NUREG-0800, STANDARD REVIEW PLAN, INTRODUCTION

*[Note: In draft Revision 3, text in Italic font is **unchanged** from Revision 2, issued March 2007.]*

Purpose of the Standard Review Plan

The Standard Review Plan (SRP) provides guidance to US Nuclear Regulatory Commission (NRC) staff in performing safety reviews of construction permit (CP) or operating license (OL) applications (including requests for amendments) under 10 CFR Part 50 and early site permit (ESP), design certification (DC), combined license (COL), standard design approval (SDA), or manufacturing license (ML) applications under 10 CFR Part 52 (including requests for amendments).

The principal purpose of the SRP is to assure the quality and uniformity of staff safety reviews. It is also the intent of this plan to make information about regulatory matters widely available and to improve communication between the NRC, interested members of the public, and the nuclear power industry, thereby increasing understanding of the NRC's review process.

Background

The NRC first issued the SRP in 1975 as NUREG-75/087. It was developed from many years of NRC experience in establishing safety requirements and staff experience in applying those requirements in evaluating the safety of various designs for nuclear facilities. NRR Office Letter No. 2, dated August 12, 1975, established the SRP as a routine tool for the NRC staff to use in evaluating the safety of nuclear power plant designs. Specifically, that office letter described the SRP as representing "the integrated result of the hundreds of conscious choices made by the staff and by the nuclear industry in developing design criteria and design requirements for nuclear power plants" and "the most definitive basis available for specifying the NRC's interpretation of an acceptable level of safety for light-water reactor facilities."

Following an extensive revision program, the NRC reissued the SRP as NUREG-0800 in July 1981. This revision identified all NRC requirements that were relevant to each review topic; described how a reviewer would determine that safety requirements had been met; and incorporated a number of newly established regulatory positions, including those related to the Three Mile Island (TMI) Action Plan.

In 1991, the NRC established the Standard Review Plan Update and Development Program (SRP-UDP) to update NUREG-0800 for use in reviewing future reactor design applications. The staff subsequently issued an "Implementing Procedures Document (IPD)," NUREG-1447, in May 1992 to describe the SRP-UDP and establish procedures for updating the SRP. This update reflected the experience of the safety reviews conducted on design certification applications for evolutionary nuclear power plant designs. The SRP-UDP resulted in a draft revision to the SRP in 1996. NRC staff used acceptance criteria and procedures introduced in the 1996 draft in reviewing license amendment applications and new applications submitted under 10 CFR Part 52, provided that the changes embodied in it were based on new regulations or regulatory guidance approved through other means. In addition, new SRP sections issued as part of the 1996 draft were used as the primary means to evaluate new applications submitted

under 10 CFR Part 52 (e.g., Section 14.3, "Inspections, Tests, Analyses, and Acceptance Criteria - Design Certification") since these sections represented the only guidance available for the given review area. Applicants under 10 CFR Part 52, however, were not required to address these new SRP sections in their applications.

In 2005, the Commission directed the staff to revise applicable sections of the NUREG-0800, other guidance documents and office procedures to ensure up-to-date guidance would be available for the next generations of staff that would be responsible for reviewing and licensing new sites and new reactors. The staff was to develop an integrated and continuing plan for updating licensing review guidance and provide the plan, along with a schedule for completion, to the Commission. "Briefing of Status of New Site and Reactor Licensing," (M050406) Staff Requirements Memorandum dated May 10, 2005 (ML051300673). The staff response to this SRM is contained in SECY-06-0019, "Semiannual Update of the Status of New Reactor Licensing Activities and Future Planning for New Reactors," dated January 31, 2006. In the next semiannual update, SECY-06-0187 dated August 25, 2006, the staff informed the Commission that they had accelerated the SRP schedule to March 2007.

In Staff Requirements — COMGBJ-10-0004/COMGEA-10-0001, "Use of Risk Insights to Enhance Safety Focus of Small Modular Reactor Reviews," dated August 31, 2010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML102510405), the Commission provided direction to the staff on the preparation for, and review of, small modular reactor applications, with near-term focus on integral pressurized-water reactor (iPWR) designs. The Commission directed the staff to more fully integrate the use of risk insights into preapplication activities and the review of applications and, consistent with regulatory requirements and Commission policy statements, to align the review focus and resources to risk-significant structures, systems, and components (SSCs) and other aspects of the design that contribute most to safety in order to enhance the efficiency of the review process. The Commission directed the staff to develop a design-specific, risk-informed review plan for each small modular reactor to address preapplication and application review activities. The staff responded to this SRM in SECY-11-00XX, "Use of Risk Insights to Enhance the Safety Focus of Small Modular Reactor Reviews," dated Month Day, 2011 (ADAMS Accession No. ML110110688).

This Revision 3, issued "month" 2011, of the SRP Introduction focuses on iPWR designs and the results from staff commitments in SECY-11-00XX. Revision 3 incorporates the following:

- The staff developed a risk-informed and integrated review framework for preapplication and application review activities pertaining to iPWR designs. The framework is intended to be consistent with current regulatory requirements and Commission policy statements and to provide guidance to the staff to align the review focus and resources to risk significant SSCs and other aspects of the design that contribute most to safety in order to enhance the efficiency of the review process. The framework builds upon the current review process to result in a more risk-informed and integrated process for the review of iPWR designs.

- The review framework incorporates a more risk-informed approach by considering both the safety importance and risk significance of SSCs to determine the appropriate level of

review (i.e., the framework uses a "graded review" approach). The determination of whether an SSC is safety related, risk significant, or both is accomplished through current evaluation and decision processes. For example, risk-significance may be determined with the use of insights from the list of risk significant SSCs included in the applicant's reliability assurance program. The framework provides a graded approach in which the staff would conduct the most detailed, in-depth review (analogous to the current review process) for SSCs determined to be both safety related and risk significant, and a progressively less detailed review applied to SSCs determined to be nonsafety related or not risk significant. SSCs determined to be neither safety related nor risk significant would receive the least detailed review under this framework.

- The review framework incorporates a more integrated approach by improving the integration of the performance-based programmatic requirements that are applicable to SSCs into the SSC review process. These programmatic requirements include activities such as tests and surveillances within established programs that can provide assurance of some aspects of SSC performance. In addition, the programs themselves undergo NRC reviews, approvals, and inspections. Certain programmatic requirements (e.g., technical specifications, availability controls for SSCs subject to regulatory treatment for nonsafety systems (RTNSS), maintenance rule) applicable to SSCs include specific activities that correlate directly with specific performance-oriented acceptance criteria identified in the respective section of the standard review plan (e.g., those criteria related to SSC capabilities, reliability, and maintainability). In the areas in which such correlation exists, the framework provides for identifying the programmatic requirements (e.g., a test or inspection) as part of the SSC review and for using these requirements to augment or replace, as appropriate, technical analysis and evaluation techniques the staff currently applies to address the performance-oriented acceptance criteria. For example, the monitoring and analyses of an SSC's performance that are associated with its inclusion within an applicant's reliability assurance program and maintenance rule program may be sufficient to satisfy performance-oriented acceptance criteria pertaining to the reliability, availability, and maintainability of the SSC. While the staff would continue conducting the detailed, in-depth review, including independent technical analysis and evaluation, for SSCs determined to be both safety-related and risk significant, for SSCs determined to be nonsafety related and/or not risk significant the staff would rely increasingly on programmatic requirements to satisfy performance-oriented acceptance criteria for such SSCs,

- The NRC will implement the review framework for each iPWR design application. During the preapplication period, the staff will prepare "design-specific review plans"—a unique plan for each iPWR design. Each plan would identify the specific preapplication and application review activities and the schedule for those activities. Each plan would provide guidance to support the staff's review activities and their documentation by incorporating provisions to tailor the SRP and the standard template for the safety evaluation report (SER) to the specific design (i.e., SRP (and corresponding SER) sections added, deleted, or modified appropriate to specific design features and SSCs). The plans would provide for ongoing communications and interactions among the staff, applicant, and other stakeholders to support the early identification and resolution of

both technical and regulatory issues and to address the scope and scheduling of activities.

- Implementation of the revised review framework can also include organizational changes such as increased use of "review team" concepts, cross-disciplinary reviews and interactions, and emphasis on preapplication exchanges with applicants and within the NRC staff.

Objectives of the SRP

The SRP is intended to be a comprehensive and integrated document that provides the reviewer with guidance that describes methods or approaches that the staff has found acceptable for meeting NRC requirements. Implementation of the criteria and guidelines contained in the SRP by staff members in their review of applications provides assurance that a given design will comply with NRC regulations and provide adequate protection of the public health and safety. The SRP also makes the staff's review guidance for licensing nuclear power plants publicly available and is intended to improve industry and public stakeholder understanding of the staff review process. It should be noted that the SRP is not a substitute for NRC regulations, and compliance with the SRP is not required.

In addition to documenting current methods of review, the SRP provides a basis for orderly modification of the review process. The NRC disseminates information regarding current safety issues and proposed solutions through various means, such as generic communications and the process for treating generic safety issues. When current issues are resolved, it is necessary to determine the need, extent and nature of revision that should be made to the SRP to reflect new NRC guidance.

The staff should use the SRP as superseded or supplemented by new or revised regulations, regulatory guidance, staff analyses of previous applications, and other published staff positions to perform its review of a power reactor operating license application and a proposed change to an existing operating license under 10 CFR Part 50, or a new reactor license application under 10 CFR Part 52.

Scope of Review of License Applications (Initial Applications and Amendments)

Because the staff's review constitutes an independent audit of the applicant's analysis, the staff may emphasize or de-emphasize particular aspects of an SRP section, as appropriate, for the application being reviewed. Prior to the initiation of a review, the technical branch chief and assigned reviewer establish the scope and depth of the review to be performed, including the use of acceptance criteria and review guidelines to be used. In some cases, the staff may propose justification for not performing certain reviews called for by the SRP. These areas of increased or decreased emphasis are acceptable, if the reviewer has management approval and documents the scope and depth of the review in the SER. Examples of acceptable variations in the scope of a review include reduced emphasis on design reviews that the design and its underlying conditions of acceptance are identical to that of another unit that was recently reviewed and approved or increased emphasis on certain aspects of the design review as a result of recent operating experience or consideration of unique design features that are not

addressed in the SRP. Risk-insights can also be used by considering the risk significance of SSCs to determine the type and depth of review. The staff should generally limit its review of a proposed amendment to an existing operating license to those parts of the SRP that are directly affected by the proposed change.

The SRP will provide pertinent review guidance to the staff for review of new license applications submitted under 10 CFR Part 52. This will include ESP, DC, COL, SDA, and ML applications. The SRP sections applicable to a COL application for a new light-water reactor (LWR) are based on Regulatory Guide (RG) 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)." The SRP sections applicable to an ESP and a DC application are based on the site-related sections and design-related sections of RG 1.206. Furthermore, RG 1.206 delineates different content based on whether the COL application references an ESP, a DC, both or neither.

In general, review of a SDA or a ML application will be similar to that of a DC.

The SRP was originally written for 10 CFR Part 50 license applications. For DC and COL applications submitted under 10 CFR Part 52, the level of design information reviewed should be consistent with that of a final safety analysis report (FSAR) submitted in an OL application. However, verification that the as-built facility conforms to the approved design is performed through the inspections, tests, analyses, and acceptance criteria (ITAAC) verification process.

For the review of COL applications, specific sections of the SRP will be used to review operational programs. The review will be performed consistent with guidance contained in SECY-05-0197, "Review of Operational Programs in a Combined License Application and Generic Emergency Planning Inspections, Tests, Analyses, and Acceptance Criteria," and the related SRM dated February 22, 2006. Consistent with this guidance, the staff will review and obtain a reasonable assurance finding on the program and its implementation schedule. In addition, the staff will include a license condition on subsequent implementation milestones for each program for which specific implementation requirements are not specified in the regulations. In lieu of the implementation schedule the applicant may propose inspections, tests, analyses, and acceptance criteria for the program.

Deviation from the SRP by Applicants

Because the SRP generally describes an acceptable means of meeting the regulations, but not necessarily the only means, applications may deviate from the acceptance criteria in the SRP. On March 10, 1982, the Commission approved 10 CFR 50.34(g), "Conformance with the Standard Review Plan (SRP)." 10 CFR 50.34(g) was subsequently renumbered as 10 CFR 50.34(h). Specifically, § 50.34(h) requires applications for light water cooled nuclear power plant operating licenses docketed after May 17, 1982, to include an evaluation of the facility against the SRP in effect on May 17, 1982, or the SRP revision in effect six months prior to the docket date of the application, whichever is later. The evaluation must include an identification and description of all differences in design features, analytical techniques, and procedural measures proposed for a facility and those corresponding features, techniques, and measures given in the SRP acceptance criteria. Where such a difference exists, the evaluation shall discuss how the alternative proposed provides an acceptable method of complying with

those rules or regulations of the Commission, or portions thereof, that underlie the corresponding SRP acceptance criteria. Similar provisions are in 10 CFR Part 52 contents of application sections of the different license processes contained in the Subparts to 10 CFR Part 52. Staff guidance for reviewing the applicant's evaluation is contained in SRP Chapter 1.0, "Introduction and Interfaces."

The General Design Criteria (GDC) do not apply to the plants that received construction permits (CPs) before 1971. For these plants, the Principal Design Criteria (PDC) in the CP, which are discussed in the FSAR, apply. For amendment requests for plants to which the GDC do not apply, the review should follow the SRP in light of applicable plant-specific PDC. In addition, certain identified SRP acceptance criteria are not readily applicable to new light-water reactor designs that use simplified, passive, or other innovative means to accomplish their safety functions.

iPWR DESIGN PREAPPLICATION ACTIVITIES AND APPLICATION REVIEWS

Background

The SRP comprises 19 chapters (corresponding to the format/content of safety analysis reports), with each chapter containing multiple sections/subsections, each one applicable to a specific SSC or topic. Each section/subsection supports a stand-alone review in that each includes a description of the scope of review, identification of the acceptance criteria to be satisfied, and a step-by-step procedure for the reviewer to use to obtain a finding of reasonable assurance that the applicant has adequately addressed the NRC regulations associated with the SRP section/subsection.

Consistent with the structure of the SRP, the staff reviews an application against each SRP section/subsection. Typically, the staff reviews each SSC and topic identified in the application against the respective SRP section/subsection. A particular SSC, for example, would be reviewed against SRP Section x.y.z. The review would consider all of the acceptance criteria and include, as appropriate, indepth evaluation, field assessments (e.g., audits), and confirmatory analyses correlated to the acceptance criteria. It would result in a finding of reasonable assurance that the applicant has adequately addressed the NRC regulations associated with the respective SRP section. In addition to the review against SRP Section x.y.z, the programmatic requirements applicable to that SSC would be subject to separate reviews, often by different reviewers, against other SRP sections/subsections (e.g., Section 14.2, "Initial Plant Test Program—Design Certification and New License Applicants"; Section 14.3 Severe Accidents, "Inspections, Tests, Analysis, and Acceptance Criteria"; Chapter 16, "Technical Specifications"; Section 17.4, "Reliability Assurance Program (RAP)"; Section 17.6, "Maintenance Rule"; and Chapter 19, "Severe Accidents," which includes availability controls regarding RTNSS).

The current review process provides for a thorough and comprehensive review of each SSC. Such a review is achieved, in part, by applying a focused perspective that provides for several reviews of each SSC by separate reviewers using different (focused) SRP sections/subsections. The following hypothetical example illustrates this approach:

The functions of the "Q" system include providing specified fluid flow rates under varying operating conditions. The review against SRP Section x.y.z likely includes analysis and evaluation of piping materials and dimensions, various system design parameters, motor/pump characteristics, and other aspects to find, with reasonable assurance that the specified flow rates are appropriate given the function of the system and can be delivered by the system under the varying operating conditions. Separately, the review against SRP Section 14.2 may identify a startup test that demonstrates the "Q" system's capability (i.e., specified flows under the varying operating conditions); the reviews against SRP Chapter 16, Section 17.4, and Section 17.6 may find the programs acceptable; and the review against Section 14.3 may identify ITAAC that verify the "Q" system's capability.

In contrast to the current review process, under the iPWR review framework, the staff would review each SSC from all different perspectives once, rather than sequentially by different reviewers. The iPWR review framework integrates review activities wherever possible in order to reduce the time and the level of effort the staff must expend to review SSCs that are nonsafety related and not risk significant. In addition, the use of the programmatic requirements is generally consistent with a performance-based approach in that it uses observable parameters to monitor performance, includes objective criteria, and ensures that failure to satisfy testing or surveillance requirements do not introduce immediate safety concerns. The net result will be an increased focus on those SSCs of higher safety or risk significance and improved efficiencies in the overall review process by using performance-based approaches to support the staff's review and finding of reasonable assurance related to those SSCs of lower safety or risk significance. Although elements of this approach could be applied to other reactor design or licensing reviews, the framework was prepared specifically for iPWRs and reflects probable schedules and constraints that may not apply to other reactor designs or technologies. Review plans for non-iPWR applications should determine the appropriate use of this framework

Programmatic Requirements

The Atomic Energy Act of 1954, as amended (AEA, as codified in Chapter 23, Title 42 of the *United States Code*, or 42 U.S.C. § 2011(ff), Commission regulations, and Commission policy mandate a number of programs applicable to SSCs. These programs include the following:

- technical specifications
- availability controls (RTNSS)
- reliability assurance program
- maintenance rule
- initial plant test program
- ITAAC

The AEA, specifically 42 U.S.C. § 2232(a), provides the basis for technical specifications. Requirements pertaining to the maintenance rule, initial plant test program, and ITAAC appear in 10 CFR Part 50 and 10 CFR Part 52. Commission policy identifies requirements pertaining to the reliability assurance program and RTNSS for passive plant designs.

The regulations in 10 CFR Part 52 require applicants for either a certified design or a COL to have these programs. The staff's review of these programs provides input to the overall safety finding to support DC and COL issuance. There are generally corollaries to these programs and requirements within the licensing provisions of 10 CFR Part 50. The appropriate use of the iPWR framework for applications using the 10 CFR Part 50 licensing process would need to be addressed in the specific construction permit and design review plan(s).

Acceptance Criteria

The NRC staff begins review of a specific SSC by gaining an understanding of its safety functions, design overview, modes of operation, relationships to other systems, and contributions to risk significance in terms of event initiation or mitigation. Based on this information, the staff continues its review using the SRP and identifying where design or technology differences may require deviations or adjustments from the existing guidance developed for large LWR designs. Each SRP section includes acceptance criteria that address the respective SSC functional requirements or design features (defined for current large LWR designs), protection from potential hazards, and other regulatory requirements.

For most SSCs, the applicable SRP section includes acceptance criteria that address aspects of design and, in addition, acceptance criteria that address aspects of demonstrated performance (i.e., performance-oriented criteria). The performance-oriented criteria typically address one or more attributes of SSC design or operation. Variations within the SRP mean that a single acceptance criterion may address more than one attribute, while in other cases multiple acceptance criteria address a single attribute. To facilitate the review process and support a more deliberative assessment of how programmatic requirements might relate to specific acceptance criteria, the following list of attributes is defined:

- Capability—The criterion addresses means to demonstrate that the SSC is capable of performing its function(s) in accordance with its design. (Note: the functional requirements of an SSC and adequacy of some aspects of the design need to be addressed by a design review/evaluation.)

- Availability—The criterion addresses the requisite availability specifications for the SSC.

- Reliability—The criterion addresses the requisite reliability specifications for the SSC.

- Maintainability—The criterion addresses the means for ensuring SSC performance through effective monitoring and maintenance.

- Codes/Standards—The criterion addresses requisite materials, design, fabrication, and quality consistent with applicable codes and standards.

- Environmental Effects:
  - External (e.g., effects of natural phenomena (GDC 2, "Design Bases for Protection Against Natural Phenomena")—The criterion specifies that the SSC will withstand, or is protected against, effects from external sources.
  - Internal (e.g., GDC 4, "Environmental and Dynamic Effects Design Bases")—The criterion specifies that the SSC will withstand, or is protected against, effects from internal sources such as dynamic effects, systems interactions, equipment failure, and radioactive contamination.

Integrating Programmatic Requirements into the Review Process

The programmatic requirements correlate with the SRP acceptance criteria in that several of the programmatic requirements directly align with, and support, attributes of the performance-oriented acceptance criteria. This relationship between programmatic requirements and acceptance criteria enables integration of the review of programmatic requirements and the review of SSCs against the respective SRP section/subsection. Table 1 illustrates this correlation. The correlation for individual SSCs is determined by the SSC-specific acceptance criteria and the specific programmatic requirements applicable to the respective SSCs.

Table 1 Correlation—Acceptance Criteria Attributes and Program Requirements

Program Requirement/ Acceptance Criteria Attribute	Technical Specification	Availability Control	Reliability Assurance Program	Maintenance Rule	Initial Test Program	ITAAC
Capability	Likely	Not Likely	Not Likely	Likely	Likely	Likely
Availability	Likely	Likely	Likely	Likely	Not Likely	Not Likely
Reliability	Likely	Likely	Likely	Likely	Not Likely	Not Likely
Maintainability	Likely	Likely	Likely	Likely	Likely	Not Likely
Codes/Standards	Not Likely	Not Likely	Not Likely	Not Likely	Not Likely	Likely
Environmental Effects	Not Likely	Not Likely	Not Likely	Not Likely	Not Likely	Likely

Integrated Review Approach

This review framework incorporates a more integrated approach by improving the integration into the SSC review process of the performance-based programmatic requirements that are applicable to SSCs. The subject programmatic requirements include activities such as tests and surveillances within established programs that can provide assurance of some aspects of SSC performance. In addition, the programs themselves undergo NRC reviews, approvals, and

inspections. Those specific programmatic requirements (e.g., a test or inspection), which correlate to attributes of acceptance criteria, illustrated in Table 1, are candidates for addressing specific SRP acceptance criteria – either to augment the independent engineering analysis/evaluation or to replace the independent engineering analysis/evaluation that the staff traditionally applied to address the performance-oriented acceptance criteria. Certain programmatic requirements (e.g., technical specifications, availability controls for RTNSS SSCs, maintenance rule) applicable to SSCs include performance-based criteria (e.g., SSC availability, reliability, maintainability) that correlate directly with specific acceptance criteria identified in the respective section of the standard review plan. Where such correlation exists, the framework provides for identifying the programmatic requirements as part of the SSC review and, additionally, using the applicable elements (e.g., tests or inspections) of the programmatic requirements to augment or replace, as appropriate, technical analysis and evaluation techniques. For example, the monitoring and analyses of an SSC's performance that are associated with its inclusion within an applicant's reliability assurance program and maintenance rule program may be sufficient to satisfy performance-oriented acceptance criteria pertaining to the reliability, availability, and maintainability of the SSC. The following hypothetical example illustrates this approach:

The functions of the "Q" system include providing specified fluid flow rates under varying operating conditions. The applicable SRP section includes both acceptance criteria pertaining to aspects of the system design and acceptance criteria that are performance-oriented. The review against the specific performance-oriented acceptance criteria identified in SRP subsection x.y.z could either be augmented – or replaced, as appropriate – by use of specific elements (e.g., tests or inspections) within programmatic requirements to satisfy those selected acceptance criteria. For example, a startup test may be specified to demonstrate the "Q" system's capability (i.e., specified flows under the varying operating conditions); inclusion of the "Q" system in RAP may assure its availability and reliability; provisions for maintenance of the "Q" system may be addressed by the maintenance rule program; and, ITAAC may verify this capability.

Risk-Informed Review Approach

The review framework incorporates a more risk-informed approach by considering both the safety importance and risk significance of SSCs to determine the appropriate level of review (i.e., the framework uses a graded review approach). The staff determines whether an SSC is safety related, risk significant, or both as a prerequisite to implementing the review framework through current evaluation and decision processes.

The process for determining risk-significance of SSCs consists of four steps. The first step is to collect and examine design/plant-specific information that can facilitate risk-significant determinations. The second step is to identify plant systems and associated functions that are modeled (explicitly or implicitly) or included in the following analyses and programs:

a) the design/plant-specific risk assessments and severe accident evaluations that cover the full spectrum of potential events and the range of plant operating modes considered in SRP Section 19.0;

b) the list of risk-significant SSCs included in the RAP, and
c) the RTNSS SSCs.

The third step is to categorize each of the system functions identified in step 2 as risk-significant if it has been included in the RAP or RTNSS. System functions that are not included in RAP and are not included in RTNSS are considered low risk-significant candidates. Guidance for significance determination is provided in interim staff guidance, ISG-018, and its references, such as Regulatory Guide 1.174 and SRP Section 19.2. The fourth, and final, step is to ensure that the identified systems/system functions and associated risk-significance are reasonably reflective of the current design/plant-specific information (e.g., plant design, risk models) and that the information is updated, as needed, throughout the review process. The staff anticipates that during the review of a new design the design/plant-specific information used to identify the systems/system functions and associated risk significance may change as review of the PRA and RAP evolve.

iPWR Risk-Informed and Integrated Review Framework

The staff accomplishes its review of iPWR designs by applying the risk-informed and integrated review process. The initial staff activities under this process are similar to the existing practices in that both require a general understanding of the functions of a specific SSC, overview of design, modes of operation, relationships to other systems, and contributions to risk significance in terms of event initiation or mitigation. Based on these general concepts, the staff assesses the appropriate safety classification and risk significance for the various SSCs under review. It is important however that the staff identify the assessment of risk significance and likely regulatory treatment (e.g., technical specifications, RTNSS, reliability assurance program) early in the review process in order to ensure that staff resources are directed to those SSCs with the highest safety or risk significance. In addition, when assessing acceptance criteria and possible application of programmatic requirements, the staff should consider the guidance in the review procedures section of the SRP section, applicable regulatory guides, and recent operating experience to ensure that possible safety issues are not overlooked.

Figure 1 illustrates the framework for this review process. For a particular SSC, the level of review is derived from both the SSC's safety importance (i.e., safety related or nonsafety related) and risk significance (i.e., risk significant or not risk significant). Four review levels (labeled as A1, A2, B1, and B2 in Figure 1) correlate to the safety importance and risk significance of the SSC under review.

A graded approach characterizes the four review levels. The staff applies a detailed, in-depth analysis and evaluation review (analogous to the current review process) to safety-related and risk-significant SSCs, and it applies a progressively less-detailed review to other SSCs. Programmatic requirements (e.g., tests or inspections) are identified to augment the review of safety-related and risk-significant SSCs; and, the programmatic requirements are progressively used, as applicable, in lieu of analysis and evaluation techniques to address specific SRP performance-oriented acceptance criteria for SSCs of lower safety or risk significance. The programs, including specific elements referenced for SSC performance-oriented acceptance criteria, are reviewed in accordance with established guidance elsewhere in the SRP (e.g., Section 14.2 for initial plant test program). This framework also advances, where appropriate,

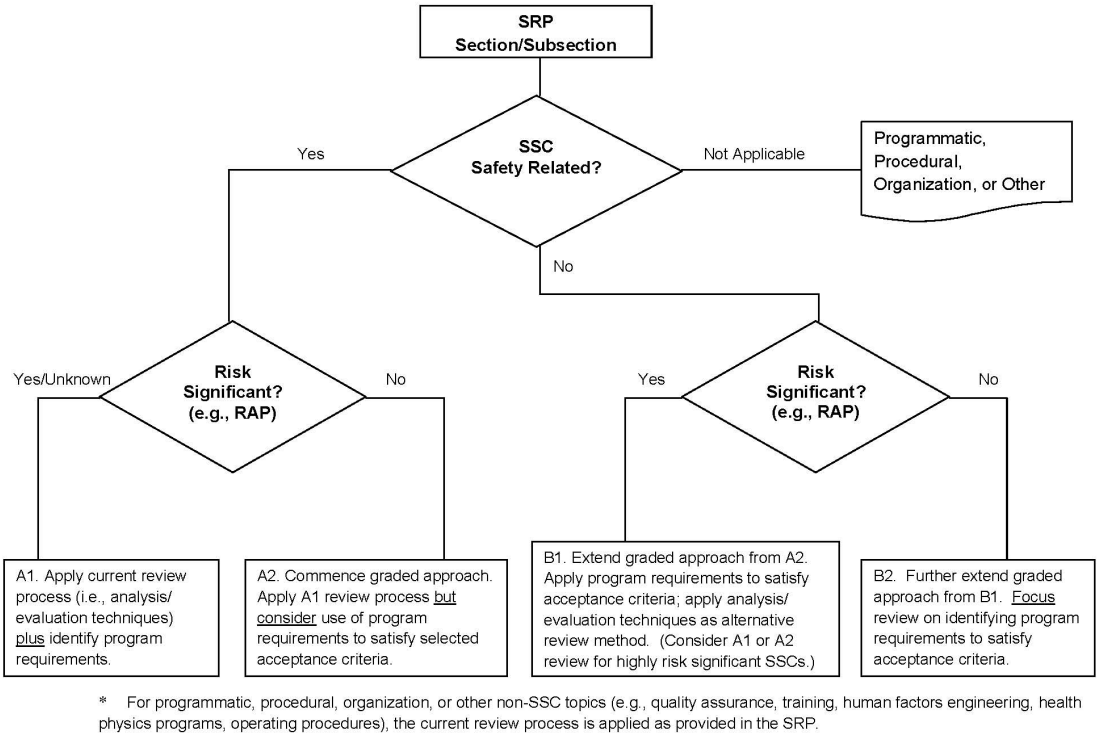
the use of a performance-based regulatory approach, which is consistent with longstanding goals of the agency.

Framework Characteristics

- The framework characterizes a review process. The determination of whether an SSC is safety related, risk significant, or both is a prerequisite for beginning the review and is accomplished through current evaluation and decision processes (e.g., process used to identify SSCs that are included in the reliability assurance program). This iPWR review process is not intended to introduce additional classifications or designations; however, an assessment of the classification and risk significance should support and define other parts of the review.

- Graded, rather than absolute, differences define the four review levels. Although depicted by four distinct boxes in Figure 1, the framework implements the graded approach characterized by progressively less use of analysis/evaluation techniques and increased use of programmatic requirements to address acceptance criteria (A1 to B2). The categories used in Figure 1 are similar to those defined in 10 CFR 50.69, "Risk informed categorization and treatment of structures, systems and components for nuclear power reactors."

- The framework is applicable to the review of all SSCs, but it is not directly applicable to the review of programmatic, procedural, organizational, or other non-SSC topics. For programmatic, procedural, organizational, or other non-SSC topics, the current review process is applied consistent with the respective SRP section/subsection (e.g., Section 18 of the SRP for Human Factors Engineering). In some cases, the subject programs are used within the framework (e.g., a test within the initial plant testing program reviewed using Section 14.2 of the SRP may be used to address a performance-oriented SRP acceptance criteria for an SSC). In other cases, the program or topical area may address regulatory requirements that are not amenable to a risk-informed approach (e.g., waste management systems).



* For programmatic, procedural, organization, or other non-SSC topics (e.g., quality assurance, training, human factors engineering, health physics programs, operating procedures), the current review process is applied as provided in the SRP.

Figure 1 Risk-informed integrated review framework (iPWRs)

Framework Implementation—SSC Reviews

- For SSCs determined to be both safety related and risk significant, the level of review is denoted as A1. For such SSCs, the review is consistent with the current review process in that the review typically involves detailed analysis and evaluation techniques to satisfy the SRP acceptance criteria. In addition, however, the review identifies those programmatic requirements applicable to the SSC in order to augment the review scope and to support the overall safety review of the application.

  For example, the SSC is likely included within the reliability assurance program, included within the maintenance rule program, addressed by technical specifications, included within the initial plant test program, and addressed by ITAAC. The review includes identification of these applicable programmatic requirements to augment the technical analysis and evaluation.

- For SSCs determined to be safety related and not risk significant, the level of review is denoted as A2. The review is similar to the A1 review in that emphasis remains on analysis and evaluation techniques; however, the graded review approach commences at the A2 level. The review identifies programmatic requirements to augment analysis and evaluation techniques as the "A1" review and, in addition, identifies programmatic

requirements (e.g., tests or inspections) to be used in lieu of some analysis and evaluation techniques for specific performance-oriented SRP acceptance criteria..

The acceptance criteria, which may be satisfied, either in whole or in part, by performance-based activities (e.g., tests or inspections) within programmatic requirements will vary among the reviewed SSCs. It is expected that the reviewer will consider the identified programmatic requirements as the means to satisfy certain acceptance criteria. However, analysis and evaluation techniques remain the review emphasis.

For example, technical specifications may address aspects of the SSC's capability, availability, and reliability that directly correlate to certain acceptance criteria. In such situation, the review identifies the specific requirements (e.g., surveillances) within the technical specifications as sufficient to satisfy the performance-oriented acceptance criteria in lieu of separate technical analysis and evaluation.

- For SSCs determined to be nonsafety related and risk significant, the level of review is denoted as B1. The graded review approach is extended from the "A2" level. The review emphasis shifts from applying analysis and evaluation techniques to identifying those programmatic requirements that satisfy SRP acceptance criteria. For those acceptance criteria that cannot be satisfied, either in whole or in part, by performance-based activities (e.g., tests or inspections) within programmatic requirements, the appropriate analysis and evaluation techniques are applied (i.e., relying on existing review methods described in the SRP). Note that for SSCs determined to be highly risk significant, it may be appropriate to perform more detailed reviews using methods associated with reviews performed at the A1 or A2 level.

  The review, including decisions on the use of programmatic requirements and analysis/evaluation techniques, should focus on the functions and characteristics of the SSC that pertain to its risk significance. The staff expects that the reviewer will identify the programmatic requirements that correlate with the performance-oriented acceptance criteria and emphasize the use of these programmatic requirements as the means to satisfy the acceptance criteria. The reviewer continues to address acceptance criteria pertaining to aspects of design by means of appropriate analysis and evaluation techniques.

  For example, RTNSS, availability controls, similar to technical specifications, may stipulate aspects of an SSC's performance capability, availability, and reliability that directly correlate to certain SRP acceptance criteria. In such a situation, the review identifies the specific availability controls as sufficient to satisfy these performance-oriented acceptance criteria. Alternatively, for a design-related acceptance criterion pertaining to the effects of natural phenomena (e.g., seismic loading), no programmatic requirements correlate, and the review includes appropriate technical analysis and evaluation techniques.

- For SSCs determined to be both nonsafety related and not risk significant, the level of review is denoted as B2. The graded review approach is further extended from the B1

level. At the B2 level, both the design-related review and the programmatic requirements are anticipated to be minimal. For the performance-oriented acceptance criteria, the review is focused on identifying those performance-based activities (e.g., tests or inspections) within the applicable programmatic requirements which can be used to satisfy the SRP acceptance criteria.

For such SSCs, the staff expects that the reviewer will conduct a minimal review against acceptance criteria pertaining to design aspects and, if needed, will identify, from among the programmatic requirements applicable to the SSC, those programmatic requirements that provide the means to satisfy the performance-oriented acceptance criteria. The reviewer may consider identifying a modification of a program requirement in order to satisfy an acceptance criterion (e.g., a modified or additional test of the SSC to be performed during the initial plant test program). The reviewer should consider application of appropriate analysis and evaluation techniques to be the alternative review method.

For example, for a SSC determined to be nonsafety related and not risk significant, the initial plant test program may be the only applicable programmatic requirement. One or more specific startup tests may satisfy all the acceptance criteria not related to the design review. Alternatively, the review may identify the need for additional specific tests to satisfy the acceptance criteria rather than the need to apply analysis and evaluation techniques.

- Review levels A1 through B2 reflect a graded approach to reviews in that performance-based activities (e.g., tests or inspections) within programmatic requirements are increasingly applied to satisfy performance-oriented SRP acceptance criteria in lieu of applying traditional analysis and evaluation techniques. This approach involves the professional judgment of the reviewer and, therefore, the extent to which programmatic requirements are applied to satisfy the acceptance criteria during A2, B1, and B2 reviews will vary, as do the traditional review approaches given the flexibilities with the SRP. In addition, in cases where iPWR designs include features that differ significantly from large LWR designs, the staff will consider the risk significance of the subject SSCs in the implementation of the requirements in 10 CFR 50.43(e).

Framework Implementation—Examples

The attachment provides examples of applying the risk-informed and integrated review framework to the review of SSCs. The examples demonstrate how programmatic requirements could be applied to the SRP acceptance criteria for selected SSCs. In the examples, where programmatic requirements do not correlate with a specific acceptance criterion, the reviewer would use the existing review method described in the SRP for that particular acceptance criterion. If a design or licensing application includes an SSC involving new or different technology not addressed by the existing SRP, the staff will address this SSC as part of the design specific review plan, where the staff will develop necessary functions, design requirements, acceptance criteria, etc. The examples are hypothetical (i.e., not applicable to a specific design) and, therefore, should not be used for any specific iPWR design (reviewers should use design-specific review plans).

Organization of SRP

Each SRP section is organized as follows:

> ***Review Responsibilities**: This subsection identifies the primary and, as applicable, secondary review functions. The organizational review responsibilities are maintained separate from the SRP.*

I. Areas of Review

The areas of review subsection describes the scope of review by the branch having primary responsibility for the identified functional area. Specifically, this subsection contains a description of the systems, components, analyses, data, or other information that is reviewed as part of the particular Safety Analysis Report (SAR) section. It also contains a discussion of the information needed or the review expected from other branches to permit the primary review branch to complete its review, as well as a list of applicable interfacing sections.

II. Acceptance Criteria

The acceptance criteria subsection identifies the applicable NRC requirements including specific regulations, NRC orders, and industry codes and standards referenced by regulations. Note, NRC orders are temporal in nature and are not applied to applicants. NRC orders are imposed when an applicant is issued a license.

For new reactor license applications submitted under 10 CFR Part 52, the applicant is also required to address the proposed technical resolution of unresolved safety issues (USIs) and medium- and high-priority generic safety issues (GSIs) that are identified in the version of NUREG-0933 current on the date 6 months before application and that are technically relevant to the design, TMI requirements, and relevant operating experience[1]. These requirements are not identified within specific SRP sections, rather, these requirements are identified within SRP Chapter 1, "Introduction and Interfaces." An applicant will tabulate information within Chapter 1, but will address the technical issues to satisfy the requirements within the specific sections, themselves.

This subsection also identifies the regulatory guidance which the staff has determined to provide an acceptable approach for satisfying the applicable requirements (i.e., SRP acceptance criteria). The types of guidance documents include but are not limited to: Regulatory Guides, Commission policy as described in SECY papers and corresponding Staff Requirement Memoranda, NRC-approved or endorsed industry codes and standards, certain technical reports (e.g., NUREGs and topical reports and corresponding safety evaluations), and Branch Technical Positions (BTPs), which are provided as appendices to

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[1]Consideration of operating experience for design certification applications only is currently addressed in a SRM, dated February 15, 1991, on SECY-90-377, "Requirements for Design Certification under 10 CFR Part 52."

the SRP. BTPs typically set forth solutions and approaches previously determined to be acceptable by the staff in dealing with a similar safety or design matter. These solutions and approaches are documented in this form so that staff reviewers can take uniform and well-understood positions as similar matters arise in the review of other applications. Each SRP section explicitly states that the SRP is not a substitute for the NRC's regulations, and compliance with them is not required. However, applicants are required to identify differences from the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide an acceptable method of complying with the NRC's regulations.

Lastly, this subsection also contains, as necessary, the technical bases for applicability of the requirements to the subject areas of review or relationship of regulatory guidance to the associated requirement.

III. Review Procedures

This subsection discusses how the review is accomplished. The subsection is a step-by-step procedure to be implemented by the reviewer to obtain reasonable assurance that the applicable regulatory requirements have been met. These review procedures are based on the identified SRP acceptance criteria. For deviations from these specific acceptance criteria, the staff should review the applicant's evaluation of how the proposed alternatives to the SRP criteria provide an acceptable method of complying with the relevant NRC requirements identified in specific review areas.

For new reactor license applications submitted under 10 CFR Part 52, this subsection should address staff review procedures for how operating experience insights identified in generic letters and bulletins or equivalent international operating experience has been incorporated into the plant design.

Evaluation Findings

This subsection presents the type of conclusion that is sought for the particular review area. For each SRP section, the staff's conclusion is incorporated into a published Safety Evaluation Report (SER). The SER describes the review and the aspects of the review the staff emphasized, and identifies (1) the changes the applicant made to the application, (2) the matters addressed by additional information, (3) the matters for which additional information is expected to be forthcoming, (4) the matters remaining unresolved, and (5) deviations from the SRP in design and operational programs, and the bases for the acceptability of such deviations. The SER also clearly identifies any requested exemptions from the regulations and the staff's basis for its determinations on these requests.

IV. Implementation

This subsection provides guidance to applicants and licensees regarding the NRC's plans for using the SRP section. 10 CFR 50.34(h) and similar provisions in 10 CFR Part 52 require each application to include an evaluation of the facility against the SRP of record 6 months prior to docketing, including all differences between the design features, analytical techniques, and procedural measures proposed for a facility and those in the SRP acceptance criteria.

While the applicant's evaluation is performed against the SRP in effect 6 months prior to the docket date of the application, the NRC staff will use the SRP in effect at the time of the application review.

V. References

This subsection lists the references used in the review process.

Maintenance of the SRP

The SRP will be revised and updated periodically as the need arises to clarify the content or correct errors and to incorporate modifications approved by the Director of the Office of Nuclear Reactor Regulation or the Director of the Office of New Reactors.

A revision number and publication date is printed at a lower corner of each page of each SRP section. Since individual sections have been, and will continue to be, revised as needed, the revision numbers and dates will not be the same for all sections. As necessary, corresponding changes to the RG 1.206 will also be made. Comments may be submitted electronically by email to NRR_SRP@nrc.gov. Notices of errors or omissions should also be sent to the same address.

Comment resolution will be addressed in subsequent SRP revisions. Prior to revision to individual sections, comment resolution may establish a basis for how alternatives to the NUREG-0800 acceptance criteria provide an acceptable method of complying with the NRC's regulations.

Attachment:
Applying Risk-Informed and Integrated
Review Framework

ATTACHMENT

Examples—Applying the Risk-Informed Integrated Review Framework

Note: The following examples are provided to demonstrate how programmatic requirements could be applied to the SRP acceptance criteria for selected SSCs. In the examples below, where programmatic requirements do not correlate with a specific acceptance criterion, the reviewer would use the existing review method described in the SRP for that particular acceptance criterion. If a design or licensing application includes an SSC involving new or different technology not addressed by the existing SRP, the staff will address this SSC as part of the design specific review plan, where the staff will develop necessary functions, design requirements, acceptance criteria, etc. The examples given are hypothetical (i.e., not applicable to a specific design) and, therefore, should not be interpreted as actually applicable to specific iPWR designs (reviewer should use design-specific review plans).

9.2.1 STATION SERVICE WATER SYSTEM

This example is review level B1 (determined to be nonsafety related and risk significant).

SRP Section 9.2.1 identifies the following acceptance criteria:

1. Protection against natural phenomena. Information that addresses requirements of General Design Criterion (GDC) 2 regarding the capability of structures housing the service water system (SWS) and the SWS itself to withstand the effects of natural phenomena will be considered acceptable if the guidance of Regulatory Guide (RG) 1.29, Position C.1 for safety-related portions of the SWS and Position C.2 for nonsafety-related portions of the SWS are appropriately addressed.

   Review: This criterion addresses the attribute of "environmental effects" (external - GDC 2, "Design Bases for Protection against Natural Phenomena"). The criterion is design related and review requires use of technical analysis/evaluation of seismic effects.

2. Environmental and Dynamic Effects. Information that addresses the requirements of GDC 4 regarding consideration of environmental and dynamic effects will be considered acceptable if the acceptance criteria in the following SRP sections, as they apply to the SWS, are met: SRP Sections 3.5.1.1, 3.5.1.4, 3.5.2, and SRP Section 3.6.1.

   In addition, the information will be considered acceptable if the design provisions presented in GL 96-06 and to GL 96-06, Supplement 1 are appropriately addressed.

   Review: This criterion addresses the attribute of "environmental effects" (internal - GDC 4, "Environmental and Dynamic Effects Design Bases").

The criterion is design-related and review requires use of technical analysis/evaluation techniques to address effects regarding internal interactions.

3. Sharing of Structures, Systems, and Components. Information that addresses the requirements of GDC 5 regarding the capability of shared systems and components important to safety to perform required safety functions will be considered acceptable if the use of the SWS in multiple-unit plants during an accident in one unit does not significantly affect the capability to conduct a safe and orderly shutdown and cool-down in the unaffected unit(s).

Review: This criterion (GDC 5, "Sharing of Structures, Systems, and Components") is not applicable to a single-unit site (analysis/evaluation may be necessary for subsequent modules of a multi-module site).

4. Cooling Water System. Information that addresses the requirements of GDC 44 regarding consideration of the cooling water system will be considered acceptable if a system to transfer heat from SSCs important to safety to an ultimate heat sink is provided. In addition, the SWS can transfer the combined heat load of these SSCs under normal operating and accident conditions, assuming loss of offsite power and a single failure, and that system portions can be isolated so the safety function of the system is not compromised.

Review: This criterion (GDC 44, "Cooling Water") includes both design-related and performance-oriented criteria. The staff's design review/evaluation would address the design aspects. The performance-oriented aspect of the criterion may be satisfied by specific performance-based activities (e.g., monitoring and analyses) within programmatic requirements (e.g., availability controls (RTNSS), initial test program).

5. Cooling Water System Inspection. Information that addresses the requirements of GDC 45 regarding the inspection of cooling water systems will be considered acceptable if the design of the SWS permits inservice inspection of safety-related components and equipment and operational functional testing of the system and its components.

Review: This criterion (GDC 45, "Inspection of Cooling Water System") addresses the performance-oriented attribute "maintainability." The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of maintenance rule program, initial plant testing, and ITAAC).

6. Cooling Water System Testing. Information that addresses the requirements of GDC 46 regarding the testing of cooling water systems will be considered acceptable if the SWS is designed for testing to detect degradation in performance or in the system pressure boundary so that the SWS will function reliably to provide decay heat removal and essential cooling for safety-related equipment.

Review: This criterion (GDC 46, “Testing of Cooling Water System”) addresses a combination of performance-oriented attributes—capability, reliability, availability, and maintenance. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of availability controls (RTNSS), RAP, maintenance rule, and ITAAC).

9.5.3 LIGHTING SYSTEMS

This example is review level B1 (determined to be nonsafety related and risk significant).

SRP Section 9.5.3 identifies the following acceptance criteria:

1. Acceptance criteria of the design of the normal and emergency lighting systems, as described in the applicant's safety analysis report (SAR), is based in part on the degree of similarity of the systems design with those for previously reviewed plants with satisfactory operating experience.

Review: This criterion is subjective, but it generally addresses a combination of attributes—capability, reliability, availability, and maintenance. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of availability controls (RTNSS), RAP, maintenance rule, initial plant testing, and ITAAC).

2. The normal lighting system(s) is acceptable if the integrated design of the system(s) will provide adequate station lighting in all areas, from power sources described in Section 8.2 of the SRP that are required for control and maintenance of equipment and plant access routes during normal plant operations.

Review: This criterion addresses a combination of attributes—capability, reliability, and availability. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of availability controls (RTNSS), RAP, initial plant testing, and ITAAC).

3. The emergency lighting system(s) is acceptable if the integrated design of the system(s) will provide adequate emergency station lighting in all areas, required for fire fighting, control and maintenance of equipment used for implementing safe shutdown of the plant during all plant operating conditions, and the access routes to and from these areas.

Review: This criterion addresses a combination of attributes—capability, reliability, availability, and maintenance. The criterion may be satisfied by programmatic requirements (e.g., combination of availability controls (RTNSS), RAP, maintenance rule, initial plant testing, and ITAAC).

4. The lighting systems designs will be acceptable if they conform to the lighting levels recommended in NUREG-0700, which is based on the

Illuminating Engineering Society of North America (IESNA) Lighting Handbook (Reference 2) as related to systems design and illumination levels recommended for industrial facilities.

Review: This criterion addresses a combination of attributes—capability, reliability, availability, and maintenance. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of availability controls (RTNSS), RAP, maintenance rule, initial plant testing, and ITAAC).

9.5.7 EMERGENCY DIESEL ENGINE LUBRICATION SYSTEM

This example is review level B2 (determined to be nonsafety related and not risk significant).

SRP Section 9.5.7 identifies the following acceptance criteria:

1. GDC 2 requirements for SSCs to withstand or be protected from the effects of natural phenomena like earthquakes, tornadoes, hurricanes, and floods apply to safety-related emergency diesel engine lubrication system (EDELS) SSCs. The identification of SSCs required to withstand earthquakes without the loss of capabilities to perform safety functions is listed in RG 1.29. Comprehensive compliance with GDC 2 is reviewed under other SRP sections as specified in subsection I of this SRP section.

   Review: This criterion is design related. The criterion would be addressed by a minimal review pertaining to design aspects. Programmatic requirements are not applicable.

2. GDC 4 requirements for SSCs to be protected against the effects of externally and internally generated missiles, pipe whip, and jet impingement forces of pipe breaks apply to safety-related EDELS SSCs. Comprehensive compliance with GDC 4 is reviewed under other SRP sections as specified in subsection I of this SRP section.

   Review: This criterion is design related. The criterion would be addressed by a minimal review pertaining to design aspects. Programmatic requirements are not applicable.

3. GDC 5 requirements for sharing of SSCs important to safety among nuclear power units are met if each unit has its own diesel generator(s), each with an independent lubrication system.

   Review: This criterion is not applicable to a single-unit site. For a multi-module plant, the criterion would be addressed by a minimal review pertaining to the design aspects. Programmatic requirements are not applicable.

4. GDC 17 requirements of independence and redundancy criteria are applicable to the EDELS. Acceptance is based on the following specific criteria:

A. NUREG/CR-0660, “Enhancement of Onsite Emergency Diesel Generator Reliability.”

Review: This criterion addresses the performance-oriented attributes of “reliability” and, perhaps, “availability” and “maintenance.” The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., maintenance rule program).

B. System operating pressure, temperature differentials, flow rate, and heat removal rate external to the engine in accordance with engine manufacturer recommendations.

Review: This criterion addresses the performance-oriented attribute “capability.” The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., initial plant testing).

C. Sufficient system protective measures to maintain required oil quality during engine operation.

Review: This criterion addresses a combination of performance-oriented attributes—capability, reliability, availability, and maintainability. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of maintenance rule program, initial plant testing).

D. Protective measures (e.g., relief ports) to prevent unacceptable crankcase explosions and to mitigate consequences of such events.

Review: This criterion addresses a combination of performance-oriented attributes—capability, reliability, availability, and maintenance. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of maintenance rule program, initial plant testing).

E. A keep-warm oil lubricating system to maintain engine lubricating oil passages in a warmed and filled state when the diesel engine is in the standby mode.

Review: This criterion addresses a combination of performance-oriented attributes—capability, reliability, availability, and maintenance. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of maintenance rule program, initial plant testing).

F. System design to circulate lubricating oil to the diesel engine during standby to enhance starting capability in conditions under

which the engine-driven oil pump can pressurize the system quickly following engine starts.

Review: This criterion addresses a combination of attributes—capability, reliability, availability, and maintenance. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of maintenance rule program, initial plant testing).

G. Each diesel engine lubricating oil system completely independent of other diesel engines so a single failure will not cause a loss of the required minimum diesel generator capacity as specified in ANSI/ANS-59.52.

Review: This criterion is only applicable to a site with multiple diesels. It addresses a combination of attributes—capability, reliability, availability, and maintenance. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of maintenance rule program, initial plant testing).

H. Onsite lubricating oil storage capacity for each diesel engine sufficient for 7 days operation after any design basis event and a continuous loss of off-site power as specified in ANSI/ANS-59.52.

Review: This criterion addresses a combination of attributes—capability, availability, and maintenance. The criterion may be satisfied by specific performance-based activities (e.g., testing, monitoring and analyses) within programmatic requirements (e.g., combination of maintenance rule program, initial plant testing).