, allow licensees to increase the testing interval (and possibly relax test methods) of components categorized, through the use of their PRA and integrated decision-making process, as low safety significant. Approval of the alternative includes evaluation and approval of the process to identify low safety significant components and adjust their test frequencies (or test methods) commensurate with their previous service and maintenance histories and existing environmental conditions. Therefore, individual component relief requests are not required to adjust the test interval of individual components that are categorized as having low safety significance (i.e., because the licensee's implementation plans for extending specific component test intervals should have been reviewed and approved by the NRC staff as part of their RI-IST program submittal). Similarly, if the proposed alternative includes improved test strategies to enhance the test effectiveness of low and high safety significant components, such as the use of ASME Code Case OMN-1, "Alternate Rules for Preservice and Inservice Testing of Certain Electric Motor Operated Valve Assemblies in LWR Power Plants, OM-Code - 1995 Edition; Subsection ISTC" then additional relief from the Code requirements (i.e., beyond staff approval of the licensee's RI-IST program describing the licensee's intention to adopt such a Code case) is not required (See footnote

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6 to 10 CFR 50.55a).

For high and low safety significant components not tested in accordance with the Code test method requirements or NRC endorsed Code Case, specific relief would be required from the applicable Code requirements. Relief would also be required from the Code test frequency requirements for high safety significant components not tested at the Code-required frequency. (High safety significant components are expected to be maintained at Code-required frequencies unless specific relief exists or adjustment is bounded by Generic Letter 89-04.)

- a. Verify that requests for relief or approval for alternative testing have been submitted to the NRC. Verify that the licensee has submitted technical specification amendment requests for proposed changes that impact technical specification.
- b. Review the basis for requests for relief and alternatives and assess the adequacy of the implementation of the alternative testing.
- c. Review the justification for deferring testing of high safety significant components to cold shutdowns or refueling outages.

5. Quality of the PRA for IST Application

The reviewer should establish that for IST applications, special attention has been paid to quantification of the failure probability of IST components in light of IST program attributes (e.g., test interval), and that special attention has been paid to quantification of the failure probability of compensating SSCs.

Fault Exposure Time for IST Components:

Reviewers must ensure that the fault exposure time credited in the PRA is reasonable in light of the IST interval and other activities. In general, the mean fault exposure time will be taken to be 1/2 of the test interval. Some analyses may apply a fault exposure time other than this: a different fault exposure time for a given component might be claimed as a result of credit taken for non-IST validation of the performance of the component, perhaps by virtue of system challenges, or an IST test on a different component that implicitly requires functioning of the subject component and would therefore reveal a failed state of the subject component. The reviewer should establish that the licensee has identified a basis for every fault exposure time modeled, and that commitments are in place wherever a fault exposure time is determined by a programmatic activity. Where a fault exposure time is the result of tests on other components, the reviewer should verify that there is assurance that these other tests will be performed and that the behavior of the subject component will be surveilled in the course of these tests. Where a fault exposure time is the result of system challenges, the reviewer should verify that this challenge frequency is consistent with system challenge

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frequencies modeled elsewhere in the PRA.

Failure Rates for IST Components:

The reviewer should establish that in general, failure rates for components are consistent with plant-specific data, except that failure rates that are appreciably less than generic data (e.g., those on the order of a factor of 3 or more lower than generic data) should be justified. To use the lower plant-specific failure rate, it must be demonstrated that the plant-specific failure rate data came from a population statistically different from the generic population and a mechanistic explanation should be provided.

The reviewer should ascertain whether the failure rate takes account of special environmental stresses or aging. If not, this should figure in the evaluation of the performance monitoring and feedback activity (see Sections III.B.3 and IV.B.3).

Basic Event Probabilities of Compensating SSCs:

Events that appear jointly in minimal cut sets with IST components (compensating SSCs) must be quantified appropriately or else perspective on the significance of IST components will be distorted. Depending on the form of PRA documentation, this can be relatively difficult for reviewers to spot check; reviewers should therefore verify that as part of IST applications, licensees warrant that the apparent significance of IST events is not distorted by inappropriate quantification of compensating events. Note that PRA updates may have been performed to boost the credited performance of compensating SSCs in anticipation of the need to justify relaxed IST intervals. This is acceptable, and need not prompt special staff attention beyond that allocated generally to review of baseline risk profiles, provided that the licensee makes programmatic commitments appropriate to the level of performance claimed.

Common Cause Failures:

Reviewers should check that licensees have appropriately modeled CCF of groups of similar components that are proposed for relaxation and that are mutually redundant. This is discussed more in detail in Section 4.2.4.2 of reference 2.

6. Modeling of the Effects of IST on PRA Basic Events

The review procedure for the modeling of the effects of IST on the risk model involves the following steps:

- The characteristics of the model used to evaluate the risk significance of extending selected component test intervals is compared against those considered acceptable as defined in Section III.B.2,

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- The reviewer establishes that the licensee looked for ways to improve test effectiveness,
- Data and analysis used to support the model are reviewed and compared with independent data sources and analysis.

7. Categorization of Components

Results from risk categorization can be used directly for identifying the high risk significant components (e.g., for the identification of risk outliers, or for the identification of SSCs where more resources can be allocated). However, when risk importance measures are used to group components as low risk significant, additional evaluations, sensitivity studies and other considerations as discussed in Section III.A.7 have to be taken into account. Review procedures for component risk categorization are provided in Appendix C of the general SRP for risk informed regulation.

8. Other Technical Issues

a. Initiating Events

For most aspects of the general case of IST changes on initiating event frequency, the reviewer is not expected to accept or reject the analysis through a process of independent validation of the licensee's evaluation of the effect of IST program changes on initiating event frequency. Rather, the reviewer is expected to look for evidence that the licensee

- considered the effect of IST changes on initiating events that were analyzed (not screened out),
- considered whether the IST changes would affect the frequencies of initiating events previously screened out from the analysis.

Note that the latter step logically requires that there have been documentation of the basis for screening out of initiating events.

However, if a licensee argues for a reduction in testing or a change in protocol based on adverse risk effects of testing, the reviewer should spot check the calculations, especially if other plants of the same type have not drawn similar conclusions.

b. Dependencies and Common Cause Failures

The reviewer should check to confirm that potential CCFs which involve IST components have been considered in the PRA. It is particularly critical that the selection of common component groups was performed correctly to ensure that important common cause failure groups were not omitted. As a minimum, the CCF groups should include: redundant standby pumps; redundant MOVs/AOVs that change state; redundant check valves; and any other components that

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change state in order to support IST component operability.

The reviewer should verify that plant specific experience which involve the failure of two or more components from the same cause was analyzed and incorporated into the model where appropriate.

The reviewer should determine that the methodology used to calculate the CCF probabilities is consistent with that given in the AEOD report (reference XX). Consistency of common cause failure probabilities with past experience and with the AEOD data should also be checked.

Reviewers should check that licensees have established that performance monitoring is capable of detecting CCF before multiple failures are allowed to occur subsequent to an actual system challenge.

c. Uncertainty and Sensitivity Analyses

The following are review considerations for the licensee evaluation of uncertainties:

- If the estimated risk change due to implementation of the IST program is a bounding estimate, then the reviewer should confirm that the models and data assumptions used do indeed produce a demonstrably conservative estimate.
- If the licensee contends that the estimated risk change due to implementation of the IST program is a best estimate, then the reviewer needs to establish that uncertainty is addressed for the change. This argument must appropriately include data and model uncertainties. The licensee may be able to argue without explicit propagation that the uncertainty is small compared to the margin between the allowable change and the estimated change.

d. Human Reliability Analysis

The comprehensive review of human reliability modeling is treated in the general Reg Guide and general SRP. For IST applications, the review can be more focused. The IST-specific aspects include errors specifically related to testing, and quantification of compensating human actions.

Errors Specifically Related To Testing:

Two types of errors are of interest here. The first is errors during testing that leave equipment unavailable until the condition is discovered during a subsequent test or until the equipment is demanded (i.e., a restoration error). In some PRAs, such errors are included in the data base that is used for the equipment failure rate. The licensee should have verified that this is the case. If such errors are not included, they should have been considered separately. If they were considered separately, then the

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assumptions, models, and data used should be consistent with those that are generally accepted.

The second type of error is associated with error during recovery (e.g., failure to actuate an alternative system train). As indicated previously, the only recovery allowed for present purposes is manual actuation of alternate available equipment to work around failed equipment when a demand occurs and the normal equipment response fails. For this recovery situation, human errors must be considered, and they should reflect the time available to actuate the alternate available equipment, the procedures and training available, and adverse environmental factors (access to equipment, local temperatures and radiation levels, etc.).

Quantification of Compensating Human Actions:

This refers to the credit taken for human actions for purposes of deciding on IST changes. The reviewer should confirm that credit for compensating human actions is limited to proceduralized actions taken to actuate systems; repair of failed equipment is not to be considered. The intent of this review step is to ensure that licensees do not reduce IST on the basis of arguably speculative and relatively uncertain quantification of recovery probabilities. That is, acceptability of IST program changes should be assessed without credit for such recovery probabilities. Quantification of the baseline for purposes of deciding the acceptability of the overall risk profile and deciding on the allowed risk increment may be performed on the basis of credit for such actions.

e. Use of Plant-Specific Data

Appendix A of the reference 3 (SRP Chapter 19) provides procedures for the review of generic and plant-specific data used in support of the licensee's PRA.

9. Evaluating the Overall Effect of Proposed Changes on Plant Risk

Reference 3 (SRP Chapter 19) provides review procedures for the acceptance of RI-IST program changes.

10. Integrated Decision Making

There are no explicit criteria for dispositioning the results of traditional engineering and probabilistic analyses which may to conflict with one another. The reviewer should evaluate the licensee's integrated decision-making process records associated with these conflicts. The licensee's integrated decision-making process records should clearly identify all factors considered by that process and the basis for conclusion. On a sampling basis, the reviewer should conduct an independent evaluation to determine if the licensee's conclusion has sufficient technical basis. The reviewer's determination that

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the proposed alternative will provide "an acceptable level of quality and safety" [ref. 10 CFR 50.55a (a)(3)(i)] should be based on the independent assessment. The reviewer should consider the following factors in trying to reach a conclusion relative to the acceptability of the licensee's proposed RI-IST program:

- a. Does the proposed RI-IST program meet the current regulations? [This principle applies unless the proposed change is explicitly related to a requested exemption or rule change.]
- b. Is defense in depth philosophy maintained?
- c. Are sufficient safety margins maintained?
- d. Are proposed changes in risk, and their cumulative effect, small and within the NRC Safety Goals?
- e. Has the licensee proposed performance-based implementation and monitoring strategies that address uncertainties in analysis models and data and provide for timely feedback and corrective action?

More detailed guidance for reviewing the integrated decision making process is provided in Appendix B of Reference 3.

B. REVIEW OF IMPLEMENTATION, PERFORMANCE MONITORING, AND CORRECTIVE ACTION

1. Program Implementation

On a sampling basis, the reviewer should verify that the following information is provided for each component in the RI-IST program:

High Safety Significant Components:

- a) component test method and interval
- b) ASME Code Case, if applicable
- c) technical specification amendment, if applicable
- d) relief request, if applicable

Low Safety Significant Components:

- a) component test method and interval with justification for extending interval if greater than interval specified in ASME Code
- b) ASME Code Case, if applicable
- c) technical specification amendment, if applicable
- d) relief request, if applicable
- e) grouping definition and justification
- f) staggered test justification for specific low safety significant components
- g) justification for test extensions for the remaining low safety

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significant components

High and low safety significant components that will continue to be tested in accordance with the ASME Code requirements for the licensee's Code of record, or ASME Code Cases that have been endorsed by the NRC, require no further evaluation.

The justification for extending the low safety significant component frequencies should be reviewed for adequacy to verify that the extension is appropriate. Staggered implementation schedules should be evaluated to ensure that component tests are distributed as equally as possible over the entire test interval.

The test intervals of the low safety significant components should be included in the RI-IST program for review. Low safety significant components that are grouped should have their respective groups identified in the RI-IST program. The implementation schedule should be described in the RI-IST program. Implementation of interval extension for low safety significant components may begin at the discretion of the licensee subsequent to NRC approval of risk informed IST program. Component corrective action procedures (see SRP section IV.B.3) should be in place for low safety significant components being tested on a staggered basis prior to implementation of any interval extensions.

For low safety significant components tested on a staggered basis, the licensee should have documented the approach to exercising to which each component in the group is subjected (where appropriate) as a result of plant operation or testing of other components to assess the justification for allowing the component to be tested on a staggered basis. The overall test interval for the low safety significant components in the group should also be justified. The adequacy of the component groupings should be verified. The establishment of the staggered test interval should be based on the maximum allowable interval for all the components in a particular group. Each component in the group should have the same designated test interval.

For low safety significant components exercised only during inservice testing, the current testing interval should be defined in the RI-IST program. In addition, a schedule should be available that shows the planned test interval of each individual low safety significant component being gradually extended to the test interval selected by the licensee and described in the approved program. An acceptable method for extending the test interval for this subset of low safety significant components is by gradually extending the test interval by a set amount (i.e., equal or successively smaller steps) until the maximum approved test interval is reached. The licensee could propose an alternative phased approach to extend the test interval. When the maximum allowed test interval is achieved in the absence of time-dependant test failures, then the components may be grouped and tested on a staggered basis. Section III.B.3 discusses adjusting (i.e., shortening) the test interval when a component experiences repeated test failures.

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Verify that the licensee has plant corrective action and feedback procedures developed (see Section IV.B.3) to ensure that testing failures are fed back to the plant licensee's integrated decision-making process and IST coordinator for reevaluation and possible adjustment to the component's grouping and test strategy.

Verify that the licensee has a program and schedule for converting from the old IST program to the RI-IST program.

2. Performance Monitoring of IST Equipment

The review procedures consist of the following steps:

The performance monitoring program is identified in the licensee's proposal for RI-IST.

The program is reviewed to determine whether it includes a test program which will provide sufficient data to detect component degradation in a timely manner as described in Section III.B.2.

3. Feedback and Corrective Action Program

The reviewer should review the licensee's corrective action procedures to verify that it is initiated by component failures that are detected by the IST program as well as by other mechanisms (e.g., normal plant operation, inspections).

Verify that the licensee's corrective action procedures meets the acceptance guidelines specified in Section III.B.3.

Verify that corrective action evaluations are provided to the licensee's PRA group so that any necessary model changes and re-grouping can be done by the PRA group if appropriate.

Verify that procedures are in place to ensure that corrective actions affecting the IST program get documented, as appropriate, in the licensee's RI-IST program.

4. Periodic Reassessment

Review the licensee's procedures for conducting the periodic risk-informed IST program review to ensure that it:

prompts the licensee to conduct overall program assessments periodically (i.e., at least once every two refueling outages) to reflect changes in plant configuration, component performance, test results, industry experience, and to reevaluate the effectiveness of the IST program,

prompts the licensee to compare actual component conditions/performance

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to predicted levels to determine if component performance and conditions are acceptable (i.e., as compared to predicted levels). If performance or conditions are not acceptable then the cause(s) should be determined and corrective action implemented,

prompts the licensee to review and revise as necessary the assumptions, reliability data, and failure rates used to group components to determine if component groupings have changed, and

prompts the licensee to reevaluate equipment performance (based on both plant-specific and generic information) and test effectiveness to determine if the inservice test program should be adjusted (Plant-specific data should be incorporated into the generic data using appropriate updating techniques).

Verify that the licensee has incorporated the results of its corrective action program for IST program components into its periodic IST program reassessment.

Verify that the licensee has procedures in place to identify the need for more emergent RI-IST program updates (e.g., following a major plant modification, or significant equipment performance problem).

The periodic RI-IST program review may be addressed in conjunction with the plant's periodic PRA updates, industry operating experience programs, the Maintenance Rule program, and other risk-informed program initiatives.

5. Formal Interactions With the NRC

Verify that the licensee has a process or procedures in place to assure that changes that meet the acceptance guidelines in Section III.B.5 above get reviewed and approved by the NRC staff prior to implementation.

V. EVALUATION FINDINGS

Before the reviewer writes findings in each of the review areas as discussed below, the reviewer should write an introduction to the safety evaluation that describes the proposed change in terms of:

- the particular components that would be affected by the proposed changes in IST strategy,
- the plant systems involved with the proposed changes in IST strategy,
- the physical change in testing strategy proposed for each component or group of components,
- its affect on the current licensing basis, and

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- its overall affect on plant risk.

A. ENGINEERING EVALUATION

1. Evaluation of Proposed Changes to the Current Licensing Basis

The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

On a component-specific basis, the staff has reviewed each IST program change as it affects the current licensing basis of the plant. In conducting its review, the staff considered the original acceptance conditions, criteria, and limits as well as the risk significance of the component. Due consideration was given to diversity, redundancy, defense in depth, safety margins, and other aspects of the General Design Criteria. Having conducted this review, the staff finds that the IST program changes proposed by the licensee are acceptable.

The licensee has reviewed commitments related to outage planning and control to ensure that components that play an integral role in the licensee's plans and procedures for maintaining the key shutdown safety functions are in the group of components that should be subjected to more frequent and effective inservice tests. The staff finds this to be acceptable.

IST-related commitments appear to be adequately modeled in the licensee's PRA analysis, or otherwise addressed.

2. IST Program Scope

The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

The staff concludes that the scope of the applicant's risk-informed inservice test program is acceptable and is consistent with the guidance provided in Regulatory Guide 1062. This conclusion is based on the applicant having provided a test program to ensure that safety-related components, as well as other components that are important to plant risk, can reasonably be expected to be capable of performing their intended function throughout the life of the plant.

3. IST Program Changes

a. General

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The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

The licensee reevaluated the testing frequency (and methods as applicable) for high safety significant components that were the subject of an approved relief request, or NRC authorized alternative test. The licensee submitted revised relief requests and requests that alternatives be authorized for these components, along with risk insights associated with the proposed test strategy. The licensee identified technical specification changes needed to implement the RI-IST program and has submitted technical specification amendment requests as appropriate. These requests were reviewed by the NRC staff and found to be acceptable [each instance should be explicitly addressed in the SE].

The licensee considered component design, service condition, and performance, as well as risk insights in establishing the test interval for low safety significant components. The proposed test intervals for low safety significant components were significantly less than the expected time to failure of the components in question (e.g., an order of magnitude less). Alternatively, the licensee ensured that adequate component capability existed, above that required during design basis conditions, such that component operating characteristics over time will not result in reaching a point of insufficient margin before the next scheduled test activity. The inservice test intervals for components were generally not extended beyond once every 5 years or 3 refueling outages (whichever is longer). In every instance where the interval was extended beyond 5 years or 3 refueling outages (whichever is longer), the licensee provided a specific compelling documented justification that was found to be acceptable to the staff [each instance should be explicitly addressed in the SE].

The licensee's proposed RI-IST program ensures that each IST component (i.e. with the exception of check valves) is exercised or operated at least once every refueling cycle. Components in the following categories are generally exercised more frequently than once per operating cycle:

- a) Components with high risk significance;
- b) Components in adverse or harsh environmental conditions; or
- c) Components with any abnormal characteristics (operational, design, or maintenance conditions).

The licensee also made a commitment to either adopt enhanced test strategies as described in risk-based IST Code cases developed by ASME, as endorsed by the NRC, or request authorization from the NRC to perform an alternative test strategy.

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Finally, where the licensee has identified high safety significant components that are not in the licensee's current IST program, the licensee has either committed to test these components in accordance with the current ASME Code or has proposed an alternative test strategy that has been reviewed and approved by the NRC staff.

b. Changes to Test Interval (Only)

The licensee's proposed RI-IST program is found to be acceptable because it:

- a) appropriately identifies components whose test interval should be decreased as well as components whose test interval might be extended,
- b) considers IST test effectiveness in determining whether components are candidates for having their inservice test requirements relaxed.

The reviewer should specify which components will be tested at a shorter interval.

c. Changes to Test Interval and Methods

The licensee's proposed RI-IST program is found to be acceptable because it appropriately identifies components whose test strategy should be more focused as well as components whose test strategy might be relaxed. The reviewer should identify (or characterize) which components will be subjected to more focused testing and describe the revised test strategy for these components.

4. Relief Requests and Technical Specification Amendments

The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

The licensee's RI-IST program is testing high safety significant components in accordance with the Code test frequency and method requirements or has a relief request approved or submitted for approval. In addition, the licensee is testing low safety significant components in accordance with the Code test method requirements (although at a extended interval) or has a relief request approved or submitted for approval. The licensee has approved technical specification amendments for all proposed changes that impact technical specification.

5. Quality of the PRA for IST Application

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The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

- Fault exposure time is modeled appropriately for IST components. Fault exposure times are appropriately linked to programmatic activities that have been explicitly identified and documented.
- Appropriate failure rates have been used for IST components. Wherever unusually good performance is being claimed, provisional justification has been provided and monitoring will provide ongoing justification.
- The licensee has reviewed the modeling of compensating SSCs, and concluded that it is appropriate and that the significance of IST events is not distorted by modeling of compensating SSCs.
- Common cause failure has been suitably addressed. The licensee has systematically identified all component groups sharing attributes that correlate with CCF potential and that affect IST, either in that they comprise IST components or compensating SSCs. The licensee's performance monitoring program addresses staggered testing of IST components in CCF groups.
- The effects of aging, environmental stresses, and frequency of testing has been addressed, either explicitly in the PRA models or as part of the licensee's integrated decision-making process (e.g., expert panel).

6. Modeling of the Effects of IST on PRA Basic Events

The reviewer verifies that the information provided supports the following conclusions:

- a model for unavailability in terms of fault exposure time exists and was used in the PRA for evaluating the risk significance of extending the selected component test intervals,
- the assumptions provided relative to time dependent degradation of the failure rates for the selected components are justified, and
- the licensee considered enhanced testing as a compensating measure.

7. Categorization of Components

The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

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The licensee's integrated decision-making process (e.g., expert panel) on the determination of risk importance of components in the RI-IST program is robust in terms of the "uncertainty" issues like common cause failure modeling and modeling of human reliability.

8. Other Technical Issues

a. Initiating Events

There is positive evidence that the licensee adequately considered the effects of proposed IST changes on the frequencies of initiating events analyzed and the frequencies of initiating events previously screened out. In addition, if the licensee analyzed adverse risk effects of IST activities, and applied these results to justify IST reductions, this analysis was found acceptable. Either the analysis is consistent with previously accepted analyses applicable to this plant type, or the causal modelling of the IST activities' effects on initiating effects was reviewed and found to address appropriately the technical issues described in this SRP under "causal modelling."

b. Dependencies and Common Cause Failures

Evaluation findings should include statements that common cause failure has been suitably addressed and that the licensee has systematically identified all component groups sharing attributes that correlate with CCF potential and that affect IST, either in that they comprise IST components or compensating SSCs. The licensee's performance monitoring program addresses staggered testing of IST components in CCF groups.

c. Uncertainty and Sensitivity Analyses

The reviewer verifies that the information provided and review findings support the following conclusions:

An appropriate consideration of uncertainties is provided in support of the proposed risk informed IST program. The licensee showed either that a demonstrably conservative estimate of the change in risk was acceptable, or that the uncertainty in the risk change was small compared to the margin between the estimated change and the allowable change. In the latter case, this was done either by explicit propagation, or by a qualitative analysis showing that no event contributing to the change in risk is subject to significant uncertainty.

d. Human Reliability Analysis

The staff safety evaluation report shall include language that is equivalent in effect to the following.

- The modeling of human performance is appropriate.

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- Post-accident recovery of failed components is modeled in a defensible way. Recovery probabilities are not quantified in a clearly non-conservative way. The formulation of the model shows decision-makers the degree to which the apparently low risk-significance of certain items is based on credit for recovery of failed components (restoration of component function, as opposed to actuation of a compensating system).

e. Use of Plant-Specific Data

The reviewer verifies that sufficient information was provided to support the following conclusions:

- The failure rates used in the proposed risk informed IST program are appropriate and consistent with Appendix A of SRP Chapter 19, or the deviations are justified.

9. Evaluating the Overall Effect of Proposed Changes on Plant Risk

The reviewer verifies that sufficient information is provided to make the following findings:

Acceptable Numerical Risk Impact

- The application is either risk neutral or results in a decrease in plant risk,

OR

- If an application results in an increase in risk, the increase is within the acceptance guidelines specified in Regulatory Guide DG-1061.

Traditional Engineering Factors

- Traditional engineering analyses and operational considerations do not conflict with the conclusions of the risk analysis.

Cumulative and Synergistic Effects from all Applications

- The cumulative changes in risk are consistent with the guidelines established in DG-1061
- Synergistic effects have been satisfactorily addressed at the component level either
 - 1) by assuring that multiple synergistic relaxations are not applied to a single component, or
 - 2) by noting exceptions to this, and convincingly justifying them case

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by case.

Implementation of a Monitoring Process

- The monitoring process will produce sufficient data that can support the PRA input and assumptions that were used as the basis for the IST risk acceptance.

10. Integrated Decision Making

If the licensee's proposed alternative is acceptable in light of the current licensing basis of the plant and the safety significance of the component,

AND

if the licensee's risk-informed IST program meets the detailed acceptance guidelines specified in this SRP,

then the staff should be able to reach the following general conclusion:

The licensee's proposed risk-informed IST program is authorized as an alternative to the ASME Code required IST program (e.g., including test frequency, test methods, and program scope requirements) pursuant to § 50.55a(a)(3)(i) based on the alternative providing an acceptable level of quality and safety.

B. RISK-INFORMED IST PROGRAM IMPLEMENTATION, PERFORMANCE MONITORING, AND CORRECTIVE ACTION

1. Program Implementation

The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

For components in the high safety significant category, the licensee is either going to continue to test these components in accordance with the current ASME Code of record for the facility (i.e., test frequency and method requirements) or has proposed an alternative test strategy that is acceptable to the staff (via either an NRC-endorsed ASME Code case or plant specific relief request). Testing strategies are adequately described in the licensee's RI-IST Program Plan and were found to be acceptable.

For components in the low safety significant category, the licensee is either going to continue to test these components in accordance with the current ASME Code of record for the facility or has proposed an alternative test strategy that was found acceptable to the staff.

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Low safety significant components that will be tested at a frequency less than the Code test frequency, which are also exercised as a result of plant operation or other system/component testing, may be grouped and tested at an extended test interval only if the interval can be justified based on past component performance. These components will be tested on a staggered basis at roughly equal time intervals. Corrective action procedures will ensure that failures or nonconforming conditions that may apply to other components in the group get evaluated and corrected. Component grouping was found to be consistent with guidance provided in NRC Generic Letter 89-04 or other documents endorsed by NRC.

Low safety significant components that will be tested at a frequency less than the current Code test frequency, which are not exercised as a result of non-Code required system or component testing, routine maintenance, or normal plant operation, will also only have their test interval extended if it can be justified based on past component performance. The licensee will gradually extend the test interval by doubling the test interval for successive tests until the component is tested at the proposed extended test interval. If no age-dependent failures occur, then the components will be grouped and tested on a staggered basis. Corrective action procedures will ensure that test interval and/or methods, as appropriate, get adjusted where the component (or group of components) experiences repeated failures or nonconforming conditions.

The licensee has plant corrective action and feedback procedures developed to ensure that testing failures are fed back to the plant licensee's integrated decision-making process (e.g., expert panel) and IST coordinator for reevaluation and possible adjustment to the component's grouping and test strategy.

The licensee has appropriate plans and schedules for converting from the old IST program to the new RI-IST program at their facility.

2. Performance Monitoring of IST Equipment

The reviewer verifies that the information provided supports the following conclusions:

a performance monitoring program exists which covers all components which are placed on an extended IST schedule,

the program responds to the attributes specified in Section III.B.2, and

the licensee is committed to maintain the program as part of its RI-IST initiative.

3. Feedback and Corrective Action Program

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The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

The staff concludes that the licensee's corrective action program is acceptable for implementation with the RI-IST program because it contains a performance-based feedback mechanism to ensure that if a particular component's test strategy is adjusted in a way that is ineffective in detecting component degradation and failure, the IST program weakness will be promptly detected and corrected.

4. Periodic Reassessment

The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

The staff concludes that the licensee's procedures for periodic reassessment of its risk-informed IST program are acceptable because the licensee's procedures for periodic reassessment ensure that the licensee's test strategies are periodically [specify periodicity not to exceed once every two refueling outages] assessed to incorporate results of inservice testing and new industry findings.

5. Formal Interactions With the NRC

The reviewer verifies that sufficient information is provided in accordance with the requirements of this SRP section and that the evaluation supports conclusions of the following type, to be included in the staff's safety evaluation report:

The staff concludes that the licensee has an adequate process or procedures in place to ensure that RI-IST program changes of the following types get reviewed and approved by the NRC prior to implementation.

- Test method changes that involve deviation from the NRC-endorsed Code requirements.
- Changes to the risk-informed IST program that involve programmatic changes (e.g., changes to the plant probabilistic model assumptions, changes to the grouping criteria or figures of merit used to group components, changes in the Acceptance Guidelines used by the licensee's integrated decision-making process (e.g., expert panel)).

Changes to component groupings, test intervals, and test methods that do

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not involve a change to the overall RI-IST approach (either traditional engineering or PRA analyses), where the overall RI-IST approach was reviewed and approved by the NRC do not require specific (i.e., additional) review and approval prior to implementation.

Component test method changes involving the implementation of an NRC-endorsed ASME Code, NRC-endorsed Code case, or published NRC guidance which were approved as part of the RI-IST program, do not require prior NRC approval.

VI. RISK-INFORMED IST PROGRAM DOCUMENTATION

The reviewer should review the licensee's submittal to assure that it contained the documentation necessary to conduct the review described in this SRP (i.e., the documentation described in Section 6 of DG-1062). The RI-IST program and its updates should be maintained on site and available for NRC inspection consistent with the requirements of 10 CFR 50, Appendix B.

The reviewer should also ensure that the cover letter that transmits to the licensee the staff's safety evaluation approving the proposed RI-IST program (i.e., alternative IST program to that prescribed by the ASME Code) contains a statement to the effect that "Failure to comply with the RI-IST program as reviewed and approved by the NRC staff and authorized pursuant to 10 CFR 50.55a(a)(3) [e.g., including scope, test strategy, documentation, and other programmatic requirements] constitutes noncompliance with 10 CFR 50.55a and is enforceable".

VII. IMPLEMENTATION

The preceding is intended to provide guidance to applicants and licensees regarding the NRC staff's plans for using this SRP section. Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of this regulatory guide, the method described herein will be used by the staff in its evaluation of risk-informed performance-based changes to the licensee's current licensing basis.

VIII. REFERENCES

1. Draft Regulatory Guide 1061, "An Approach for Plant Specific Risk-Informed Decision Making: General Guidance," January 16, 1997.
2. Draft Regulatory Guide 1062, "Use of PRA in Risk-Informed Inservice Testing," February 4, 1997.
3. Draft Standard Review Plan Chapter 19, "Use of PRA in Regulatory Activities," dated January 16, 1997.

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4. Nuclear Energy Institute Draft (Revision B) "Industry Guidelines for Risk-Based Inservice Testing" dated March 19, 1996.
5. ASME Research Report (CRDT-Vol. 40-2, Volume 2), "Risk-Based Inservice Testing - Development of Guidelines" dated 1996.
6. NUMARC 91-06, "Guidelines for Industry Actions to Assess Shutdown Management," December 1991.
7. ASME Code Case OMN-1, "Alternate Rules for Preservice and Inservice Testing of Certain Electric Motor Operated Valve Assemblies in LWR Power Plants, OM-Code - 1995 Edition; Subsection ISTC."
8. Generic Letter 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," dated April 3, 1989.
9. Generic Letter 89-10, Supplement 6, "Information on Schedule and Grouping, and Staff Responses to Additional Public Questions" dated March 8, 1994.
10. Draft NUREG-1602, "Use of PRA in Risk-Informed Applications"