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Deletions are shown with the following attributes and color:

~~Strikeout~~, **Blue** RGB(0,0,255).

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Double Underline, Redline, **Red** RGB(255,0,0).

The document was marked with 155 Deletions, 207 Insertions, 0 Moves.

C.I.17. ~~Quality~~ Quality Assurance & Reliability Assurance

Consistent with the approach taken in the new update to Chapter 17 of ~~the Standard Review Plan~~ NUREG-0800, Sections C.I.17.1, C.I.17.1.1, C.I.17.2, and C.I.17.3 of this chapter point the reader to Section- C.I.17.5 for the required format and content of a QA program during design, construction, and operation.

C.I.17.1 Quality Assurance During the Design and Construction Phase

COL applicants should refer to Section C.I.17.5 for a complete discussion of the required format and content of a QA program during design, construction, and operation.

C.I.17.1.1 *Early Site Permit Quality Assurance Measures*

COL applicants should refer to Section C.I.17.5 for a complete discussion of acceptable format and content of a QA program during design, construction, and operation. This section will identify those aspects of a QAPD associated with ESP versus other applications, such as design certification and COL.

C.I.17.2 Quality Assurance During the Operations Phase

COL applicants should refer to Section C.I.17.5 for a complete discussion of acceptable format and content of a QA program during design, construction, and operation. ~~This section will identify those aspects of a QAPD associated with early site permits, versus other applications, such as design certification and COL.~~

C.I.17.23 Quality Assurance during the Operations Phase Program Description

COL applicants should refer to Section C.I.17.5 for a complete discussion of acceptable format and content of a QA program during design, construction, and operation.

~~C.I.17.3 Quality Assurance Program Description~~

~~COL applicants should refer to Section I.17.5 for a complete discussion of acceptable format and content of a QA program during design, construction, and operation.~~

~~C.I.17.4~~

C.I.17.4 Reliability Assurance Program Guidance

C.I.17.4.1 *New Section 17.4 in the Standard Review Plan*

~~The Office of Nuclear Reactor Regulation (NRR) revised NUREG-800, Standard Review Plan (SRP) to add new Section 17~~ The NRC staff revised the SRP to add the new Section 17.4, “Reliability Assurance Program (RAP).” This new SRP section addresses the Commission’s Policy for the RAP that is presented in SECY-95-132, “Policy and Technical

~~Issues Associated with the Regulatory Treatment of Non-Safety Systems (RTNSS) in Passive Plant Designs (SECY 94-084),” Item E, Reliability Assurance Program, dated June 28, 1995. SRP Section 17.4 is the principle~~ Item E of SECY-95-132. Section 17.4 of the SRP is the principal guidance for NRC reviews of a RAP submitted by a COL ~~an~~ applicant.

C.I.17.4.2 Reliability Assurance Program Scope, Stages, and Goals

The RAP applies to those plant ~~structures, systems and components~~ (SSCs) that are identified as being risk-significant (or significant contributors to plant safety), as determined by using a combination of probabilistic, deterministic, or other methods of analysis, including information obtained from sources such as plant- and site-specific ~~probabilistic risk assessment (PRA)~~, nuclear plant operating experience, relevant component failure ~~data bases~~ databases, and expert panels. The purposes of the RAP ~~are~~ is to provide reasonable assurance ~~that of the following four considerations:~~

- (1) ~~a~~ A reactor is designed, constructed, and operated in a manner that is consistent with the assumptions and risk insights for these risk-significant SSCs;

⋮

- (2) ~~t~~ The risk-significant SSCs do not degrade to an unacceptable level during plant operations;
- (3) ~~t~~ The frequency of transients that challenge SSCs is minimized, ~~and~~;
- (4) ~~t~~ These SSCs function reliably when challenged.

The RAP is implemented in two stages. The first stage applies to reliability assurance activities that occur before the initial fuel load. The goal of the RAP during this stage is to ensure that the reactor design meets the ~~purposes~~ considerations identified above, through the reactor design, procurement, fabrication, construction, and preoperational testing activities and programs. The second stage applies to reliability assurance activities for the operations phase of the plant life cycle. The ~~goal of the RAP~~ objective during this stage is to ensure that the ~~operation of the plant meets the purposes identified above, through~~ reliability for the SSCs within the scope of the RAP is maintained during plant operations. Reliability assurance activities are integrated into existing operational programs (i.e.g., ~~m~~ Maintenance ~~r~~ Rule, surveillance testing, ~~inservice inspection, inservice testing~~ ISI, IST, maintenance, and quality assurance). Note that for the Maintenance Rule program to be credited in the implementation of the RAP in the operational phase, all operational phase/site-specific RAP SSCs must be included in the high-safety-significant (HSS) category within the scope of the Maintenance Rule program. Individual component reliability may change throughout the course of plant life ~~due to~~ because of a number of factors, including aging and changes in suppliers and technology. Changes in individual component reliability values are acceptable as long as overall plant safety performance is maintained within the licensing basis.

C.I.17.4.3 Reliability Assurance Program Implementation

The RAP is implemented in several phases. The first phase implements the aspects of the program that apply to the ~~design process. During this phase, risk-significant SSCs are identified for inclusion in the program by using probabilistic, deterministic, and other methods.~~

The design certification document addresses this phase. The design certification document also addresses a non-system based Tier 1 inspection, test, analysis, and acceptance criteria (ITAAC) requirement for RAP reactor design process. The second phase is the site-specific phase, which introduces the plant's site-specific design information to the RAP process. The COL applicant performs this phase. At this phase, the RAP is modified or appended based on considerations specific to the site. Tier 1 ITAAC are required for these phases. The COL applicant establishes the probabilistic, deterministic, and other methods to determine and maintain the site-specific list of SSCs under the scope of the RAP and ITAAC. The COL applicant is also responsible for implementing the RAP using existing operational programs.

C.I.17.4.4 describing how it will integrate reliability assurance activities into existing programs (e.g., Maintenance Rule, surveillance testing, ISI, IST, maintenance and QA).

C.I.17.4.4 Reliability Assurance Program Information Needed in a COL Application

The provisions of 10 CFR 50.34(h) and 10 CFR 52.79(ba)(41) require that COL applicants include an evaluation of the facility against the NRC's application and review guidance SRP that is in effect 6 months prior to the docket date of the application of a new facility. A COL applicant should address/provide the following in Chapter 17 of the SAR safety analysis report in accordance with the provisions in SRP Section 17.4:

- Describe a description of the applicant's RAP that includes, including scope, purpose, and objectives:
- The process deterministic or other methods used for evaluating, identifying, and prioritizing the site-specific SSCs; according to their degree of risk significance:
- The methods used to (probabilistic/PRA methods and results for evaluating, identifying, and prioritizing SSCs to be addressed in Section C.I.19)
- a prioritized list of SSCs designated as risk-significant based on deterministic or other methods (a prioritized list of SSCs designated as risk-significant based on probabilistic/PRA methods to be addressed in Section C.1.19)
- the quality controls (organization, design control, procedures and instructions, records, corrective action, and audit plans) for developing and implementing the RAP
- how procurement, fabrication, construction, and test specifications for the SSCs within the scope of the RAP ensure that significant assumptions, such as equipment reliability and unavailability, are realistic and achievable.
- A prioritized list of site-specific SSCs designated as risk-significant:
- The quality controls for developing and implementing the RAP.
- The design and operational information used for plant reliability assurance activities:
- Procurement how QA requirements are implemented during the procurement, fabrication, installation, construction, and testing requirements for risk-significant of SSCs: within the scope of the RAP
- The integration of the RAP activities into the applicant's existing operational programs (i.e.g., mMaintenance rRule, surveillance testing, inservice testing, inservice inspection, and quality assurance).
- The IST, ISI, maintenance and QA) must be ensured. Note that for the Maintenance

Rule program to be credited in the implementation of the RAP in the operational phase, all operational phase/site-specific RAP SSCs must be included in the HSS category within the scope of the Maintenance Rule program.

- the process for providing corrective action for design and operation errors that degrade nonsafety-related, risk-significant SSCs.

~~————~~ If more detailed information is provided in non-safety-related SSCs within the scope of the RAP

- ITAAC for the RAP
- expert panel qualification requirements, if an expert panel is used

If other sections or chapters of the applicant's FSAR provide more detailed information regarding particular aspects of the RAP (e.g., the use of the plant- and site-specific PRA, the methods used in identifying and prioritizing SSCs in accordance with their risk significance), it is acceptable to provide a cross-reference to the specific section or chapter. ~~—~~Describing these aspects of the applicant's RAP in ~~FSAR~~ Chapter 17 of the FSAR in accordance with the provisions in SRP Section 17.4 is an acceptable method for meeting the Commission's policy for a RAP in SECY-95-132.

C.I.17.5 Quality Assurance Program Guidance

C.I.17.5.1 COL Applicant QA Program Responsibilities

An applicant is responsible for the establishment and implementation of a quality assurance (QA) program applicable to activities during design, fabrication, construction, testing, and operation of the nuclear power plant. The minimum QA information required to be provided in the FSAR is described in 10 CFR 50.34 (referenced from 10 CFR 52.79).

17.5.2 regulation at 10 CFR 52.79(a)(25) describes the QA information that the application must contain.

C.I.17.5.2 Updated SRP Section 17.5 and the QA Program Description

~~————~~ The Office of Nuclear Reactor Regulation (NRR) revised NUREG-800, Standard Review Plan (SRP) to add The NRC staff revised the SRP to add the new Section 17.5, "Quality Assurance Program Description—~~—~~Design Certification, Early Site Permit and New License Applicants." This new SRP section ~~—~~addresses QA program description (QAPD) provisions for combined license (COL) applicants. ~~NRR~~ The NRC staff reviews and evaluates QAPDs in accordance with the applicable sections of the SRP. ~~SRP~~ Section 17.5 of the SRP is the principle principal guidance for NRC reviews of a QAPD submitted by a COL applicant. A COL applicant's QAPD applicant may ~~be submitted~~ submit its QAPD in two phases. The first phase could apply to design, fabrication, construction, and testing QA activities, and the second phase could apply to operational QA activities. The requirements for the two phases are fully defined in SRP 17.5. Regardless of the approach, the QAPD(s) NRC would ~~be reviewed~~ and evaluated by the NRC prior to evaluate QAPDs before issuing the COL. The QAPD (or QAPDs) should be incorporated by reference in Chapter 17 of the FSAR should incorporate the QAPD

(or QAPDs) by reference.

C.I.17.5.3 Evaluation of the QAPD Against the SRP and QAPD Submittal Guidance

COL applicants may use an existing QAPD that ~~is the NRC has~~ approved ~~by the NRC~~ for current use for either or both phases, provided that they identify and justify alternatives to, or differences from, the SRP in effect 6 months prior to the docket date of the application of a new facility ~~are identified and justified.~~

If not addressed by an NRC approved QAPD, Chapter 17 of the FSAR should also describe the extent to which the applicant will delegate the work of establishing and implementing the QA program or any part thereof to ~~other~~ contractors. The FSAR should also clearly delineate those QA functions ~~which that~~ are implemented within the applicant's QA organization and those ~~which that~~ are delegated to other organizations. ~~+~~In addition, the FSAR should describe how the applicant will retain responsibility for, and maintain control over, those portions of the QA program delegated to other organizations. The FSAR should identify the responsible organization and the process for verifying that delegated QA functions are effectively implemented. The FSAR should identify major work interfaces for activities affecting quality and should describe how clear and effective lines of communication between the applicant and its principal contractors are maintained to assure coordination and control of the QA program.

C.I.17.6 Description of the Applicant's Program for Implementation of 10 CFR 50.65, the Maintenance Rule

For requested information that is not known at the time of COL application, explain why it is not known and estimate when the information will become available.

C.I.17.6.1 Program Procedures

Describe program procedures

The applicant should describe its program for Maintenance Rule implementation in accordance with NUMARC 93-01, "Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," as endorsed by ~~Regulatory Guide~~ RG 1.160; including, but not limited to, the following areas:

(1) Note 1: ~~D~~The applicant should explain and justify deviations from the guidance in NUMARC 93-01 and RG 1.160 ~~should be explained and justified~~

Note 2: While,

(2) At the time of the review, the NRC-endorsed version of the industry guidance on implementation of 10 CFR 50.65(a)(4) may still be contained in the February 22, 2000, revision to Section 11 of NUMARC 93-01, which was endorsed by RG 1.182. This is the effective guidance for 10 CFR 50.65(a)(4) until the NRC endorses a later revision of NUMARC 93-01 (later than Revision 2) that incorporates this guidance through a later revision of RG 1.160 (later than Revision 2) which will supercede RG 1.182. RG 1.182 will then be cancelled.

(3) Applicants referencing a certified design must address the COLA information or action items relevant to the Maintenance Rule ~~does not require procedures or documentation, the NRC needs this information to obtain reasonable assurance of consistent~~

compliance.

~~—— Note 3: Include procedures' status in procedural hierarchy, whether treated as safety-related or non-safety-related, level of compliance expected, responsibility for preparation, review, approval, use, compliance oversight, and disposition. in Chapter 17 of the SER-approved generic design certification document.~~

(4) Submission of actual procedures or software for review is not ~~desired~~ required or ~~required~~ expected for the COL application, but they must be available for NRC inspection by the time the program is required to be implemented, i.e., by the time fuel load is authorized.

(5) If an applicant proposes to use the existing Maintenance Rule program used for its operating plants for new plants, applicability to, and adjustments required by the new plant design should be addressed.

C.I.17.6.1.4 Scoping per 10 CFR 50.65(b)

~~List and provide information on the~~ The applicant should describe its process for determining which plant structures, systems, or components (SSCs) within the scope of your proposed Maintenance Rule (MR) program to the extent that this information is known at the time of the COL application. For each SSC in scope, provide the following:

- ~~(1) Specific MR requirement(s) in 50.65(b) that require it to be in scope. Provide data for each subparagraph, i.e., (b)(1)(i), (b)(1)(ii), (b)(1)(iii), (b)(2)(i), (b)(2)(ii), (b)(2)(iii).~~
- ~~(2) For each SSC, indicate for each applicable paragraph (b) scoping criterion the function(s) that require the SSC to be in scope.~~
- ~~(3) For each SSC, indicate for each applicable paragraph (b) scoping criterion, the failure modes and effects that required the SSC to be in scope, as applicable.~~
- ~~(4) For each SSC scoping function or vulnerability, indicate the functional performance requirements/success criteria and/or functional failure definitions and implications.~~

~~17.6.1.2 Reactor Safety Significance Classification and Other Factors Considered by Expert Panel~~

~~—— Describe the process for safety significance classification (i.e., HSS or LSS) of in-scope SSCs and the bases thereof, including risk metrics/importance measures and values, operating experience, vendor information, and any other factors to be considered by the expert panel.~~

~~17.6.1.3 Scoping Procedures~~

~~—— Identify and describe the program procedures and documents (including computer software and data) that prescribe or govern scoping, including the items above.~~

~~17.6.2 Monitoring per 10 CFR 50.65(a) and (a)(2)~~

~~—— For each SSC, indicate its standby or continuously operating status and associated type (i.e., availability, reliability, or condition) and level (i.e., component, system, pseudo-system, train, or plant) of monitoring/tracking. Describe the process for determining which SSCs' performance or condition will be monitored initially per paragraph 50.65(a)(1) and which will be~~

tracked per 50.65(a)(2).

17.6.3 Periodic Evaluation per 10 CFR 50.65(a)(3)

~~Identify the plant's refueling cycle. Identify and describe the program procedures and documents (including computer software and data) that prescribe or govern periodic evaluation. will be included in the scope of the Maintenance Rule program in accordance with 50.65(a)(3). Ensure the following paragraph (b) of the rule and the NRC-endorsed guidance. The program description should identify that additional SSC functions may be added to or subtracted from the Maintenance Rule scope prior to fuel load, as appropriate, as additional information is developed (e.g., EOPs) after the license is issued. The description of the Maintenance Rule scoping process should address:~~

- (1) The criteria for including safety-related SSCs relied upon to remain functional during and following DBE in accordance with 10 CFR 50.65(b)(1)
- (2) The criteria for including nonsafety-related SSCs in accordance with 10 CFR 50.65(b)(2)
 - (a) The accidents or transients referred to in 10 CFR 50.65(b)(2)(i) are those described in the FSAR
 - (b) SSCs that are "used in plant emergency operating procedures (EOPs)" per 10 CFR 50.65(b)(2)(i), are as described in Paragraph 1.1.2 of RG 1.160, Rev. 2. Note that this differs from the corresponding description in NUMARC 93-01, Rev. 2. The applicant's program should reflect the description in RG 1.160, Rev. 2, until this description, currently under review for revision, is changed in a future revision of NUMARC 93-01 and RG 1.160. The latest revision of RG 1.160 in effect at the time of the COL application should be followed.

NOTE: The NRC's interpretation of the meaning of the phrase "used in ...EOPs" is explained in the statements of considerations are included:

- ~~(1) how procedures govern the scheduling and timely~~ for the Maintenance Rule and will be amplified and clarified in a future revision to RG 1.160 and this is expected to be reflected in a future revision to NUMARC 93-01. The amplified and clarified definition will be as follows: SSCs used in the EOPs that are required to be in the scope of the Maintenance Rule program are those that are directly used to mitigate the accident or transient (explicitly mentioned in the EOPs or in steps of referenced procedures needed to accomplish the EOP step) and those whose use is implied and that provide a significant portion of the mitigating function. For the purposes of this definition, significant proportion of the mitigating function means that the implied-use SSC is essential to the performance of one or more EOP steps and there are no reliable and consistently readily available (under EOP conditions) alternatives. SSCs that do not provide or support a mitigating function, but are included in the EOPs for other reasons, for example, operator convenience or simplifying EOP compliance, equipment protection, etc., are not necessarily required to be in the Maintenance Rule scope under 10 CFR 50.65(b)(2)(i).

If the amplified and clarified definition is in effect at the time of the COL application, the applicant should describe the process for identifying SSCs explicitly mentioned in the EOPs (including those mentioned in referenced procedures), but that are proposed not to be included in the Maintenance Rule scope. The process for exclusion from scope should address the bases for exclusion from scope (e.g., not used for accident or transient mitigation), the bases for inclusion in the EOPs (e.g.,

operator convenience, equipment protection), the portion of any and all mitigating functions provided, the expectation of reliability in EOP application(s), and the means by which operators are alerted (e.g., procedural warnings, cautions, disclaimers, signs, etc.) to reduced assurance or expectation of reliability.

(c) SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related functions per 10 CFR 50.65(b)(2)(ii). Describe how the process considers system interdependencies, including failure modes and effects of nonsafety-related SSCs (e.g., support systems) that could directly affect safety-related functions.

(d) SSCs whose failure could cause scrams or unwanted engineered safeguard feature actuations and those whose failure caused a reactor SCRAM or actuation of safety-related systems at your plant or plants of similar design per 10 CFR 50.65(b)(2)(iii). Describe the process for identifying and using relevant utility-specific and industry-wide operating experience.

NOTE: If at the time of the COLA, the Commission has approved the applicant's program for implementing 10 CFR 50.69 for its new reactor plant, the requirements of 10 CFR 50.69 may be followed instead of those of 10 CFR 50.65 for RISC-3 and RISC-4 SSCs in the scope of the Maintenance Rule except for the purposes of 10 CFR 50.65(a)(4). In this case, the applicant should describe its process for identifying RISC-3 SSCs among those in Maintenance Rule scope under 10 CFR 50.65(b)(1), and RISC-4 SSCs among those in Maintenance Rule scope under 10 CFR 50.65(b)(2) and for treatment under 10 CFR 50.69 of those RISC-3 and RISC-4 SSCs that would otherwise be treated in accordance with 10 CFR 50.65. Deviations in this process from SSC risk classification and treatment in accordance with NUMARC 93-01, as endorsed by RG 1.160, where it would result in classifying an SSC as RISC-3 or RISC-4 that otherwise would be classified as HSS under NUMARC 93-01, as endorsed by RG 1.160, or would otherwise be classified as HSS consistent with a new reactor design, should be identified and explained.

(3) Specific information on the actual SSCs within the scope of the Maintenance Rule program will be reviewed as part of the operational program implementation inspection by the NRC, including, for each SSC in scope, the following:

(a) Specific Maintenance Rule requirement(s) in 10 CFR 50.65(b) that require the SSC to be in scope.

(b) For each SSC, for each paragraph (b) scoping criterion, the function(s) that require the SSC to be in scope.

(c) For each SSC, for each paragraph (b) scoping criterion, as applicable, the failure modes and effects that require the SSC to be in scope.

(d) For each SSC scoping function or vulnerability, the functional performance requirements/success criteria and/or functional failure definitions and implications.

(4) The applicant's submittal should describe the process for determining the safety/risk significance classification of SSCs within the scope of the Maintenance Rule program, including risk metrics/importance measures and values, operating experience, vendor information, design reliability assurance program (D-RAP) scope (modified for the operations phase as necessary), and any other factors considered by the expert panel.

The Maintenance Rule program description should address the criteria for risk ranking of passive components in the new plant designs, especially if it involves a deviation from NUMARC 93-01 and RG 1.160.

- (5) If the applicant proposes to credit its Maintenance Rule program (along its with QA, testing, surveillance and underlying maintenance programs) in implementing reliability assurance in the operations phase, the applicant should include a description of how the D-RAP SSCs (as identified in Section 17.4.1) will be included in the Maintenance Rule program scope and also included in the HSS category.

In addition, the process and procedures controlling how the D-RAP SSC list may be modified by site-specific requirements and information (e.g., SSCs included in the EOPs) should be described. Because not all modifications (if any) to the D-RAP list are expected to be available at the time of the combined license application (COLA) (e.g., the EOPs are not be expected to be fully developed at this time), it is important that information provided in the FSAR clearly identifies the scope, purpose and essential elements of the program, such that there is assurance that the design reliability established by the D-RAP will be maintained.

The safety/risk classification and treatment of SSCs in the Maintenance Rule program scope, including those in the D-RAP scope, and the modified RAP scope for the operations phase, will be reviewed during NRC inspection.

- (6) The applicant's submittal should describe the process for determining the type of monitoring (i.e., performance (availability and/or reliability), and/or condition) and level (e.g. component, system, classes of components, train, or plant) of monitoring/tracking. Classes of components means SSCs or equipment (e.g., circuit breakers, motorized valve actuators, etc.) that may need to be monitored/tracked at the component level or in special component classes or "pseudo systems" that may involve applications in multiple systems and the bases thereof (e.g., industry operating experience (IOE), common failure modes, etc.)

The standby or continuously operating status and associated type of monitoring and level of monitoring/tracking and the basis thereof of each SSC within the scope of the Maintenance Rule program will be reviewed by NRC inspection.

C.I.17.6.2 Monitoring per 10 CFR 50.65(a)

Specific SSCs, if any, whose performance or condition will be monitored initially per paragraph 50.65(a)(1) and the basis thereof will be reviewed by NRC inspection.

The program description for monitoring in accordance with 10 CFR 50.65(a)(1) should address the following:

- (1) The process for establishing performance or condition monitoring goals for SSCs in (a)(1) status, including how goals are ensured to be commensurate with safety and how IOE is taken into account.

For each SSC to be in (a)(1) status, the performance monitoring (availability and reliability) or condition monitoring goals established, the basis thereof, how the goals are commensurate with safety and how IOE was taken into account will be reviewed during NRC inspection.

- (2) The process for disposition of SSCs in (a)(1) status that do not meet goals, including

administration of corrective action. The applicant should describe how the program will ensure prompt, comprehensive and thorough corrective action that (a) addresses the proximate and ultimate causes of degraded performance or condition, (b) encompasses the extent of condition, and (c) institutes preventive measures, including changes that may be required in maintenance and/or maintenance support practices, procedures and training. This discussion should also address how failures will be evaluated against Maintenance Rule functions, since not all failures that cause loss of some function are Maintenance Rule functional failures (MRFFs), and also how maintenance-preventable functional failures (MPFF) will be identified and dispositioned.

Any plant management policies, procedures or practices that involve the (a)(1) status of Maintenance Rule SSCs, e.g., for Maintenance Rule staff performance evaluation, etc., will be reviewed during inspection.

The process for determining which SSCs within the scope of the Maintenance Rule program will be tracked to demonstrate effective control of their performance or condition in accordance with paragraph 50.65(a)(2). The (a)(2) process should address the following:

(1) The process for developing performance criteria or condition monitoring criteria used to demonstrate effective control of performance or condition for SSCs in (a)(2) status. The applicant's submittal should explain how the program ensures that performance criteria are commensurate with safety (including PRA insights) and good engineering practice, take industry operating experience into account, and are reasonable and verifiable, i.e., achievable and sufficiently sensitive to degraded performance or condition such that meeting them could adequately demonstrate effective control of the performance or condition of the SSC through appropriate preventive maintenance and such that the SSC would remain capable of performing its function(s) and not fail in a manner adverse to safety.

The program description should address how effective control of performance or condition of SSCs in (a)(2) status will be demonstrated including condition monitoring of passive SSCs (e.g., structures) and SSCs for which the reliability performance criterion has been set to zero failures allowed, if any.

For each SSC to be in (a)(2) status, performance (availability and/or reliability) criteria or condition monitoring criteria will be reviewed during NRC inspection.

(2) For reliability performance criteria, the process for defining and determining and treating functional failures, MRFFs, MPFFs, and repetitive MPFFs.

(3) For availability performance criteria, the process for defining and tracking availability or unavailability (planned and unplanned), including exceptions and credits and the basis thereof.

(4) For condition monitoring criteria, the process for addresses sensing, surveillance, tracking & trending, action levels (predictive maintenance), etc.

(5) The process for disposition of SSCs for which effective control of performance or condition is not demonstrated (including not meeting performance criteria or condition monitoring criteria). Conditions under which the expert panel may justify not placing an SSC in (a)(1) status when performance criteria are not met or are exceeded as appropriate should be described.

(6) The process for identification and treatment of SSCs categorized in a "run-to-failure" status

NOTE: The NRC is considering amplification and clarification of the guidance on run-to-failure SSC screening and treatment considerations (and will also be reviewed during inspection) as follows:

- (a) SSC function(s) and success/failure criteria
- (b) ability to detect degradation in performance or condition prior to failure
- (c) ability to predict failure based on IOE (e.g., average failure rates, application vulnerabilities, mean times between failure, etc.) and vendor information
- (d) consequences of failure (modes, effects, safety significance), both with and without prompt detection and correction/repair or replacement (e.g., single point vulnerabilities)
- (e) ability promptly to detect failure (e.g., self revealing)
- (f) means to ensure prompt identification and resolution
- (g) procedures for identification and disposition of excessive failure rates (including vendor interaction).

C.I.17.6.3 Periodic Evaluation per 10 CFR 50.65(a)(3)

Identify and describe the program for periodic evaluation of the Maintenance Rule program in accordance with 10 CFR 50.65(a)(3). Ensure that this information includes the following considerations:

- (1) scheduling and timely performance of 10 CFR 50.65(a)(3) evaluations
- (2) documenting, reviewing, and approving evaluations; as well as providing and implementing results
- (3) making adjustments to achieve or restore balance between reliability and availability
- (4) applying industry operating experience ~~(IOE)~~; including the following:

C.I.17.6.4 Risk Assessment and Management per 10 CFR 50.65(a)(4)

~~Identify and describe the program procedures and documents (including computer software and data) that prescribe or govern for~~ maintenance risk assessment and management in accordance with 50.65(a)(4) including, but not limited to 10 CFR 50.65(a)(4). The program description should address how removing SSCs from service will be evaluated, since it is important to be aware of what Maintenance Rule function(s) is/are being lost so the impact of removing multiple SSCs from service can be determined. For qualitative risk assessments, the program description should explain how the risk assessment and management program will preserve plant-specific key safety functions. The 50.65(a)(4) program description should address (but not be necessarily limited to) the following areas:

- (1) determination of the scope (or limited scope) of SSCs to be included in 10 CFR 50.65(a)(4) risk assessments
- (2) risk assessment and management during work planning, addressing as a minimum: qualitative, quantitative or blended approach in different modes of plant operation, pre-established plant risk categories or bands and basis (e.g., baseline core damage frequency multiples (address time limits), incremental conditional core damage

probability), defense in depth, preservation of key safety functions, standard risk management actions for the various risk bands, provisions for configuration-specific risk management plans.

- (3) risk assessment and management of emergent conditions and updating risk assessments as maintenance situations and plant conditions and configurations are changed
- (4) assessment (quantitative and qualitative capabilities) and management of risk of external events or conditions, ~~including~~

NOTE: The NRC is considering amplification and clarification of the guidance on consideration and management of the risk of external events or conditions to better address fire (internal, external, and fire-risk-sensitive maintenance activities), severe weather, internal and external flooding, landslides, seismic activity and other natural phenomena; and grid/offsite power reliability for grid-risk-sensitive maintenance activities ~~(respond to or refer to responses to MR-related questions in NRC GL 2006-02), and internal flooding~~

. The need for this amplification and clarification is expected to be explained in an NRC generic communication. Improved guidance is expected to be provided in a future revision of NUMARC 93-01, "Guidelines for Industry Actions to Assess Shutdown Management," and will be endorsed by a future revision to RG 1.160.

- (5) assessment and management of risk of maintenance activities affecting containment integrity
- (6) assessment and management of risk of maintenance activities when at low power or when shut down (including implementation of NUMARC 91-06)
- (7) assessment and management of risk associated with the installation of plant modifications and assessment and management of risk associated with temporary modifications in support of maintenance activities (in lieu of screening in accordance with 10 CFR 50.59), in accordance with latest revision of NEI 96-07, as endorsed by the latest revision of RG 1.187
- (8) risk assessment and management associated with risk-informed technical specifications
- ~~(9) If known at the time of COL application, describe the scope and level of the probabilistic risk analysis (i.e., operational modes, Level I or II, internal or external events, etc.) and risk assessment tool or process to be used for TS that uses the existing (a)(4) risk assessments and its capabilities and limitations (otherwise, this information will be reviewed during inspection)~~

~~17.6.5~~ assessment process

C.I.17.6.5 Maintenance Rule Training and Qualification

Describe the program, ~~including procedures and documentation for selection, for Maintenance Rule training and qualification of personnel with Maintenance Rule-related responsibilities~~ consistent with the provisions of Section C.I.13 of this guide as applicable.

~~17.6.6~~ Training should be commensurate with maintenance rule responsibilities, including Maintenance Rule program administration, the expert panel process, operations, engineering, maintenance, licensing, and plant management.

C.I.17.6.6 Maintenance Rule Program ~~and Operational~~ Role in Implementation of Reliability

Assurance Program *Interface*

Describe

(RAP) in the Operations Phase

As discussed in detail above, the applicant should describe the relationship and interface between MR Maintenance Rule and the Operational Reliability Assurance Program (ORAP) RAP (See Section C.I.17.4), including how functions are coordinated and procedures overlap and/or are cross referenced. Note: If the scope of the ORAP is enveloped by The NRC has determined that the reliability assurance program may be implemented in the operations phase by (a) the 10 CFR Part 50, Appendix B, QA program, (b) the maintenance and surveillance program, and (c) the Maintenance Rule Program's SSCs classified as HSS; program. If the applicant's maintenance rule program is to be used in implementation of RAP, in conjunction with the QA program and the underlying maintenance and surveillance programs, the COL application submittal should describe how the maintenance rule program will ensure that all RAP SSCs (consistent with operational and plant-specific considerations) are included within the Maintenance Rule Program is an acceptable method of implementation of scope in the ORAP HSS category.

C.I.17.6.7 Maintenance Rule Program Implementation

Describe the plan or process for implementing the MR Maintenance Rule program as described in the COL application, including sequence and milestones for establishing program elements, and commencing monitoring or tracking of the performance and/or condition of SSCs as they become operational.

I.17.7 References

- 10 CFR Part 21
- 10 CFR Part 50
- 10 CFR 50.4
- 10 CFR 50.34(a)(7)
- 10 CFR 50.34(b)(6)(ii)
- 10 CFR 50.34(f)(3)(ii)
- 10 CFR 50.34(f)(3)(iii)
- 10 CFR 50.34(g)
- 10 CFR 50.54(a)
- 10 CFR 50.55(e)(4)
- 10 CFR 50.55(f)
- 10 CFR 50.55a(b)(1)(iv)
- 10 CFR 50.55a(b)(2)(x)
- 10 CFR 50.55a(b)(3)(f)
- 10 CFR 50.65
- 10 CFR Part 50, Appendix B

- 10 CFR Part 52
- 10 CFR 52.47(a)(1) [cross references to other regulatory requirements]
- 10 CFR 52.79 [cross references to other regulatory requirements]
- 10 CFR 52.81 [cross references to other regulatory requirements]
- 10 CFR 52.83 [cross references to other regulatory requirements]

- Regulatory Guidance Documents

- NUREG-0800, “Standard Review Plan”
- RS-002, “Processing Applications for Early Site Permits,” May 2004
- RIS 00-018 “Guidance on Managing Quality Assurance Records in Electronic Media”
- RG 1.189, “Fire Protection for Operating Nuclear Power Plants”
- RG 1.155, “Station Blackout”
- RG 1.26, “Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants”
- RG 1.29, “Seismic Design Classification”
- RG 1.54, “Service Level I, II, and III Protective Coatings Applied to Nuclear Power Plants”
- RG 1.97, “Instrumentation for Light-Water Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident”
- RG 1.142 Revision 2, “Safety-Related Concrete Structures for Nuclear Power Plants (Other Than Reactor Vessels and Containments)” (11/01)
- RG 1.143, “Design Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants”
- RG 1.152, “Criteria for Digital Computers in Safety Systems of Nuclear Power Plants”
- RG 1.160, “Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,” Revision 2, March 1997
- RG 1.168, “Verification, Validation, Reviews, and Audits for Digital Computer Software Uses in Safety Systems of Nuclear Power Plants”
- RG 1.169, “Configuration Management Plans for Digital Computer Software Used in Safety Systems of Nuclear Power Plants”
- RG 1.170, “Software Test Documentation for Digital Computer Software Used in Safety Systems of Nuclear Power Plants”
- RG 1.171, “Software Unit Testing for Digital Computer Software Used in Safety Systems of Nuclear Power Plants”
- RG 1.172, “Software Requirements Specifications for Digital Computer Software Used in Safety Systems of Nuclear Power Plants”
- RG 1.173, “Developing Software Live Cycle Processes for Digital Computer Software Used in Safety Systems of Nuclear Power Plants”
- RG 1.182, “Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants,” May 2000
- RG 1.200, “An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities”
- RG 4.15, “Quality Assurance for Radiological Monitoring Programs (Normal Operations)- Effluent Streams and the Environment”
- RG 7.10, “Establishing Quality Assurance Programs for Packaging Used in Transport of Radioactive Material”
- NUMARC 93-01, “Industry Guidance for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,” Revision 2, dated April 1996
- February 22, 2000, revision to Section 11 of NUMARC 93-01, “Assessment of Risk Resulting from Performance of Maintenance Activities.”
- NUREG 1070, “NRC Policy on Future Reactor Designs,” July 1985
- NUREG 1462, “Final Safety Evaluation Report Related to the Certification of the System 80+ Design,” August 1994
- NUREG 1503, “Final Safety Evaluation Report Related to the Certification of the Advanced Boiling Water Reactor Design,” July 1994
- NUREG 1512, “Final Safety Evaluation Report Related to the Certification of the AP600 Standard Design,” September 1998
- NUREG 1793, “Final Safety Evaluation Report Related to the Certification of the AP1000

Standard Design," September 2004

- NUREG/CR 3385, "Measures of Risk Importance and Their Applications," May 1986
- Generic Letters
 - Generic Letter 83-28, "Required Actions Based on Generic Implications of Salem ATWS Events," July 8, 1983
 - Generic Letter 85-06, "Quality Assurance Guidance for ATWS Equipment That Is Not Safety Related," January 16, 1985
 - Generic Letter 89-02, "Actions to Improve the Detection of Counterfeit and Fraudulently Marketed Products," March 21, 1989
 - Generic Letter 91-05, "Licensee Commercial-Grade Procurement and Dedication Programs," April 9, 1991
 - Generic Letter 2006-02, "Grid Reliability and the Impact on Plant Risk and the Operability of Offsite Power," February 1, 2006
- Commission Papers
 - SECY 89-013, "Design Requirements Related to the Evolutionary Advanced Light-Water Reactors (ALWR)," January 19, 1989
 - SECY 93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor Designs," April 2, 1993
 - SECY 94-084, "Policy and Technical Issues Associated with Regulatory Treatment of Non-Safety Systems in Passive Plant Designs," March 28, 1994 and related Staff Requirements Memorandum, dated June 30, 1994
 - SECY 95-132, "Policy and Technical Issues Associated with Regulatory Treatment of Non-Safety Systems (RTNSS) in Passive Plant Designs," May 22, 1995

The Maintenance Rule will require that the program be implemented by the time that fuel load is authorized.