



U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

2.4.12 GROUNDWATER

REVIEW RESPONSIBILITIES

Primary - Organization responsible for the review of issues related to hydrology

Secondary - None

I. AREAS OF REVIEW

Chapter 2 of the Standard Review Plan (SRP) discusses the site characteristics that could affect the safe design and siting of a plant. The staff reviews information presented by the applicant for a construction permit (CP), operating license (OL), design certification (DC), early site permit (ESP), or combined license (COL) concerning hydrological setting of the site as they relate to safety-related structures, systems, and components (SSC). This SRP section applies to reviews performed for each of these types of applications. The staff's review and findings are described in the appropriate section of the safety evaluation report (SER).

The hydrogeological characteristics of the site are evaluated in this section of the applicant's safety analysis report (SAR) to describe the effects groundwater on plant foundations and reliability of safety-related water supply and dewatering systems.

The specific areas of review are as follows:

1. Local and Regional Groundwater Characteristics and Use: The staff reviews identification of the aquifers, types of onsite groundwater use, sources of recharge, present withdrawals and known and likely future withdrawals, flow rates, travel time,

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USNRC STANDARD REVIEW PLAN

This Standard Review Plan, NUREG-0800, has been prepared to establish criteria that the U.S. Nuclear Regulatory Commission staff responsible for the review of applications to construct and operate nuclear power plants intends to use in evaluating whether an applicant/licensee meets the NRC's regulations. The Standard Review Plan is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide an acceptable method of complying with the NRC regulations.

The standard review plan sections are numbered in accordance with corresponding sections in Regulatory Guide 1.70, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants (LWR Edition)." Not all sections of Regulatory Guide 1.70 have a corresponding review plan section. The SRP sections applicable to a combined license application for a new light-water reactor (LWR) are based on Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants (LWR Edition)."

These documents are made available to the public as part of the NRC's policy to inform the nuclear industry and the general public of regulatory procedures and policies. Individual sections of NUREG-0800 will be revised periodically, as appropriate, to accommodate comments and to reflect new information and experience. Comments may be submitted electronically by email to NRR_SRP@nrc.gov.

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gradients, and other properties that affect movement of accidental contaminants in groundwater, groundwater levels beneath the site, seasonal and climatic fluctuations, monitoring and protection requirements, and man-made changes that have the potential to cause long-term changes in local groundwater regime.

2. Effects on Plant Foundations and other Safety-Related Structures, Systems, and Components: The staff reviews effects of groundwater levels and other hydrodynamic effects of groundwater on design bases of plant foundations and those of other SSC important to safety.
3. Reliability of Groundwater Resources and Systems Used for Safety-Related Purposes: The staff reviews reliability of groundwater resources and related systems used to supply safety-related water to the plant.
4. Reliability of Dewatering Systems: The staff reviews reliability of dewatering systems to maintain groundwater conditions within the plant's design bases.
5. Consideration of Other Site-Related Evaluation Criteria: The staff reviews potential effects of seismic and non-seismic information on the postulated worst-case groundwater conditions for the proposed plant site.
6. Additional Information for 10 CFR Part 52 Applications: Additional information will be presented dependent on the type of application. For a COL application, the additional information is dependent on whether the application references an ESP, a DC, both, or neither. Information requirements are prescribed within the "Contents of Application" sections of the applicable Subparts to 10 CFR Part 52.

Review Interfaces

Other SRP sections interface with this section as follows:

1. For DC applications and COL applications referencing a DC rule or DC application, review of the site parameters in the Design Control Document (DCD) Tier 1, Chapter 2 of the DCD Tier 2, and the supporting information in DCD Tier 2, Section 14.3, submitted by the applicant is performed under SRP Section 2.0, "Site Characteristics and Site Parameters."
2. The review to ensure that adverse environmental conditions, including those from groundwater, will not preclude the safety function of the ultimate heat sink is performed under SRP Section 9.2.5, "Ultimate Heat Sink."
3. Regional and local groundwater characteristics and subsurface properties are used to determine the bounding set of pathways that result in critical impact to ground and surface water resources in SRP Section 2.4.13, "Accidental Releases of Radioactive Liquid Effluents in Ground and Surface Waters."

The specific acceptance criteria and review procedures are contained in the referenced SRP sections.

II. ACCEPTANCE CRITERIA

Requirements

Acceptance criteria are based on meeting the relevant requirements of the following Commission regulations:

1. 10 CFR Part 100, as it relates to identifying and evaluating hydrological features of the site. The requirements to consider physical site characteristics in site evaluations are specified in 10 CFR 100.10(c) for applications before January 10, 1997, and in 10 CFR 100.20(c) for applications on or after January 10, 1997.
2. 10 CFR 100.23(d) sets forth the criteria to determine the siting factors for plant design bases with respect to seismically induced floods and water waves at the site.
3. 10 CFR Part 50, Appendix A, General Design Criterion (GDC) 2, for CP and OL applications, as it relates to consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.
4. 10 CFR 52.17(a)(1)(vi), for ESP applications, and 10 CFR 52.79(a)(1)(iii), for COL applications, as they relate to identifying hydrologic site characteristics with appropriate consideration of the most severe of the natural phenomena that have been historically reported for the site and surrounding area and with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated.
5. 10 CFR 50, Appendix A, General Design Criterion (GDC) 44, for CP and OL applications, as it relates to providing an ultimate heat sink for normal operating and accident conditions.

SRP Acceptance Criteria

Specific SRP acceptance criteria acceptable to meet the relevant requirements of the NRC's regulations identified above are as follows for the review described in this SRP section. The SRP is not a substitute for the NRC's regulations, and compliance with it is not required. However, an applicant is required to identify differences between the design features, analytical techniques, and procedural measures proposed for its facility and the SRP acceptance criteria and evaluate how the proposed alternatives to the SRP acceptance criteria provide acceptable methods of compliance with the NRC regulations.

Appropriate sections of the following Regulatory Guide are used by the staff for the identified acceptance criteria:

Regulatory Guide 1.27 describes the applicable ultimate heat sink capabilities.

1. Local and Regional Groundwater Characteristics and Use: To meet the requirements of 10 CFR 50.55a, GDC 2, GDC 4, GDC 5, 10 CFR 100.20(c)(3), 10 CFR 100.23(d), and 10 CFR 100.10(c) or 100.20(c), a complete description of regional and local groundwater aquifers, sources, and sinks, local and regional groundwater use, present

and known and likely future withdrawals, regional flow rates, travel time, gradients, and velocities, subsurface properties that affect movement of contaminants in the groundwater, groundwater levels including their seasonal and climatic fluctuations, groundwater monitoring and protection requirements, and any man-made changes with a potential to affect regional groundwater characteristics over a long period of time is needed. This description should be sufficient to define local and regional groundwater characteristics and groundwater use at and in the vicinity of the site.

2. Effects on Plant Foundations and other Safety-Related Structures, Systems, and Components: To meet the requirements of 10 CFR 50.55a, GDC 2, GDC 4, GDC 5, 10 CFR 100.20(c)(3), 10 CFR 100.23(d), and 10 CFR 100.10(c) or 100.20(c), a complete description of the effects of groundwater levels and other hydrodynamic effects on the design bases of plant foundations and other SSC important to safety is needed. This description should be sufficient to determine any adverse effects of groundwater on plant foundations and SSC important to safety.
3. Reliability of Groundwater Resources and Systems Used for Safety-Related Purposes: To meet the requirements of 10 CFR 50.55a, GDC 2, GDC 4, GDC 5, 10 CFR 100.20(c)(3), 10 CFR 100.23(d), and 10 CFR 100.10(c) or 100.20(c), a complete description of all SSC important to safety that depend on groundwater is needed. Sufficient data and analyses regarding the reliability of the groundwater source as well as that of these systems should be provided.
4. Reliability of Dewatering Systems: To meet the requirements of 10 CFR 50.55a, GDC 2, GDC 4, GDC 5, 10 CFR 100.20(c)(3), 10 CFR 100.23(d), and 10 CFR 100.10(c) or 100.20(c), a complete description of the site dewatering system, including its reliability to maintain the groundwater conditions within the groundwater design bases of SSC important to safety is needed. Sufficient information should be provided to determine if the dewatering system is a safety-related system as proposed in the plant design. This information should also be sufficient to determine if the dewatering system is required during plant operation.
5. Consideration of Other Site-Related Evaluation Criteria: To meet the requirements of 10 CFR 50.55a, GDC 2, GDC 4, GDC 5, 10 CFR 100.20(c)(3), 10 CFR 100.23(d), and 10 CFR 100.10(c) or 100.20(c), the applicant's assessment of the potential effects of site-related proximity, seismic, and non-seismic information on the postulated worst-case scenario related to groundwater effects for the proposed plant site is needed. This assessment should be sufficient to demonstrate that the applicant's design bases appropriately account for these effects.

Technical Rationale

The technical rationale for application of these acceptance criteria to the areas of review addressed by this SRP section is discussed in the following paragraphs:

1. Compliance with 10 CFR 50.55 requires that any holder of a facility construction permit who obtains information indicating the reasonable possibility of a deficiency related to construction or a compliance failure involving substantial safety hazards should notify the Commission.

This criterion is applicable to Section 2.4.12 inasmuch as the design of permanent dewatering systems (a cost-effective technique frequently employed at nuclear power plants to minimize foundation design complexities) requires information that can only be inferred from measurements available before construction begins. For this reason, data gathered during construction excavation often indicate the need to modify designs for dewatering systems. Changes with the potential to affect a safety-related structure or system should have the concurrence of NRC reviewers.

Meeting these requirements provides a level of assurance that the foundations of plant structures, systems, or components important to safety are not vulnerable to groundwater hazards more severe than those considered when the design bases were established.

2. Compliance with 10 CFR 55.55a requires that structures, systems, and components shall be designed, fabricated, erected, constructed, tested, and inspected in accordance with the requirements of applicable codes and standards commensurate with the importance of each safety function.

10 CFR 50.55a specifies appropriate codes and standards for use in the design, construction, and inspection of dewatering systems intended for the protection of safety-related structures that might be affected by higher levels of groundwater. This is an important consideration in such areas as foundation design and slope stability, particularly when the potential exists for seismic ground motion that could cause soil liquefaction.

Meeting these requirements provides a level of assurance that the plant structures, systems, or components important to safety are designed to withstand (or are protected against the effects of) high levels of groundwater.

3. Compliance with GDC 2 requires that nuclear power plant structures, systems, and components important to safety be designed to withstand the effects of natural phenomena such as earthquake, tornado, hurricane, flood, tsunami, and seiche without loss of capability to perform their safety functions. The criterion further specifies that the design bases for these structures, systems, and components shall reflect the following:
 - A. Appropriate consideration of the most severe natural phenomena historically reported for the site and surrounding area, with sufficient margin for the limited accuracy, quantity, and time period in which the historical data have been accumulated;
 - B. Appropriate combinations of the effects of normal and accident conditions with the effects of the natural phenomena; and
 - C. The importance of the safety functions to be performed.

This criterion is applicable to SRP Section 2.4.12 because the groundwater level is often an important consideration in establishing seismic design bases for the foundations of safety-related structures. Such concerns frequently result in decisions to design and construct site dewatering systems to minimize the dynamic design loads on these structures.

For applications pursuant to 10 CFR Part 52, meeting the applicable requirements of 10 CFR 52.17 and 10 CFR 52.79 that correspond to GDC 2 provides a level of assurance that the most severe hydrologic site characteristics have been identified; whether GDC 2 is met with respect to the adequacy of the associated design bases will be evaluated pursuant to other SRP sections.

4. Compliance with GDC 4 requires that components important to safety be designed to accommodate the effects of (and be compatible with) environmental conditions associated with normal operation, maintenance, testing, and postulated accidents (e.g., loss-of-coolant accidents and dynamic effects, including pipe whip, missiles, and discharging fluids). The design of any dewatering system intended to protect safety-related structures should be consistent with this design objective.

SRP Section 2.4.12 provides guidance on the design of safety-related dewatering systems and the necessity to accommodate adverse environmental conditions (e.g., waterline breaks) with the potential to degrade or overwhelm the system.

Meeting the requirements of GDC 4 provides assurance that safety-related dewatering systems will not be seriously affected by adverse environmental conditions resulting from normal operations or an accident within or near site structures.

5. Compliance with GDC 5 requires that nuclear power units do not share structures, systems, and components important to safety unless it can be shown that such sharing will not impair their ability to perform required safety functions.

SRP Section 2.4.12 describes staff positions related to the design of a safety-related dewatering system. Such a system is usually designed to protect an entire site. This criterion is applicable because it provides the basis for requiring that a dewatering system be designed and sized so that an accident, such as a major waterline break in one unit, will not degrade the system to the extent that hydrostatic loadings will exceed the original design bases of safety-related structures associated with other units.

Meeting these requirements will provide a level of assurance that a site dewatering system shared by two or more nuclear units will be designed so that no single failure will prevent the system from performing its safety function.

6. As specified in 10 CFR 100.10(c), the site's physical characteristics (including seismology, meteorology, geology, and hydrology) should be considered when determining its acceptability for a nuclear power reactor.

Paragraph 100.10(c)(3) stipulates that special precautions should be planned if a reactor is to be located at a site where a significant quantity of radioactive effluent might find ready access to underground water tables. To satisfy the hydrologic requirements of 10 CFR Part 100, the NRC staff review of the applicant's SAR should verify the description of groundwater conditions at the proposed site and of how those conditions will be affected by the construction and operation of a nuclear power plant. In particular, this description should include the details of any site dewatering system.

Meeting this requirement provides a level of assurance that groundwater at or near the site of a nuclear power plant will not be significantly affected by the release of radioactive effluents from the plant.

7. 10 CFR 100.23 requires that geologic and seismic factors be considered when determining the suitability of the site and the acceptability of the design for each nuclear power plant.

10 CFR 100.23 is applicable to SRP Section 2.4.12 because it addresses requirements for investigating vibratory ground motion, including the hydrologic conditions at and near the site. Static and dynamic engineering properties of the materials underlying the site should be determined, including the properties (e.g., density, water content, porosity, and strength) needed to determine the behavior of those materials in transmitting earthquake-induced motions to the foundations of the plant. Additionally, it addresses the requirements for considering cooling water supply, soil and rock stability and liquefaction potential.

Meeting this requirement provides a level of assurance that the plant foundations are designed to withstand the effects of a safe shutdown earthquake.

III. REVIEW PROCEDURES

The reviewer will select material from the procedures described below, as may be appropriate for a particular case.

The procedures outlined below are used to review CP applications, ESP applications, and COL applications that do not reference an ESP to determine whether data and analyses for the proposed site meet the acceptance criteria given in Subsection II of this SRP section. For reviews of OL applications, these procedures are used to verify that the data and analyses remain valid and that the facility's design specifications are consistent with these data. As applicable, reviews of OLs and COLs include a determination on whether the content of technical specifications related to hydrology-related site characteristics are acceptable and whether the technical specifications reflect consideration of any identified unique conditions.

These review procedures are based on the identified SRP acceptance criteria. For deviations from these acceptance criteria, the staff should review the applicant's evaluation of how the proposed alternatives provide an acceptable method of complying with the relevant NRC requirements identified in Subsection II.

1. Local and Regional Groundwater Characteristics and Use: Local and regional groundwater conditions are reviewed by comparing the applicant's description of present and projected local and regional groundwater use, including amounts, water levels, location, drawdown, and source aquifers with reports by the U.S. Geological Survey (USGS), other agencies, and professional organizations. Drawdown effects of projected future groundwater use, including the possibility for reversing the groundwater flow, should be evaluated and may be checked by independent calculations. Construction effects, including dewatering, on potential recharge areas may also be evaluated. Other NRC organizational elements with related review responsibilities should be notified of any applicable groundwater data and analyses.

The staff should verify flow directions, gradients, velocities, water levels, and effects of potential future use on these parameters, including any possibility for reversing the direction of groundwater flow using data provided by the applicant and supplemented by data from USGS and other State or Federal agencies. The staff should identify any potential groundwater recharge area within the influence of the plant and effects of

construction, including dewatering using hydrogeologic maps and descriptions available from State and Federal agencies. The influence of existing and potential future wells with respect to groundwater beneath the site should be discussed. Bases and sources of data should be described and referenced. Changes resulting from the alteration of hydraulic properties associated with the subsurface portions of the plant and the fill used during construction should also be discussed. Any assumptions and approximations regarding the hydrogeologic properties, aquifer parameters, or boundary conditions need to be documented and described appropriately with justifications.

The need for and extent of procedures and measures to protect present and projected groundwater users, including monitoring programs, should be reviewed based upon site-specific groundwater features since these items are site-specific and will vary with each application.

2. Effects on Plant Foundations and Other Safety-Related Structures, Systems, and Components: The design bases (and development thereof) for groundwater-induced loadings on subsurface portions of SSC important to safety are reviewed. Independent calculations should be performed to determine the adequacy of the design criteria and the capability to reflect any potential future changes which can be induced by variations in precipitation, construction of future wells and reservoirs, accidents, pipe failures, or other natural events.
3. Reliability of Groundwater Resources and Systems Used for Safety-Related Purposes: If wells are proposed for safety-related purposes, the hydrodynamic design bases (and development thereof) for protection against seismically induced pressure waves should be described and be consistent with site characteristics. If onsite groundwater use and facilities are safety-related, the criteria of Regulatory Guide 1.27 should be applied.
4. Reliability of Dewatering Systems: If a permanent dewatering system is employed to lower design basis groundwater levels, the bases for the design of the system and determination of the design basis for groundwater levels are reviewed. Information regarding (a) all structures, components, and features of the system; (b) the reliability of the system as related to available performance data for similar systems used at other locations; (c) the various soil parameters (such as permeability, porosity, and specific yield) used in the design of the system; (d) the bases for determination of groundwater flow rates and areas of influence to be expected; (e) the bases for determination of time available to mitigate the consequences of system failure where system failure could cause design bases to be exceeded; (f) the effects of malfunctions or failures (such as a single failure of a critical active component or failure of circulating water system piping) on system capacity and subsequent groundwater levels; and (g) a description of the proposed groundwater level monitoring program and outlet flow monitoring program should be reviewed. For dewatering systems, calculations should be performed to determine phreatic surfaces, normal flow rates, flow rates into the system as a result of pipe breaks (circulating and service water system pipes), groundwater rebound times assuming total failure of the system, and system capacity.
5. Consideration of Other Site-Related Evaluation Criteria: 10 CFR Part 100 describes site-related proximity, seismic, and non-seismic evaluation criteria for power reactor applications. Subpart A to 10 CFR Part 100 addresses the requirements for applications before January 10, 1997, and Subpart B is for applications on or after January 10, 1997. The staff's review should include evaluation of pertinent information

to determine if these criteria are appropriately used in postulation of worst-case groundwater effects at the proposed plant site.

6. Review Procedures Specific to 10 CFR Part 52 Application Types

- A. Early Site Permit Reviews: Subpart A to 10 CFR Part 52 specifies the requirements and procedures applicable to the Commission's review of an ESP application for approval of a proposed site. Information required in an ESP application includes a description of the site characteristics and design parameters of the proposed site. The scope and level of detail of review of data parallel that used for a CP review.

In the absence of a compliance or adequate protection issue, a modification necessary based on updating early site permit-emergency preparedness information, or a variance, 10 CFR 52.39 precludes the Commission from imposing new site characteristics, design parameters, or terms and conditions on the early site permit at the COL stage. Accordingly, the reviewer should ensure that all physical attributes of the site that could affect the design basis of SSCs important to safety are reflected in the site characteristics, design parameters, or terms and conditions on the early site permit.

- B. Standard Design Certification Reviews: DC applications do not contain general descriptions of site characteristics because this information is site-specific and will be addressed by the COL applicant. However, pursuant to 10 CFR 52.47(a)(1), a DC applicant must provide site parameters postulated for the design. The reviewer verifies that:

- i. The postulated site parameters would be representative of a reasonable number of sites that may be considered within a COL application;
- ii. The appropriate site parameters are included as Tier 1 information per SRP Section 14.3.1; and
- iii. Pertinent parameters are stated in a site parameters summary table.

- C. Combined License Reviews: For a COL application referencing a certified standard design, NRC staff reviews that application to ensure sufficient information was presented to demonstrate that the characteristics of the site fall within the site parameters specified in the DC rule. Should the actual site characteristics not fall within the certified standard design site parameters, the COL applicant will need to demonstrate by some other means that the proposed facility is acceptable at the proposed site. This might be done by re-analyzing or redesigning the proposed facility.

For a COL application referencing an ESP, NRC staff reviews the application to ensure the applicant provided sufficient information to demonstrate that the design of the facility falls within the site characteristics and design parameters specified in the early site permit as applicable to this SRP section. Should the design of the facility not fall within the site characteristics and design parameters, the application should include a request for a variance from the ESP that complies with the requirements of 10 CFR 52.39 and 52.93.

In addition, long-term environmental changes and changes to the region resulting from human or natural causes may have introduced changes to the site characteristics that could be relevant to the design basis. The requirements of 10 CFR 52.39 preclude the Commission from changing or imposing new site characteristics, design parameters, or terms and conditions on an ESP, unless the change is: necessary to assure adequate protection of the public health and safety; necessary to bring the permit or site into compliance with the Commission's regulatory requirements in effect when the permit was issued; necessary based upon an update to early site permit-emergency preparedness information, or based on a variance. Consequently, the staff's review of a COL application referencing an ESP should not include a re-investigation of the site characteristics that have previously been accepted in the referenced ESP. However, in accordance with 10 CFR 52.6, "Completeness and Accuracy of Information," the applicant or licensee is responsible for identifying changes of which it is aware, that would satisfy the criteria specified in 10 CFR 52.39. Information provided by the applicant in accordance with 10 CFR 52.6(b) will be addressed by the staff during the review of a COL application referencing an ESP or a DC.

For a COL application referencing either an ESP or DC or both, the staff should review the corresponding sections of the ESP and DC FSEIR to ensure that any unresolved items, commitments, assumptions, and deferred issues identified in the FSEIRs are appropriately handled in the COL application.

IV. EVALUATION FINDINGS

The review should document the staff's evaluation of site characteristics against the relevant regulatory criteria. The evaluation should support the staff's conclusions as to whether the regulations are met. The reviewer should state what was done to evaluate the applicant's safety analysis report. The staff's evaluation may include verification that the applicant followed applicable regulatory guidance, performance of independent calculations, and/or validation of appropriate assumptions. The reviewer may state that certain information provided by the applicant was not considered essential to the staff's review and was not reviewed by the staff. While the reviewer may summarize or quote the information offered by the applicant in support of its application, the reviewer should clearly articulate the bases for the staff's conclusions.

The reviewer verifies that the applicant has provided sufficient information and that the review and calculations (if applicable) support conclusions of the following type to be included in the staff's SER.

1. Construction Permit, Operating License, and Combined License Reviews

The following statements should be preceded by a summary of the site characteristics and parameters used for the plant:

As set forth above, the applicant has presented and substantiated information relative to the groundwater effects important to the design and siting of this plant. The staff has reviewed the available information provided and, for the reasons given above, concludes that the identification and consideration of the potential effects of groundwater in the vicinity of the site are acceptable and meet the requirements of 10 CFR 50.55, 10 CFR 50.55a, 10 CFR Part 50, Appendix A,

General Design Criteria 2, 4, and 5, 10 CFR 100.20(c)(3), 10 CFR 100.23(d), and 10 CFR Part 100 [10 CFR 100.10(c) or 10 CFR 100.20(c), as applicable], with respect to determining the acceptability of the site.

The staff finds that the applicant has considered the appropriate site phenomena in establishing the groundwater effects in the vicinity of the site. The staff has generally accepted the methodologies used to determine the potential effects of groundwater, as documented in safety evaluation reports for previous licensing actions. Accordingly, the staff concludes that the use of these methodologies results in design bases containing margin sufficient for the limited accuracy, quantity, and period of time in which the data have been accumulated. The staff concludes that the identified design bases meet the requirements of 10 CFR 50.55a, 10 CFR Part 50, Appendix A, General Design Criteria 2, 4, and 5, 10 CFR 100.20(c)(3), 10 CFR 100.23(d), and 10 CFR 100.10(c) [or 10 CFR 100.20(c)], with respect to establishing the design basis for SSCs important to safety.

2. Early Site Permit Reviews

The following statements should be preceded by a summary of the site characteristics to be included in any ESP that might be issued for the proposed site:

As set forth above, the applicant has presented and substantiated sufficient information pertaining to the identification and evaluation of effects of groundwater in the vicinity of the proposed site. Section 2.4.12, "GroundWater," of NUREG-0800, Standard Review Plan, provides that the site safety analysis report should address the requirements of 10 CFR Parts 52 and 100 as they relate to identifying and evaluating effects of groundwater in the vicinity of the site and site regions. Further, the applicant considered the most severe natural phenomena that have been historically reported for the site and surrounding area while describing the hydrologic interface of the plant with the site, with sufficient margin for the limited accuracy, quantity, and period of time in which the historical data have been accumulated. The staff has generally accepted the methodologies used to determine the severity of the phenomena reflected in these site characteristics, as documented in safety evaluation reports for previous licensing actions. Accordingly, the staff concludes that the use of these methodologies results in site characteristics containing sufficient margin for the limited accuracy, quantity, and period of time in which the data have been accumulated. In view of the above, the site characteristics previously identified are acceptable for use in establishing the design bases for SSCs important to safety, as may be proposed in a COL or CP application.

Therefore, the staff concludes that the identification and consideration of the climatic site characteristics set forth above are acceptable and meet the requirements of 10 CFR 52.17(a)(1)(vi), 10 CFR 100.20(c) and 10 CFR 100.21(d).

In view of the above, the staff finds the applicant's proposed site characteristics related to hydrology for inclusion in an ESP for the applicant's site, should one be issued, acceptable.

3. Design Certification Reviews

The following statement should be preceded by a list of the applicable site parameters used for the plant:

The NRC staff acknowledges that the applicant has selected the site parameters referenced above for plant design inputs (a subset of which is included as Tier 1 information), but does not claim that they are representative of any particular percentile of possible sites in the United States, and does not assert the acceptability of the basis for the choice of values with respect to siting. Effects of groundwater in the vicinity of the site are site-specific and will be addressed by the COL applicant. This should include the provision of information sufficient to demonstrate that the design of the plant falls within the site parameters specified by the siting review.

V. IMPLEMENTATION

The staff will use this SRP section in performing safety evaluations of DC applications and license applications submitted by applicants pursuant to 10 CFR Part 50 or 10 CFR Part 52. Except when the applicant proposes an acceptable alternative method for complying with specified portions of the Commission's regulations, the staff will use the method described herein to evaluate 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.

VI. REFERENCES

1. 10 CFR 50.55, "Conditions of Construction Permits."
2. 10 CFR 50.55a, "Codes and Standards."
3. 10 CFR Part 50, Appendix A, General Design Criterion 1, "Quality Standards and Records."
4. 10 CFR Part 50, Appendix A, General Design Criterion 2, "Design Bases for Protection Against Natural Phenomena."
5. 10 CFR Part 50, Appendix A, General Design Criterion 4, "Environmental and Missile Design Bases."
6. 10 CFR Part 50, Appendix A, General Design Criterion 5, "Sharing of Structures, Systems, and Components."
7. 10 CFR Part 52, "Early Site Permits; Standard Design Certifications; and Combined Licenses for Nuclear Power Plants."
8. 10 CFR Part 100, "Reactor Site Criteria."
9. 10 CFR Part 100.23, "Geologic and Seismic Siting Criteria."

10. Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Power Plants."

PAPERWORK REDUCTION ACT STATEMENT

The information collections contained in the Standard Review Plan are covered by the requirements of 10 CFR Part 50 and 10 CFR Part 52, and were approved by the Office of Management and Budget, approval number 3150-0011 and 3150-0151.

PUBLIC PROTECTION NOTIFICATION

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

SRP Section 2.4.12
Description of Changes

This SRP section affirms the technical accuracy and adequacy of the guidance previously provided in Draft Revision 3, dated April 1996 of this SRP. See ADAMS accession number ML052070262.

In addition, this SRP section was administratively updated in accordance with NRR Office Instruction, LIC-200, Revision 1, "Standard Review Plan (SRP) Process." The revision also adds standard paragraphs to extend application of the updated SRP section to prospective submittals by applicants pursuant to 10 CFR Part 52.

The technical changes are incorporated in Revision 3, dated 2007:

REVIEW RESPONSIBILITIES - Reflects changes in review branches resulting from reorganization and branch consolidation. Change is reflected throughout the SRP.

I. AREAS OF REVIEW

1. An introductory paragraph was added at the beginning of this section.
2. This section was updated to include review of reliability of groundwater resources and systems used for safety-related purposes.
3. This section was updated to include review of reliability of dewatering systems with respect to their capability to maintain design groundwater conditions.
4. A review was added of consideration of seismic and non-seismic criteria on worst-case groundwater conditions.
5. The Review Interfaces subsection in this section was rewritten to provide a list of other SRP sections which interface with the review in this section.
6. The Review Interfaces subsection was expanded to state that review of site parameters for DC applications and COL applications that reference a DC is performed in SRP Section 14.3.
7. The Review Interfaces subsection was expanded to state that review of the effects of freezing on the safety function of the ultimate heat sink is performed in SRP Section 9.2.5.
8. A statement was added to the Review Interfaces subsection that regional and local groundwater characteristics and subsurface properties reviewed in this SRP section are used to determine the bounding set of pathways that result in critical impact to ground and surface water resources in SRP Section 2.4.13.

II. ACCEPTANCE CRITERIA

1. Specific acceptance criteria for each item in area of review were rewritten to realign with the Commission's regulations.

2. The Acceptance Criteria section was updated to include requirements of 10 CFR 100.20(c)(3).
3. The Acceptance Criteria section was updated to include requirements of 10 CFR 100.23(d).
4. The Acceptance Criteria section was updated to include requirements of 10 CFR Part 100 as it relates to site evaluations in 10 CFR 100.10(c) for applications before January 10, 1997, and 10 CFR 100.20(c) for applications on or after January 10, 1997, in the Acceptance Criteria.

III. REVIEW PROCEDURES

1. Introductory paragraphs were added at the beginning of the Review Procedures section to provide guidance related to application of the procedures described therein to different types of applications.
2. This section was expanded to describe the review approach for each area of review.

IV. EVALUATION FINDINGS

1. This section was rewritten to provide specific guidance related to each type of application. Sample statements addressing evaluation findings for each application type were also rewritten.

V. IMPLEMENTATION

1. This section was revised to indicate that this SRP section will also be used in reviews of design certification applications.

VI. REFERENCES

1. The References list was updated.