U.S. NUCLEAR REGULATORY COMMISSION

STANDARD REVIEW PLAN

2. 0 SITE CHARACTERISTICS AND SITE PARAMETERS

REVIEW RESPONSIBILITIES

Primary - Licensing Project Manager

Secondary - All SRP Chapter 2 review organizations

I. AREAS OF REVIEW

This SRP section contains general review guidance related to site characteristics and site parameters together with site-related design parameters and design characteristics, as applicable, contained in early site permit (ESP), design certification (DC), and combined license (COL) applications submitted in accordance with 10 CFR Part 52. This section is not applicable to CP and OL applications submitted in accordance with 10 CFR Part 50.

Information related to the review of specific characteristics and parameters is provided in the respective SRP Chapter 2 sections.

Early Site Permit (ESP) Reviews

> For an ESP application, the Chapter 2 review is focused on the site characteristics and site-related design parameters necessary for approval of the proposed site. The scope and level of review parallels that used for a construction permit (CP) review. Examples of site characteristics and site-related design parameters that should be addressed in an ESP application are included in Tables 1 and 2 of Appendix A to this SRP section.

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Standard Design Certification (DC) Reviews

For a DC application, the Chapter 2 review is focused on site-related design characteristics and postulated site parameters for the design. A subset of the site parameters will become part of the certified design. Previous certified designs have used the designations Tier 1 and Tier 2[1] for delineating the portion of design-related information that is approved and certified, and the portion that is approved but not certified, respectively. Site parameters are included in both Tier 1 and Tier 2 information. This section should summarize the complete set of site parameters and the subset of site parameters that will be included within the certified design – the top-level bounding site parameters used to define a suitable site for a facility referencing the certified design. Because site parameters were used in bounding evaluations of the certified design, they define the requirements for the design that must be met by a site. [Review guidance for Tier 1 site parameters was previously included in draft SRP Section 14.3.1, "Site Parameters (Tier 1)."] Examples of site-related design characteristics and site parameters that should be addressed are included in Tables 1 and 2 of Appendix A to this SRP section.

Combined License Reviews

For a COL application, the Chapter 2 review is focused on the site characteristics and site-related design characteristics needed to enable the staff to reach a conclusion on all safety matters related to siting. The scope of this section is dependent on whether a COL application references an ESP, a DC, both, or neither.

- For a COL application that references an ESP, this section focuses on the applicant's demonstration that the design of the facility falls within the site characteristics and site-related design parameters specified in the ESP.

- For a COL application that references a DC, this section focuses on the applicant's demonstration that the characteristics of the site fall within the site parameters specified in the DC rule.

- For a COL application referencing a DC and an ESP, this section focuses on the applicant's demonstration that the site characteristics and site-related design parameters specified in the ESP fall within the site parameters and design characteristics specified in the DC.

- For a COL application that references neither an ESP nor a DC, this section focuses only on summary information related to the set of site characteristics and site-related design characteristics needed to enable the staff to reach a conclusion on all safety matters related to siting. The review of the specific site characteristics and site-related design characteristics is contained in the related SRP Chapter 2 or other referenced SRP sections.

[1]See Appendices A through D to 10 CFR Part 52.

Review Interfaces

The specific site characteristics/parameters and site-related design characteristics/parameters are reviewed in the SRP Chapter 2 and other referenced SRP sections.

II. ACCEPTANCE CRITERIA

Requirements

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

1. 10 CFR 52.17 describes the technical contents of an ESP application.

2. 10 CFR 52.47(a)(1) requires a DC applicant to provide site parameters postulated for the design.

3. 10 CFR 52.79(a)(1)(i) - (vi) provides the site-related contents of a COL application.

4. 10 CFR 52.79(b) for a COL referencing an ESP as it relates to information sufficient to demonstrate that the design of the facility falls within the site characteristics and design parameters specified in the ESP.

5. 10 CFR 52.79(d)(1) for a COL referencing a DC as it relates to information sufficient to demonstrate that the characteristics of the site fall within the site parameters specified in the DC.

6. 10 CFR Part 100 as it relates to the siting factors and criteria for determining an acceptable site.

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.

1. For ESP, DC, and COL applications, the acceptance criteria associated with specific site characteristics/parameters and site-related design characteristics/parameters are contained in the related SRP Chapter 2 or other referenced SRP sections.

2. For a COL application referencing an ESP, acceptance is based on the applicant’s demonstration that the design of the facility falls within the site characteristics and site-related design parameters specified in the ESP. If the final safety analysis report does not demonstrate that the design of the facility falls within the site characteristics and design parameters, the application shall include a request for a variance from the ESP that complies with the requirements of 10 CFR 52.39 and 10 CFR 52.93.

3. For a COL application referencing a DC, acceptance is based on the applicant's demonstration that the characteristics of the site fall within the site parameters of the certified design. If the actual site characteristics do not fall within the certified standard design site parameters, the COL applicant provides sufficient justification (e.g., by request for exemption or amendment from the DC) that the proposed facility is acceptable at the proposed site.

4. For a COL application referencing an ESP and a DC, acceptance is based on the applicant's demonstration that the site characteristics and site-related design parameters specified in the ESP fall within the site parameters and design characteristics specified in the DC. If the actual site characteristics do not fall within the certified standard design site parameters, the COL applicant provides sufficient justification (e.g., by request for exemption or amendment from the DC, or request for a variance from the ESP) that the proposed facility is acceptable at the proposed site.

5. For a COL application referencing neither an ESP nor a DC, acceptance is based on the applicant's identification of the complete set of site characteristics and site-related design characteristics needed to enable the staff to reach a conclusion on all safety matters related to siting.

III. REVIEW PROCEDURES

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

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.

Detailed review procedures are provided within the subsections of SRP Chapter 2.

1. Early Site Permit Reviews. The licensing project manager will work with the technical reviewers to ensure that the appropriate site characteristics and site-related design parameters are included within the ESP. The licensing project manager should summarize this information within SER Section 2.0 for inclusion in the permit. Examples of site characteristics and site-related design parameters that should be addressed are included in Tables 1 and 2 in Appendix A to this SRP section. Note that these tables are not necessarily complete lists (For example, additional attributes particular to a given area or region may exist that should also be covered in the Chapter 2 reviews).

2. Standard Design Certification Reviews. The licensing project manager will work with the technical reviewers to ensure that the applicable site parameters and site-related design characteristics are included within the DC. The licensing project manager should summarize this information in tabular form within SER Section 2.0. The table should identify which site parameters are included as Tier 1 information. Examples of site parameters and design characteristics that should be addressed are included in Tables 1 and 2 of Appendix A to this SRP section. Note that these tables are not necessarily complete lists of all the necessary site parameters and site-related design characteristics to be included in the DC review.

3. Combined License Reviews.

For a COL application referencing an ESP, the licensing project manager will work with the technical reviewers to ensure that the application provides sufficient information to demonstrate that the design of the facility falls within the site characteristics and site-related design parameters specified in the ESP. Should the design of the facility not fall within the site characteristics and site-related design parameters, the technical staff evaluates supporting justification (through a variance) that the proposed facility is acceptable at the proposed site.

For a COL application referencing a DC, the licensing project manager will work with the technical reviewers to ensure that sufficient information is 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 technical staff evaluates supporting justification (through an exemption or amendment) that the proposed facility is acceptable at the proposed site.

For a COL application referencing a DC and ESP, the licensing project manager will work with the technical reviewers to ensure sufficient information is presented to demonstrate that the site characteristics and site-related design parameters specified in the ESP fall within the site parameters and site-related design characteristics specified in the DC. Should the site characteristics and design parameters not fall within the site parameters and design characteristics, the technical staff evaluates supporting justification (through an exemption or amendment to the DC or a variance from the ESP) that the proposed facility is acceptable at the proposed site.

For a COL application referencing either an ESP or DC or both, the staff should review the corresponding sections of the ESP and DC FSERs to ensure that any early site permit conditions, restrictions to the DC, or COL action items identified in the FSERs are appropriately handled in the COL application.

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. In the absence of certain circumstances, such as a compliance or adequate protection issue, 10 CFR 52.39 precludes the staff from imposing new site characteristics, design parameters, or terms and conditions on the early site permit. Consequently, a COL application referencing an ESP need 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 DC.

For a COL application referencing neither an ESP nor a DC, the licensing project manager will work with the technical reviewers to ensure that the applicant has identified the complete set of site characteristics and site-related design characteristics needed to enable the staff to reach a conclusion on all safety matters related to siting.

V. EVALUATION FINDINGS

The evaluation findings of SRP Chapter 2 are described in the SRP Chapter 2 sections. The SRP Section 2.0 evaluation findings are specific to the application types as identified below.

The licensing project manager with the identified technical reviewers 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 safety evaluation report. The reviewer also states the bases for those conclusions.

1. Early Site Permit Reviews

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

> As set forth above, the applicant has presented and substantiated information to establish site characteristics and site-related design parameters for the proposed site. The staff has reviewed the information provided and, for the reasons given in subsequent chapters of this SER, concludes that the applicant has established site characteristics and design parameters acceptable to meet the requirements of 10 CFR 52.17 and 10 CFR Part 100.

2. Design Certification Reviews

The following statement should be preceded by a list of the site-related design characteristics and postulated site parameters used for the plant:

> The applicant has selected the site-related design characteristics and site parameters referenced above for plant design inputs (a subset of which is included as Tier 1 information), and the staff agrees that they are representative of a reasonable number of sites that have been or may be considered for a COL application. Accordingly, the staff concludes that the site parameters meet the requirements of 10 CFR 52.47(a)(1)(iii).

3. Combined License Applications

The following statements should be preceded by identification of the selected site characteristics, design parameters, site-related design characteristics, and/or postulated site parameters as applicable:

a. For a COL application that references an ESP: As set forth above, the NRC staff reviewed the application to ensure that sufficient information was presented to demonstrate that the design of the facility falls within the site characteristics and site-related design parameters specified in the ESP. Accordingly, the staff concludes that the applicant has demonstrated that the design of the facility falls within the site characteristics and design parameters and thus meets the requirements of 10 CFR 52.79(b)(1).

[For the instances where the design of the facility does not fall within one or more site characteristics or postulated design parameters in the ESP, use the following conclusion:

> As set forth above, the NRC staff reviewed the application to ensure that sufficient information was presented to demonstrate that the design of the facility falls within the site characteristics and site-related design parameters specified in the ESP. The following exceptions were noted. [The specific site characteristics or site-related design parameters not meeting the above condition are identified with reference to the technical basis identified to support a variance to the ESP.] Accordingly, the staff concludes that the applicant has demonstrated, with the identified exception(s), that the design of the facility falls within the ESP site characteristics and design parameters and thus meets the requirements of 10 CFR 52.79(b)(1).]

b. For a COL application that references a DC: As set forth above, the NRC staff reviewed the application to ensure that sufficient information was presented to demonstrate that the characteristics of the site fall within the site parameters specified in the DC. Accordingly, the staff concludes, that the applicant has demonstrated that the site characteristics fall within the DC site parameters and thus meets the requirements of 10 CFR 52.79(d)(1).

[For the instances where one or more site characteristics do not fall within one or more of the related site parameter(s) specified in the DC, use the following conclusion:

> As set forth above, the NRC staff reviewed the application to ensure that sufficient information was presented to demonstrate that the characteristics of the site fall within the site parameters specified in the DC. The following exceptions were noted. [The specific site parameters not meeting the above conditions are identified with reference to the technical basis identified to support an exception or amendment to the DC.] Accordingly, the staff concludes that the applicant has demonstrated, with the identified exception(s), that the characteristics of the site fall within the DC specified site parameters and thus meets the requirements of 10 CFR 52.79(b)(1).]

c. For a COL application that references a DC and an ESP: As set forth above, the NRC staff reviewed the application to ensure that sufficient information was presented to demonstrate that the site characteristics and site-related design parameters specified in the ESP fall within the site parameters and design characteristics specified in the DC. Accordingly, the staff concludes, that the applicant has demonstrated that the ESP site characteristics and design parameters fall within the DC site parameters and design characteristics and thus meets the requirements of 10 CFR 52.79(d)(1).

[For the instances where one or more site characteristics or site-related design parameters do not fall within the related site parameters or site-related design characteristics, use the following conclusion:

As set forth above, the NRC staff reviewed the application to ensure that sufficient information was presented to demonstrate that the site characteristics and site-related design parameters specified in the ESP fall within the site parameters and design characteristics specified in the DC. The following exceptions were noted. [The specific site characteristics/parameters and the related design characteristics/ parameters not meeting the above condition are identified with reference to the technical basis identified to support a variance to the ESP or exemption or amendment to the DC.] Accordingly, the staff concludes, that the applicant has demonstrated, with the identified exception(s), that the site characteristics and design parameters fall within the site parameters and design characteristics and thus meets the requirements of 10 CFR 52.79(d)(1).

d. For a COL application that references neither a DC nor an ESP: As set forth above, the NRC staff reviewed the application to ensure that sufficient information was presented to demonstrate that the applicant has identified the complete set of site characteristics and site-related design characteristics needed to enable the staff to reach a conclusion on all safety matters related to siting.

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 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 submitted six months or more after the date of issuance of this SRP section, unless superseded by a later revision.

VI. REFERENCES

1. 10 CFR 52.17
2. 10 CFR 52.47(a)(1)
3. 10 CFR 52.79(a)(1)(i) - (vi)
4. 10 CFR 52.79(b)(1)
5. 10 CFR 52.79(d)(1)
6. 10 CFR Part 100

APPENDIX A

TABLE 1: EXAMPLES OF SITE CHARACTERISTICS AND SITE PARAMETERS

Site Characteristic / Parameter	SRP Location	ESP/COL Site Characteristic	DC Site Parameter
Exclusion Area Boundary (EAB)	2.1.2	✔	
Outer Boundary of Low Population Zone (LPZ)	2.1.3	✔	
Population Center Distance	2.1.3	✔	
External Hazards on Plant SSCs (eg: explosions, fires, release of toxic chemicals and flammable clouds, pressure effects)[1]	2.2.3	✔	
Weight of 100-Year Snowpack	2.3.1	✔	✔
Weight of 48-Hour PMWP	2.3.1	✔	✔
Conditions Resulting in the Maximum Evaporation and Drift Loss of Water From the UHS[2] During Any Consecutive 30 Days	2.3.1	✔	
Conditions Resulting in the Minimum Water Cooling in the UHS[2] During Any 1 Day During Any Consecutive 5 Days	2.3.1	✔	
100-Year 3-Second Wind Gust Speed	2.3.1	✔	✔
Tornado Parameters Maximum Horizontal Wind Speed Translational Speed Rotational Speed Radius of Maximum Rotational Speed Maximum Pressure Differential Maximum Rate of Pressure Drop	2.3.1	✔	✔
Dry-Bulb Temperature and Coincident Wet-Bulb Temperature 2% Annual Exceedance 1% Annual Exceedance 100-Year Maximum	2.3.1	✔	✔
Dry-Bulb Temperature 98% Annual Exceedance 99% Annual Exceedance 100-Year Minimum	2.3.1	✔	✔
Wet-Bulb Temperature (Non-concurrent) 2% Annual Exceedance 1% Annual Exceedance 100-Year Maximum	2.3.1	✔	✔

[1]External hazards (except for tornado missiles) are not typically within the scope of design certification.

[2]The UHS is typically not within the scope of design certification.

Site Characteristic / Parameter	SRP Location	ESP/COL Site Characteristic	DC Site Parameter
Accident Release χ/Q Values at EAB 0-2 hr	2.3.4	✔	✔
Accident Release χ/Q Values at LPZ 0-8 hr 8-24 hr 24-96 hr 96-720 hr	2.3.4	✔	✔
Routine Release χ/Q Values at Site Boundary Undepleted/No Decay Undepleted/2.26–Day Decay Depleted/8.00-Day Decay D/Q	2.3.5	✔	✔
Routine Release χ/Q Values at Locations of Interest Undepleted/No Decay Undepleted/2.26–Day Decay Depleted/8.00-Day Decay D/Q	2.3.5	✔	
Maximum Flood Elevation Probable Maximum Flood Coincident Wind Wave and Other Effects on Max Flood Level	2.4.1	 ✔ ✔	✔
Maximum Precipitation Rate	2.4.2	✔	✔
Potential for Water Freezing in the UHS Water Storage Facility[3] Potential Frazil and Anchor Ice Maximum Ice Thickness Maximum Cumulative Degree-Days Below Freezing	2.4.7	✔	
Maximum Elevation of Groundwater	2.4.12	✔	✔
Travel Time for Groundwater Flow	2.4.12	✔	
Travel Time for Radionuclide Transport in the Groundwater	2.4.13	✔	
Inventory of Radionuclides Which Could Potentially Seep into the Groundwater	2.4.13		✔
Ground Motion Response Spectra (GMRS)[4]/Safe Shutdown Earthquake (SSE)[5]	2.5.2	✔	✔
Fault Displacement Potential (yes/no)	2.5.3	✔	✔
Minimum Static Bearing Capacity	2.5.4	✔	✔
Minimum Shear Wave Velocity	2.5.4	✔	✔

[3]The UHS is typically not within the scope of design certification.

[4]GMRS represents the seismic hazard and satisfies 10 CFR 100.23 with respect to the development of the safe shutdown earthquake ground motion (SSE) in FSAR Section 3.7.

[5]The SSE represents the design earthquake ground motion satisfying both Appendix S to 10 CFR Part 50 and 10 CFR 100.23 requirements.

Site Characteristic / Parameter	SRP Location	ESP/COL Site Characteristic	DC Site Parameter
Liquefaction Potential (yes/no)	2.5.4	✔	✔
Maximum Settlement	2.5.4	✔	✔
Slope Failure Potential (yes/no)	2.5.5	✔	✔
Tornado Missile Spectra	3.5.1.4		✔
Aircraft Hazards on Plant SSCs[1]	3.5.1.6	✔	

TABLE 2: EXAMPLES OF SITE-RELATED DESIGN PARAMETERS AND DESIGN CHARACTERISTICS

Site-Related Design Parameter / Characteristic	SRP Location	ESP Design Parameter	DC Design Characteristic
Accident Airborne Effluent Release Point Characteristics for Offsite Receptors[6] Release Height Adjacent Building Height Adjacent Building Cross-sectional Area	2.3.4	✔	
Routine Airborne Effluent Release Point Characteristics for Offsite Receptors[5] Release Height Adjacent Building Height Adjacent Building Cross-sectional Area Vent Velocity Vent Inside Diameter Vent Heat Emission Rate	2.3.5	✔	
Cooling Water Flow Rate	2.4	✔	✔
Maximum Inlet Temperature to Condenser	2.4	✔	✔
Minimum Site Grade	2.4	✔	✔
Forced Evaporation for the Facility Under Normal Operation	2.4	✔	✔
Design-Basis Accident Source Term	15.0.3	✔	✔

[6]The plant vent is typically not within the scope of design certification.