U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

OFFICE OF NUCLEAR REACTOR REGULATION

9.3.5 STANDBY LIQUID CONTROL SYSTEM (BWR)

REVIEW RESPONSIBILITIES

Primary - ~~Auxiliary~~Reactor Systems Branch (~~ASB~~SRXB)[1]

Secondary - Materials and Chemical Engineering Branch (EMCB)
Plant Systems Branch (SPLB)[2]

I. AREAS OF REVIEW

Boiling water reactor (BWR) plants include a standby liquid control system (SLCS) that provides backup capability for reactivity control independent of the control rod system. The SLCS functions by injecting a boron solution into the reactor to effect shutdown. This system has the capability for controlling the reactivity difference between the steady-state operating condition at any time in core life and the cold shutdown condition. The review covers the SLCS design to the point where the system connects to the reactor coolant system (RCS). The ~~ASB~~SRXB[3] reviews the system to determine its adequacy to perform the shutdown function to assure conformance with the requirements of General Design Criteria 2, 26, and 27, and 10 CFR 50.62(c)(4).[4] Other points reviewed by ~~ASB~~SRXB[5] are as follows:

1. The functional performance characteristics of SLCS components and the effects of adverse environmental occurrences, abnormal operational conditions, or accident conditions such as those due to a loss-of-coolant accident (LOCA).

2. The system to determine that a malfunction or a single failure of a component will not reduce the safety-related functional performance capabilities of the system.

3. The system design with respect to the capability to detect, collect, and control system leakage and the capability to isolate portions of the system in case of excessive leakage or component malfunctions.

4. The capability of the system to prevent precipitation of the neutron absorber in components and lines containing the absorber solutions.

5 The provisions for operational testing and the instrumentation and control features that verify that the system is available to operate in the correct mode.

Review Interfaces:[6]

~~ASB~~SRXB[7] also performs the following reviews under the SRP sections indicated:

1. ~~The Core Performance Branch (CPB)~~Determines[8] the adequacy of the specified boron neutron absorber quantities and concentrations required in the primary coolant to assure that the plant can be brought from rated power to cold shutdown at any time in core life with the control rods withdrawn in the rated power pattern as part of its primary review responsibility for SRP Section 4.3.

~~2. Review of flood protection is performed under SRP Section 3.4.1;~~

~~3. Review of the protection against internally generated missiles is performed under SRP Sections 3.5.1.1 and 3.5.1.2;~~

~~4. Review of the structures, systems and components to be protected against externally generated missiles is performed under SRP Section 3.5.2;~~

~~5. Review of high- and moderate-energy pipe breaks is performed under SRP Section 3.6.1; and~~[9]

2. ~~Review to verify~~Verifies that redundant reactivity control systems are not vulnerable to common mode failures ~~is performed under~~as part of its primary review responsibility for[10] SRP Section 4.6.

3. Reviews the design of the SLCS for new designs to verify, to the extent practical, that low-pressure portions of the SLCS that interface with the RCS will withstand full RCS pressure, as part of its primary review responsibility for SRP Section 3.12 (proposed). If designing the SLCS with an ultimate rupture strength capable of withstanding full RCS pressure is not possible, the SRXB verifies that appropriate compensating measures have been taken in accordance with the review provided in SRP Section 3.12 (proposed).[11]

In addition, the ~~ASB~~SRXB[12] will coordinate other branches' evaluations that interface with the overall review of the system as follows:

1. The ~~Structural Engineering Branch (SEB)~~Civil Engineering and Geosciences Branch (ECGB)[13] determines the acceptability of the design analyses, procedures, and criteria

used to establish the ability of Category I structures housing the system and supporting systems to withstand the effects of natural phenomena such as the safe shutdown earthquake (SSE), the probable maximum flood (PMF), and tornado missiles as part of its primary review responsibility for SRP Sections 3.3.1, 3.3.2, 3.5.3, 3.7.1 through 3.7.4, 3.8.4, and 3.8.5. The ECGB also verifies that inservice inspection requirements are met for system components as part of its primary review responsibility for SRP Section 6.6.[14]

2. The review of flood protection is performed by the Plant Systems Branch (SPLB) as part of its primary review responsibility for SRP Section 3.4.1.

3. The review of the protection against internally generated missiles is performed by the SPLB as part of its primary review responsibility for SRP Sections 3.5.1.1 and 3.5.1.2.

4. The review of the structures, systems and components to be protected against externally generated missiles is performed by the SPLB as part of its primary review responsibility for SRP Section 3.5.2.

5. Review of high and moderate-energy pipe breaks is performed by the SPLB as part of its primary review responsibility for SRP Section 3.6.1.[15]

6. The Mechanical Engineering Branch (~~MEB~~EMEB)[16] determines that the components, piping, and structures are designed in accordance with applicable codes and standards as part of its primary review responsibility for SRP Sections 3.9.1 through 3.9.3.

7. The ~~MEB~~EMEB ~~also~~[17] determines the acceptability of the seismic and quality group classifications for system components as part of its primary review responsibility for SRP Sections 3.2.1 and 3.2.2.

8. The ~~MEB~~EMEB ~~also~~[18] reviews the adequacy of the inservice testing program of pumps and valves as part of its primary review responsibility for SRP Section 3.9.6.

9. The Materials and Chemical Engineering Branch (~~MTEB~~EMCB)[19] ~~verifies that inservice inspection requirements are met for system components as part of its primary review responsibility for SRP Section 6.6 and~~[20], upon request, verifies the compatibility of the materials of construction with service conditions.

10. The Instrumentation and Controls ~~Systems~~ Branch (~~ICSB~~HICB)[21] and ~~Power Systems~~Electrical Engineering Branch (~~PSB~~EELB)[22] determine the adequacy of the design, installation, inspection, and testing of instrumentation and electrical components (sensing, control, and power) required for proper operation as part of their primary review responsibility for SRP Sections 7.1 and 8.1, respectively. The HICB also determines that design and quality assurance criteria specified for instrumentation required by the ATWS rule are consistent with criteria established in conjunction with ATWS rulemaking, as part of its primary review responsibility for SRP Section 7.8 (LATER).[23]

~~The review for fire protection, technical specifications, and quality assurance are coordinated and performed by the Chemical Engineering Branch, Licensing Guidance Branch, and Quality Assurance Branch as part of their primary review responsibility for SRP Sections 9.5.1, 16.C, and 17.0, respectively.~~

11. The review for fire protection is coordinated and performed by the SPLB as part of its primary review responsibility for SRP Section 9.5.1.

12. The review for technical specifications is coordinated and performed by the Technical Specifications Branch (TSB) as part of its primary review responsibility for SRP Section 16.0.

13. The review for quality assurance is coordinated and performed by the Quality Assurance and Maintenance Branch (HQMB) as part of its primary review responsibility for SRP Chapter 17.[24]

~~The Equipment Qualification Branch (EQB) reviews the seismic qualification of Category I instrumentation and electrical equipment and the environmental qualification of mechanical and electrical equipment as part of its primary review responsibility for SRP Sections 3.10 and 3.11, respectively.~~

14. The EMEB reviews the seismic qualification of Category I instrumentation and electrical equipment as part of its primary review responsibility for SRP Section 3.10.

15. The SPLB reviews the environmental qualification of mechanical and electrical equipment as part of its primary review responsibility for SRP Section 3.11.[25]

For those areas of review identified above as being ~~reviewed as~~ part of the ~~primary~~ review ~~responsibility of other branches~~under other SRP sections, the acceptance criteria and their methods of application are contained in the referenced SRP sections ~~of the corresponding primary branch~~.[26]

II. ACCEPTANCE CRITERIA

Acceptability of the SLCS design, as described in the applicant's Safety Analysis Report (SAR), is based on specific general design criteria, the ATWS rule,[27] and regulatory guides. The design of the SLCS is acceptable if the integrated design of the system is in accordance with the following criteria:

1. General Design Criterion 2, as related to structures housing the system and the system itself being capable of withstanding the effects of earthquakes. Acceptance is based on meeting the guidance of Regulatory Guide 1.29, Position C-1.

2. General Design Criterion 26, as related to the requirement that two independent reactivity control systems of different design principles be provided, and the requirement that one of the systems shall be capable of holding the reactor subcritical in the cold condition.

3. General Design Criterion 27, as related to the requirement that the reactivity control systems have a combined capability in conjunction with poison addition by the emergency core cooling system, of reliably controlling reactivity changes under postulated accident conditions. To meet GDC 27, the system should have suitable redundancy in components and features to assure system safety function assuming a single failure.

4. 10 CFR Part 50, §50.62(c)(4), as related to the SLCS being capable of reliably injecting a borated water solution into the reactor pressure vessel at a boron concentration, boron enrichment, and flow rate that provides sufficient reactivity control and as related to the system having automatic initiation, where required under the rule, to satisfy anticipated transient without scram (ATWS) risk reduction requirements.[28]

Technical Rationale:[29]

The technical rationale for application of the above acceptance criteria to the SLCS is discussed in the following paragraphs.

1. Compliance with GDC 2 requires that nuclear power plant structures, systems and components important to safety be designed to withstand the effects of seismic events and other natural phenomena without loss of capability to perform their safety functions. The subject structures, systems and components are those necessary to ensure (1) the integrity of the reactor coolant pressure boundary, (2) the capability to shut down the reactor and maintain it in a safe shutdown condition, or (3) the capability to prevent or mitigate the consequences of accidents that could result in potential offsite exposures comparable to the guideline exposures of 10 CFR Part 100. Since the SLCS provides one means to shut down the reactor and maintain it in a safe shutdown condition, the SLCS, and structures housing the SLCS, must be capable of withstanding the effects of natural phenomena.

   Based on reviewing a number of safety analysis reports (SARs) for light-water reactor nuclear power plants, a seismic design classification system was developed for identifying those plant features that should be designed to withstand the effects of the safe shutdown earthquake (SSE). Regulatory Guide 1.29, Position C.1, states that systems required for safe shutdown, including their foundations and supports, are designated as Seismic Category I and should be designed to withstand the effects of the SSE and remain functional. Compliance with Regulatory Guide 1.29 provides assurance that the SLCS will perform its intended safety function in the event of an earthquake.[30]

2. Compliance with GDC 26 requires that two independent reactivity control systems of different design principles be provided, with one of the systems being capable of holding the reactor core subcritical under cold conditions. In a BWR, the normal method of reactivity control utilizes control rods, which are capable of maintaining the reactor subcritical, including allowance for a stuck rod, without the addition of any poison to the reactor coolant. The SLCS acts as a emergency backup to the insertion of control rods to provide a diverse means of making the reactor subcritical. Making provisions for the storage of an adequate amount of neutron absorber in solution, along with the capability

for injection at a rate sufficient to bring the reactor from rated power to cold shutdown (at any time in core life with the control rods remaining withdrawn in the rated power pattern, taking into account the reactivity gains from complete decay of the rated power xenon inventory, an allowance for imperfect mixing and leakage, and dilution by the residual heat removal system), assures that the SLCS will the meet the performance requirements of GDC 26.[31]

3. Compliance with GDC 27 requires that two independent reactivity control systems of different design principles be provided, with the reactivity control systems having a combined capability of reliably controlling reactivity changes under design-basis accident conditions. The primary means for fine and coarse control of reactivity in a BWR are the control rods and their drive system, with the SLCS serving as a backup system. As such, the SLCS is a reliable and automatic means of making the reactor subcritical following an anticipated transient with a failure of the shutdown rods to insert. Acting in conjunction with other features to mitigate an ATWS, the SLCS provides additional protection and safety for all barriers to the release of fission products by reducing the potential for exceeding fuel, reactor coolant pressure boundary and containment integrity limits.[32]

4. Compliance with 10 CFR 50.62(c)(4) invokes explicit requirements regarding the performance of the SLCS. 10 CFR 50.62(c)(4) states, in essence, that each boiling water reactor must have a SLCS with a minimum flow capacity and boron content providing equivalent reactivity control to 326 Lpm (86 gpm) of 13 weight percent sodium pentaborate solution. As discussed in Generic Letter 85-03 (Reference 7), the "equivalent in control capacity" wording was chosen to allow flexibility in the implementation of the requirement (e.g., the equivalence can be obtained by appropriately adjusting flow rate, boron concentration or boron enrichment). Generic Letter 85-03 also states that the 326 Lpm (86 gpm) and 13 weight percent sodium pentaborate were values used in NEDE-24222, "Assessment of BWR Mitigation of ATWS, Volumes I and II," December 1979, for BWR/4, BWR/5 and BWR/6 plants with a 638-cm (251-in) vessel inside diameter. That different values would be equivalent for smaller plants was recognized in NEDE-24222. The important parameters to consider in establishing equivalence are vessel boron concentration required to achieve shutdown and the time required to achieve that vessel boron concentration. The minimally acceptable system should show an equivalency in these parameters to the 638-cm (251-in) diameter vessels studied in NEDE-24222. Invoking specific requirements concerning "equivalent reactivity control capacity" for the minimum flow capacity and boron content in the SLCS ensures that sufficient boron can be injected at a rate sufficient to bring the reactor from rated power to cold shutdown. By providing automatic initiation (where required), further assurance is provided with respect to the timeliness of injection and thus of the initiation of reactivity control. This ensures that the SLCS can operate in conjunction with other features to mitigate an ATWS and will increase safety by reducing the potential for exceeding fuel, reactor coolant pressure boundary, and containment integrity limits.[33]

III. REVIEW PROCEDURES

The procedures below are used during the construction permit (CP) review to determine that the design criteria and bases and the preliminary design as set forth in the preliminary safety analysis report meet the acceptance criteria given in subsection II of this SRP section. For the review of operating license (OL) applications, the procedures are also utilized to verify that the initial design criteria and bases have been appropriately implemented in the final design as set forth in the final safety analysis report.

Upon request from the primary reviewer, the coordinating review branches will provide input for the areas of review stated in subsection I of this SRP section. The primary reviewer obtains and uses such input as required to assure that this review procedure is complete.

For the purpose of this SRP section, a typical system is assumed for use as a guide. It is assumed that the SLCS consists of a boron solution tank, a test water tank, two positive displacement pumps, two explosive valves, and associated local valves and controls. For cases where there are variations from this system, the reviewer would adjust the review procedures given below. However, the system design would be required to meet the acceptance criteria given in subsection II of this SRP section.

1. The SAR is reviewed to determine that the system description and piping and instrumentation diagrams (P&IDs) delineate the SLCS equipment. The reviewer, using the results of failure modes and effects analyses, comparisons with previously approved systems, or independent calculations, as appropriate, determines that the system can sustain the loss of any active component and meet the minimum system requirements for the safe shutdown and accident mitigation. The system P&IDs, layout drawings, and component descriptions and characteristics are reviewed to determine the following:

   a. The SLCS is classified Quality Group B and seismic Category I. Component and system descriptions in the SAR are reviewed by the ~~ASB~~SRXB[34] to verify that the above classifications have been included, and the P&IDs should indicate any points of change in piping quality group classification. The review for seismic design is performed by the ~~SEB~~ECGB[35] and the review for seismic and quality classification is performed by the ~~MEB~~EMEB[36] as indicated in subsection I of this SRP section.

   b. Design provisions have been made that permit appropriate inservice inspection and functional testing of the system. It will be acceptable if the SAR information delineates a testing and inspection program and if the system drawings show the connections and special piping and equipment required by this program. For new applications, the reviewer evaluates the SLCS design provisions to test motor-operated valves under design-basis differential pressure and the piping design provisions for full flow testing (at maximum design flow) of pumps and check valves, as applicable. In accordance with the staff's position described in SECY 93-087 (Reference 6), design features should support inservice valve tests under the maximum practicable differential pressure and flow when it is not practicable to achieve design-basis differential pressure during an inservice test. Where it is not practicable to conduct inservice pump testing at design flow and pressure, analysis to extrapolate to design pressure is permitted.[37]

c. Using the results of the evaluation performed under SRP Section 4.3 ~~by the Core Performance Branch~~,[38] the ~~ASB~~SRXB[39] determines that the system has the capability to store the required quantity of neutron absorber in solution and that the injection rate is sufficient to bring the reactor from rated power to cold shutdown at any time in core life with the control rods remaining withdrawn in the rated power pattern, taking into account the reactivity gains from complete decay of the rated power xenon inventory, an allowance for imperfect mixing and leakage, and dilution by the residual heat removal system.

d. To verify compliance with relevant ATWS rule requirements, SRXB determines that the system has the capability of injecting into the reactor pressure vessel a borated water solution at such a flow rate, level of boron concentration and boron-10 isotope enrichment, and accounting for reactor pressure vessel volume, that the resulting reactivity control is at least equivalent to that resulting from injection of 326 Lpm (86 gpm) of 13 weight percent sodium pentaborate decahydrate solution at the natural boron-10 isotope abundance into a 638-cm (251-in) inside diameter reactor pressure vessel for a given core design. The requirement allows flexibility in its implementation; i.e., the equivalence can be obtained by increasing flow rate, boron concentration or boron enrichment. The important parameters considered in establishing equivalence are the vessel boron concentration required to achieve shutdown and the time required to achieve that vessel boron concentration (see Generic Letter 85-03). The SRXB reviewer evaluates the system arrangement and associated features, including the injection location(s), to determine that they will facilitate reliable, undiverted injection of borated solution to the reactor vessel. For BWRs that are required to provide automatic SLCS initiation under the rule, the SRXB reviewer coordinates with HICB as described in subsection I to also verify that the system has acceptable provisions for automatic initiation.[40]

e. The system P&IDs indicate that adequate means are provided to maintain the system temperature above the saturation temperature of the neutron absorber solution.

f. The controls and the summary of operating and test procedures for neutron absorber addition are adequate.

2. The reviewer verifies that the safety function of the system will be maintained as required in the event of adverse environmental phenomena such as earthquakes, tornadoes, hurricanes, and floods, or in the event of certain pipe breaks or loss of offsite power. The reviewer uses engineering judgment, failure modes and effects analyses, and the results of reviews performed under other SRP sections, as applicable, to determine the following:

a. The failure of systems not designed to seismic Category I standards and located close to essential portions of the system, or of non-seismic structures that house, support, or are close to essential portions of the SLCS, will not preclude operation of the SLCS. Reference to SAR sections describing site features and the general

arrangement and layout drawings will be necessary, as well as the SAR tabulation of seismic design classifications for structures and systems. Statements in the SAR that verify that the above conditions are met are acceptable. (CP)

b. The SLCS is protected from the effects of floods, hurricanes, tornadoes, and internally or externally generated missiles. Flood protection and missile protection criteria are discussed and evaluated in detail under the SRP Section 3 series. The location and the design of the system, structures, and pump rooms (cubicles) are reviewed to determine that the degree of protection provided is adequate. A statement to the effect that the system is located in a seismic Category I structure that is tornado missile and flood protected, or that components of the system will be located in individual cubicles or rooms that will withstand the effects of both flooding and missiles is acceptable.

c. Essential components and subsystems (i.e., those necessary for safe shutdown) can function as required in the event of loss of offsite power. The system design is acceptable if the SLCS meets minimum system requirements as stated in the SAR assuming a failure of a single active component within the system or in the auxiliary electric power source which supplies the system. Statements in the SAR and the results of failure modes and effects analyses are considered in assuring that the system meets these requirements. This will be an acceptable verification of system functional reliability.

3. The descriptive information, P&IDs, layout drawings, and failure modes and effects analyses in the SAR are reviewed to assure that essential portions of the system will function following design-basis accidents assuming a single active component failure. The reviewer evaluates the information in the SAR to assure function of required components, traces the availability of these components on system drawings, and checks that the SAR contains verification that minimum system flow requirements are met for each accident situation for the required time spans. For each case, the design will be acceptable if minimum system requirements are met.

4. Some SLCS designs no longer use squib-activated (explosive) injection valves and instead incorporate motor-operated storage tank discharge valves. Where motor operated discharge valves are provided, because of the importance of valve reliability for the SLCS storage tank discharge valves, the reviewer verifies that the valves will be covered by adequate reliability assurance requirements under a Reliability Assurance Program.[41]

For standard design certification reviews under 10 CFR Part 52, the procedures above should be followed, as modified by the procedures in SRP Section 14.3 (proposed), to verify that the design set forth in the standard safety analysis report, including inspections, tests, analysis, and acceptance criteria (ITAAC), site interface requirements and combined license action items, meet the acceptance criteria given in subsection II. SRP Section 14.3 (proposed) contains procedures for the review of certified design material (CDM) for the standard design, including the site parameters, interface criteria, and ITAAC.[42]

IV. EVALUATION FINDINGS

The reviewer verifies that sufficient information has been provided and his review supports conclusions of the following type, to be included in the staff's safety evaluation report:

> The standby liquid control system (SLCS) includes storage tanks, pumps, valves, and piping to the point where the system connects to the reactor coolant boundary. The SLCS, which is provided for BWRs only, provides reactivity control in the event the control rods cannot be inserted. The basis for acceptance in the staff review of the standby liquid control system is the conformance of the applicant's design and design criteria to the Commission's regulations as set forth in the General Design Criteria, 10 CFR 50.62[43] and to the positions of applicable regulatory guides, staff technical positions, and industry standards.
>
> The staff concludes that the design of the standby liquid control system is acceptable and conforms to the requirements of General Design Criteria 2, 26, and 27, and 10 CFR 50.62[44] with respect to seismic design, reactivity control system redundancy, and reactivity control system capability. This conclusion is based on the following:
>
> 1. The applicant has met the requirements of General Design Criterion 2 with respect to seismic design by meeting regulatory position C-1 of Regulatory Guide 1.29.
>
> 2. The applicant has met the requirements of General Design Criterion 26 with respect to the redundancy of reactivity control systems by providing two independent reactivity control systems of different design principles and with respect to the capability of holding the reactor core subcritical under cold conditions.
>
> 3. The applicant has met the requirements of General Design Criterion 27 with respect to the combined capabilities of the reactivity control systems to reliably control reactivity changes under postulated accident conditions since the SLCS has the capability to shut down the reactor with all control rods withdrawn, assuming a single failure.
>
> 4. The applicant has met the requirements of 10 CFR Part 50, §50.62(c)(4) by providing a reliable SLCS having the capability of injecting a borated water solution into the reactor pressure vessel that meets, or exceeds, the reactivity control requirements specified in the rule.
>
> Where applicable, also include the following: The applicant has also provided a system with acceptable provisions for automatic initiation.[45]
>
> Where applicable, for designs incorporating motor-operated SLCS storage tank discharge valves, the following conclusion should also be included:
>
> 5. The applicant has acceptably incorporated the SLCS storage tank discharge valves into a Reliability Assurance Program.[46]

For design certification reviews, the findings will also summarize, to the extent that the review is not discussed in other safety evaluation report sections, the staff's evaluation of inspections, tests, analyses, and acceptance criteria (ITAAC), including design acceptance criteria (DAC), site interface requirements, and combined license action items that are relevant to this SRP section.[47]

V. IMPLEMENTATION

The following is intended to provide guidance to applicants and licensees regarding the NRC staff's plans for using this SRP section.

This SRP section will be used by the staff when performing safety evaluations of license applications submitted by applicants pursuant to 10 CFR 50 or 10 CFR 52.[48] Except in those cases in which the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the method described herein will be used by the staff in its evaluation of conformance with Commission regulations.

The provisions of this SRP section apply to reviews of applications docketed six months or more after the date of issuance of this SRP section.[49]

Implementation schedules for conformance to parts of the method discussed herein are contained in 10 CFR 50.62 and[50] the referenced regulatory guide.

VI. REFERENCES[51]

1. 10 CFR Part 50, §50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants."[52]

~~1~~2. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena."

~~2~~3. 10 CFR Part 50, Appendix A, General Design Criterion 26, "Reactivity Control System Redundancy and Capability."

~~3~~4. 10 CFR Part 50, Appendix A, General Design Criterion 27, "Combined Reactivity Control Systems Capability."

~~4~~5. Regulatory Guide 1.29, "Seismic Design Classification."

6. SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs," April 2, 1993.[53]

7. NRC Letter to all Boiling Water Reactor Licensees and Applicants, "Clarification of Equivalent Control Capacity for Standby Liquid Control Systems (Generic Letter 85-03)," dated January 28, 1985.[54]

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SRP Draft Section 9.3.5
Attachment A - Proposed Changes in Order of Occurrence

Item numbers in the following table correspond to superscript numbers in the redline/strikeout copy of the draft SRP section.

Item	Source	Description
1.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 9.3.5.
2.	Editorial - Current PRB review responsibilities.	Change made to add EMCB and SPLB as being responsible for the secondary review to reflect the current secondary review responsibility for SRP section 9.3.5.
3.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 9.3.5.
4.	**Integrated Impact # 119.**	Revised Areas of Review introduction to include reference to 10 CFR 50.62(c)(4). The ATWS rule requirements should receive a level of emphasis equal to that of GDCs 2, 26, and 27.
5.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 9.3.5.
6.	SRP-UDP format item, reformat areas of review.	Added "Review Interfaces" to "Areas of Review" subsection, formatted in numbered paragraph form, to describe how SRXB reviews aspects of the SLCS under other SRP sections and how other branches support the review of the SLCS.
7.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 9.3.5.

Item	Source	Description
8.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 4.3. Area of Review was relocated from a review performed by another PRB to a related review performed by this PRB. Additionally, the PRB identified was revised to reflect current responsibility and PRB name.
9.	Editorial - Current PRB names and abbreviations.	Editorial change made to delete four areas of review items applicable to the primary review branch and relocated them to other branch review interfaces to reflect current PRB name and responsibility for SRP sections 3.4.1, 3.5.1.1, 3.5.1.2, 3.5.2, and 3.6.1.
10.	Editorial - Current PRB names and abbreviations.	Editorial change made to be consistent with the tense of Item 1 and to reflect current PRB name and responsibility for SRP section 4.6.
11.	**PI # 25660,** Editorial	Consistent with changes to other sections, an Areas of Review (review interface) discussion was added for SRXB to clearly describe the reviews applicable to ISLOCA. Proposed new SRP section 3.12 will address the NRC staff positions for ISLOCA and will provide the detailed review procedures necessary to verify an evolutionary plant design has met the applicable positions. Because the details for an ISLOCA review will be contained in SRP Section 3.12, no additional Review Procedures are proposed for inclusion in the SLCS SRP Section.
12.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 9.3.5.

Item	Source	Description
13.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP sections 3.3.1, 3.3.2, 3.5.3, 3.7.1 through 3.7.4, 3.8.4, and 3.8.5.
14.	PRB Assignments	Relocated interface to SRP 6.6 to reflect assignment to ECGB.
15.	Editorial - Current PRB names and abbreviations.	Editorial change made to relocate four areas of review deleted above (item 9) and to reflect current PRB name and responsibility for SRP sections 3.4.1, 3.5.1.1, 3.5.1.2, 3.5.2, and 3.6.1.
16.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP sections 3.9.1 through 3.9.3.
17.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP sections 3.2.1 and 3.2.2.
18.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 3.9.6.
19.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for review of material compatibility.
20.	PRB Assignments	Relocated interface to SRP 6.6 to reflect assignment to ECGB.
21.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 7.1.
22.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 8.1.

Item	Source	Description
23.	SRP-UDP Integration of ATWS Issues	Provided Review Interface supporting overall review of compliance with the ATWS rule. Note that ROC 964 for SRP Section 7.1 recommends addition of design and quality assurance criteria in Review Procedures associated with determining ATWS rule compliance in Appendix A. ROC 181 for SRP Section 7.4 adds review of ATWS rule-required instrumentation. Although ROC 181 currently adds this review in SRP Section 7.4 per an earlier PNL agreement with the PRB for SRP Section 7.4, a new SRP Section 7.8 is now planned which will cover this review of ATWS rule-required instrumentation. New SRP Section 7.8 is referenced in response to PRB comment 3 on an earlier draft of new SRP Section 15.8 as detailed in the June 22, 1995 memorandum from George Thomas addressed to Armand Masciantonio.
24.	Editorial - Current PRB names and abbreviations.	Editorial change made to separate text into three different statements and to reflect current PRB names and responsibilities for SRP sections 9.5.1, 16.0, and 17.0.
25.	Editorial - Current PRB names and abbreviations.	Editorial change made to separate text into two different statements and to reflect current PRB names and responsibilities for SRP sections 3.10 and 3.11.
26.	SRP-UDP format item	Revised consistent with standard wording to cover interfaces with other SRXB reviews as well as interfaces with other PRBs.

Item	Source	Description
27.	**Integrated Impact # 119.**	Added a reference for 10 CFR 50.62 to the introduction of the Acceptance Criteria subsection to reflect its importance relative to that of the GDCs.
28.	**Integrated Impact # 119.**	Added 10 CFR 50.62(c)(4) as acceptance criterion, which provides detailed, specific requirements for the performance of the SLCS.
29.	SRP-UDP format item, develop Technical Rationale.	Technical Rationale is a new feature added to the SRP.
30.	SRP-UDP format item, develop Technical Rationale.	Added Technical Rationale for General Design Criterion 2 and Regulatory Guide 1.29, Section C.1.
31.	SRP-UDP format item, develop Technical Rationale.	Added Technical Rationale for General Design Criterion 26.
32.	SRP-UDP format item, develop Technical Rationale.	Added Technical Rationale for General Design Criterion 27.
33.	**Integrated Impact # 119.**	Added Technical Rationale for 10 CFR 50.62(c)(4).
34.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 9.3.5.
35.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP sections 3.7.1 through 3.7.4.
36.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP sections 3.2.1 and 3.2.2.

Item	Source	Description
37.	**Integrated Impact 1431**	Added review procedure applicable to new applications for review of SLCS testability features with respect to current staff positions regarding testability of safety-related pumps and valves.
38.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 4.3.
39.	Editorial - Current PRB names and abbreviations.	Editorial change made to reflect current PRB name and responsibility for SRP section 4.3.
40.	**Integrated Impact # 119.**	Incorporated details from the requirements of 10 CFR 50.62(c)(4) as interpreted in Generic Letter 85-03 into Review Procedures related to the performance of the SLCS. The requirements of the rule were appropriately converted into metric units.
41.	**Integrated Impact # 120.**	Added guidance to Review Procedures from the ABWR FSER to assure that the SLCS storage tank discharge valves are included in the COL applicant's Reliability Assessment Program.
42.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard paragraph to address application of Review Procedures in design certification reviews.
43.	**Integrated Impact # 119.**	Revised Evaluation Findings introduction to include a reference to 10 CFR 50.62 so that its importance relative to that of GDCs 2, 26, and 27 be properly reflected.

Item	Source	Description
44.	**Integrated Impact # 119.**	Revised Evaluation Findings introduction to include a reference to 10 CFR 50.62 so that its importance relative to that of GDCs 2, 26, and 27 be properly reflected.
45.	**Integrated Impact # 119.**	Included statement of compliance to 10 CFR 50.62(c)(4) in Evaluation Findings, so that its importance relative to that of GDCs 2, 26, and 27 be properly reflected.
46.	**Integrated Impact # 120.**	Added statement to Evaluation Findings to assure that the SLCS storage tank discharge valves are included in the COL applicant's Reliability Assessment Program.
47.	SRP-UDP format item - 10 CFR 52 Applicability.	Added a general description of additional items that should be discussed in the Evaluation Findings subsection for the design certification reviews.
48.	SRP-UDP Guidance, Implementation of 10 CFR 52	Added standard sentence to address application of the SRP section to reviews of applications filed under 10 CFR Part 52, as well as Part 50.
49.	SRP-UDP Guidance	Added standard paragraph to indicate applicability of this section to reviews of future applications.
50.	**Integrated Impact # 119.**	Revised Implementation subsection to include a reference to the 10 CFR 50.62 implementation schedule.
51.	SRP-UDP format item	Reordered reference consistent with SRP-UDP format.
52.	**Integrated Impact # 119.**	Added 10 CFR 50.62 to the list of references in the References subsection.

Item	Source	Description
53.	**Integrated Impact 1431**	Added reference to SECY 93-087 as applicable to new applications for review of SLCS testability features with respect to current staff positions regarding testability of safety-related pumps and valves.
54.	**Integrated Impact # 119.**	Added Generic Letter 85-03 to the list of references in the References subsection.

SRP Draft Section 9.3.5
Attachment B - Cross Reference of Integrated Impacts

Integrated Impact No.	Issue	SRP Subsections Affected
119	Incorporate requirements from 10 CFR Part 50, Section 50.62(c)(4) (ATWS Rule) as Acceptance Criteria and incorporate into other SRP Section 9.3.5 subsections as appropriate.	Subsection I, Areas of Review (first paragraph). Subsection II, Acceptance Criteria, (Item 4). Subsection III, Review Procedures, (Item 1.d). Subsection IV, Evaluation Findings, (Item 4). Subsection V, Implementation (last paragraph). Subsection VI, References (Items 1 and 7).
120	Develop Review Procedures to verify inclusion of SLCS storage tank discharge valves in the Reliability Assurance Program	Subsection III, Review Procedures, (Item 4). Subsection IV, Evaluation Findings, (Item 5).
1431	Develop Review Procedures to evaluate SLCS testability design features with respect to current staff positions for testability of safety-related pumps and valves.	Subsection III, Review Procedures, (Item 1.b). Subsection VI, References, (Item 6).