C.I.1 Introduction and General Description of the Plant

In accordance with Subpart C, "Combined Licenses," of 10 CFR Part 52, COL applicants may reference designs that have been certified according to Subpart B, "Standard Design Certifications," of 10 CFR Part 52 and ESPs that have been certified according to Subpart A, "Early Site Permits," of 10 CFR Part 52. The guidance in Section C.I of this regulatory guide applies to COL applicants who reference neither a certified design nor an ESP, but provides a design for a complete facility on a specified site (i.e., a custom design). For COL applicants who reference a certified design, Section C.III.1 of this regulatory guide furnishes additional guidance. For COL applicants who reference a certified design and an ESP, Section C.III.2 of this regulatory guide offers additional guidance.

The first chapter of the FSAR should include an introduction to the report and a general description of the plant. This chapter should provide the reviewer or reader with a basic understanding of the overall facility without needing to refer to subsequent chapters. The review of the subsequent detailed chapters can then be accomplished with a better perspective and recognition of the relative safety-significance of each individual item in the overall plant design.

C.I.1.1 Introduction

In this section, the COL applicant should briefly discuss the principal aspects of the overall application, including the type of license requested,[1] the number of plant units, a brief description of the proposed plant location, the type of containment structure and its designer, the type of nuclear steam supply system and its designer, the core thermal power levels (both rated and design), the corresponding net electrical output for each thermal power level, and the scheduled completion date and anticipated commercial operation date of each unit. The following subsections address these aspects of the application.

C.I.1.1.1 *Plant Location*

The COL applicant should provide plant location information, such as the State and county in which the site will be located, as well as one or more maps showing the site location and plant arrangement within the site, including the extent (if any) to which the plant is collocated and/or interfaces with an existing licensed existing nuclear power plant (i.e., one that is currently located within the existing exclusion area boundary (EAB)).

C.I.1.1.2 *Containment Type*

The COL applicant should provide a summary-level description of the containment design (i.e., freestanding or supported, cylindrical or spherical, liner or vessel type, and shield building type, such as reinforced concrete or post-tensioned).

C.I.1.1.3 *Reactor Type*

The COL applicant should specify the nuclear steam supply system model and designer, as well as whether the reactor is a pressurized-water reactor (PWR) or boiling-water reactor (BWR).

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[1] 10 CFR 52.8, "Combining licenses; elimination of repetition," allows an applicant to combine several applications for different kinds of licenses (e.g., power reactor and an independent spent fuel storage installation) and allows the agency to combine in a single license the activities of an applicant that would otherwise be licensed separately (e.g., identical units on same site). However, multiple applicants may not file for the same license.

C.I.1.1.4 *Power Output*

The COL applicant should provide the approximate net electrical output (for information only) and the core thermal power levels (both rated and design).[2]

C.I.1.1.5 *Schedule*

The COL applicant should provide estimated schedules for the completion of construction and the start of commercial operation (estimates may be specified in duration, rather than calendar dates, based on the application submittal date). As an alternative, COL applicants may include a commitment to provide the construction and startup schedules after issuance of the COL once the licensee has made a positive decision to construct the plant.

C.I.1.1.6 *Format and Content*

The COL applicant should provide information on the following aspects of the format and content of its application:

1.1.6.1 This section should discuss conformance with the format and content guidance of this regulatory guide (i.e., RG 1.206).

1.1.6.2 This section should discuss conformance with NUREG-0800 in effect 6 months before the application submittal date[3] (i.e., the applicant should evaluate the differences in the design features, analytical techniques, and procedural measures proposed for a facility and those corresponding features, techniques, and measures given in the SRP acceptance criteria).

1.1.6.3 This section should provide the format, content, and numbering of text, tables, and figures included in the application and discuss their use.

1.1.6.4 This section should discuss the format for page numbering.

1.1.6.5 This section should discuss the method used to identify and reference proprietary information.

1.1.6.6 This section should list the acronyms used in the FSAR. Documents that are not part of the FSAR, but are part of the application should include their own list of acronyms.

C.I.1.2 General Plant Description

In this section, the COL applicant should summarize the principal characteristics of the site and provide a concise description of the facility. The facility description should include a brief discussion of the principal design criteria, operating characteristics, and safety considerations for the facility; engineered safety features (ESF) and emergency systems; instrumentation, control, and electrical systems; power conversion system; fuel handling and storage systems; cooling water and other auxiliary systems; and radioactive waste management system. The applicant should indicate the general

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[2] Rated power is defined as the power level at which the plant would operate if licensed. Design power is defined as the highest power level that would be permitted by the plant design and that is used in some safety evaluations.

[3] Although the requirements of 10 CFR Part 52 specify "in effect 6 months prior to docket date," NRC practice for implementation of this requirement has been to use 6 months before application submittal. However, the rule language has been retained as "docket date" to retain flexibility for situations in which an applicant submits an incomplete application that the staff does not docket for an extended period of time because of the additional work required of the applicant to complete the application. This footnote applies to the other references in this section to information with a baseline of 6 months before docket date.

arrangement of major structures and equipment by using plan and elevation drawings, furnished in sufficient number and detail to provide a reasonable understanding of the general layout of the plant.[4] The applicant also should identify those features of the plant that are likely to be of special interest because of their relationship to safety. In addition, the COL applicant should highlight items such as unusual site characteristics, solutions to particularly difficult engineering and/or construction considerations (e.g., modular construction techniques or plans), and significant extrapolations in technology represented by the design.

C.I.1.3 Comparison with Other Facilities

The COL applicant should provide a comparison with other facilities of similar design and comparable power level.

C.I.1.4 Identification of Agents and Contractors

In this section, the COL applicant should identify the primary agents or contractors for the design, construction, and operation of the nuclear power plant. The applicants should note the principal consultants and outside service organizations (such as those providing audits of the QA program). The applicant also should delineate the division of responsibility among the reactor/facility designer, architect-engineer, constructor, and plant operator.

C.I.1.5 Requirements for Additional Technical Information

In this section, COL applicants who do not reference a certified design should provide information to demonstrate the performance of new safety features for nuclear power plants that either differ significantly from those of evolutionary LWRs or use simplified, inherent, passive, or other innovative means to accomplish their safety functions. The requirement to provide this information is part of 10 CFR Part 52 and is necessary to ensure that (1) these new safety features will perform as predicted in the applicant's FSAR, (2) the effects of system interactions are acceptable, and (3) the applicant provides sufficient data to validate analytical codes. The design qualification testing requirements may be met with either separate effects or integral system tests; prototype tests; or a combination of tests, analyses, and operating experience. These requirements implement the Commission's policy on proof-of-performance testing for all advanced reactors (Volume 51, page 24643 of the *Federal Register* (51 FR 24643), dated July 8, 1986), as well as the Commission's goal of resolving all safety issues before authorizing construction.

The COL applicant who does not reference a certified design as part of the application must provide design information for the entire proposed facility, including a level of detail necessary to resolve all safety issues (i.e., the same level of detailed design information as that supplied in a certified design). Although a COL applicant who does not reference a certified design must furnish sufficient design information for a complete facility, the NRC expects that it may need additional technical information (beyond that in the application), including items such as verification of unique design concepts (e.g., concepts that may require tests and/or additional verification analyses for the first plant, the first three plants, and so forth).

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[4] The general arrangement drawings of buildings other than primary containment may warrant a designation as sensitive unclassified nonsafeguards information in accordance with the agency guidance described in SECY-04-0191, "Withholding Sensitive Unclassified Information Concerning Nuclear Power Reactors from Public Disclosure," dated October 19, 2004.

The COL applicant is responsible for providing a complete design for its proposed facility to identify any requirements for additional technical information in its application, including an estimated schedule for furnishing the additional technical information that may be necessary for issuance of a COL.

C.I.1.6 Material Referenced

In this section, the COL applicant should tabulate all topical reports that are incorporated by reference as part of the application. In this context, topical reports are defined as reports that reactor designers and manufacturers, architect-engineers, or other organizations have prepared and filed separately with the NRC in support of this application or of other applications or product lines. For each topical report, this tabulation should include the report number and title, the date that the report was submitted to the NRC, and the sections of the COL application that reference the report. For any topical reports that have been withheld from public disclosure as proprietary documents pursuant to 10 CFR 2.390(b), this tabulation should also reference nonproprietary summary descriptions of the general content of each such report. This section should also include a tabulation of any documents submitted to the Commission in other applications that are incorporated in whole or in part into the application by reference. If any information submitted in connection with other applications is incorporated by reference into the application, the applicant should summarize such information in appropriate sections of the application, as necessary, to provide clarity and context.

The applicant may submit results of test and analyses as separate reports. In such cases, this section should reference these reports, which the appropriate sections of the FSAR should summarize.

C.I.1.7 Drawings and Other Detailed Information

The COL applicant should provide a tabulation of all instrument and control functional diagrams and electrical one-line diagrams cross-referenced to the related application sections, including legends for electrical power, instrument and control, lighting, and communication drawings.

In addition, the COL applicant should furnish a tabulation of system drawings (e.g., piping and instrumentation diagrams) and system designators that are cross-referenced to the related sections of the application. This information should include the applicable drawing legends and notes.

C.I.1.8 Interfaces (with Standard Designs and Early Site Permits)

COL applicants who do not reference a certified design as part of the application must provide design information for a complete facility (i.e., not limited in scope such as a certified design), including a level of detail necessary to resolve all safety issues (i.e., the same level of detailed design information as that provided in a certified design). By definition, there are no interface requirements between standard designs and site-specific designs for a complete facility design. The expectation is that all interfaces, such as those that may exist between certified designs, ESPs, and a COL application that references a certified design and/or ESP, will be integral to a COL application that provides a complete facility design. COL applicants who reference a certified design and/or ESP are the only applicants who will have interface requirements.

COL applicants who do not reference a certified design will need to submit design information on the entire facility and should not include any conceptual design information for the facility. To facilitate the NRC staff review of previous applications for design certification, conceptual designs were included in the design control documents (DCDs) to offer a comprehensive design perspective. However, the conceptual design portions of the DCDs were not (and were not intended to be) certified by the NRC. Rather, these conceptual designs typically included portions of the balance-of-plant. Thus, the NRC expects that COL applicants who do not reference a certified design will provide complete designs for the facility without reliance on conceptual designs.

C.I.1.9 Conformance with Regulatory Criteria

C.I.1.9.1 *Conformance with Regulatory Guides*

The requirements of 10 CFR 52.79(a)(4)(I) specify that the content of a COL application must include information on the design of the facility, including its principal design criteria. Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, establishes minimum requirements for the principal design criteria for water-cooled nuclear power plants that are similar in design and location to plants for which the Commission has previously issued construction permits. Appendix A also provides guidance to applicants for use in establishing principal design criteria for other types of nuclear power units. In general, regulatory guides describe methods that the NRC staff considers acceptable for implementing the general design criteria (GDC) specified in Appendix A to 10 CFR Part 50. Thus, COL applicants should provide an evaluation of conformance with the guidance in NRC regulatory guides in effect 6 months before the submittal date of the COL application. That evaluation should also include an identification and description of deviations from the guidance in the NRC regulatory guides as well as suitable justifications for any alternative approaches proposed by the COL applicant.

COL applicants should furnish an evaluation of conformance with the following groups of regulatory guides:

- Division 1, Power Reactors
- Division 4, Environmental and Siting (applies to the environmental report and should be discussed therein)
- Division 5, Materials and Plant Protection (applies to the security plan and should be discussed therein)
- Division 8, Occupational Health

C.I.1.9.2 *Conformance with Standard Review Plan*

The requirements of 10 CFR 52.79(a)(41) specify that COL applications for a light-water-cooled nuclear power plant should evaluate the facility against the NRC's application and review guidance in effect 6 months before the docket date of the application. The evaluation required by this section must include an identification and description of all differences in design features, analytical techniques, and procedural measures proposed for the facility and those corresponding features, techniques, and measures in the acceptance criteria in the application and review guidance. If differences exist, the evaluation should discuss how the proposed alternative provides an acceptable method of complying with the Commission's regulations, or portions thereof, that underlie the corresponding acceptance criteria.

C.I.1.9.3 *Generic Issues*

The requirements of 10 CFR 52.79(a)(20) specify that a COL application must include the proposed technical resolutions for those unresolved safety issues (USIs) and medium- and high-priority generic safety issues (GSIs) that (1) are identified in the version of NUREG-0933, "A Prioritization of Generic Safety Issues," current on the date up to 6 months before the docket date of the application and (2) are technically relevant to the design.

Since the inception of the generic issues program in 1976, the NRC has identified and categorized reactor safety issues. The NRC grouped these issues into Three Mile Island (TMI) action plan items, task action plan items, new generic items, human factors issues, and Chernobyl issues, collectively calling them GSIs. Section C.IV.8 of this regulatory guide provides additional guidance for addressing the USIs and medium- and high-priority GSIs that NUREG-0933 identifies.

C.I.1.9.4 *Operational Experience (Generic Communications)*

The requirements of 10 CFR 52.79(a)(37) specify that the COL application must include information to demonstrate how operating experience insights from generic letters and bulletins issued after the most recent revision of the applicable SRP and 6 months before the docket date of the application, or comparable international operating experience, have been incorporated into the plant design.

To ensure that the knowledge base for reviewers and applicants captured the operational experience described in generic letters and bulletins from decades of nuclear power plant operation in the United States, the NRC staff incorporated the insights from these generic letters and bulletins into the updates to applicable SRPs.[5] To ensure that the operational experience in these SRP updates is considered, applicants with plant designs that are based on, or are evolutions of, plants that have operated in the United States are required by 10 CFR 52.79(a)(41) to evaluate their facility designs against the review guidance (i.e., SRPs) in effect 6 months before the docket date of the application. In addition, applicants are required to demonstrate how the operating experience insights from generic letters and bulletins issued after the review guidance update (i.e., in or about March 2007) have been incorporated into the plant design (i.e., address those generic communications not incorporated in the SRP update). The significance of limiting this review to generic letters and bulletins is that these documents pertain to issues that rose to a level of safety significance such that responses and resolutions from nuclear operating plant licensees were required. Other forms of generic communications have included circulars, information notices, and regulatory information summaries (RIS); however, as these types of generic communications do not require responses or actions on the part of licensees, COL applicants need not address them. In addition, the issues discussed in these types of communications are generally of a more specific (rather than generic) nature.

Alternatively, COL applicants with a plant design that is not based on, or is not an evolution of, plants that have operated in the United States should demonstrate how they have incorporated comparable international operating experience into the plant design. Nuclear industry regulators or owners groups in countries that include nuclear reactor vendors and/or nuclear power plants (e.g., Canada, France, Germany, Japan) may track, maintain, and/or issue operating experience bulletins or reports similar to the NRC generic letters and bulletins. The COL applicant should address how it

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[5] The NRC updated the SRP in March 2007 to support COL applications for new nuclear power plants that were planned for submittal to the NRC as early as September 2007.

assessed and/or incorporated the applicable operating experience into the plant design. In addition, COL applicants should consult organizations such as the Institute of Nuclear Power Operations (INPO) or the World Association of Nuclear Operators for applicable comparable international operating experience.

C.I.1.9.5 ***Advanced and Evolutionary Light-Water Reactor Design Issues***

COL applicants who do not reference a certified design should provide sufficient information on the complete design of the proposed facility, including those portions of the facility design that are typically provided by reactor vendors or applicants for reactor design certification in accordance with Subpart B of 10 CFR Part 52. Therefore, COL applicants should address the licensing and policy issues developed by the NRC and documented in the Office of the Secretary of the Commission (SECY) documents listed below and the associated staff requirements memoranda (SRM) for advanced and evolutionary LWR designs that apply to the proposed facility design. The following SECY documents provide guidance to applicants on issues that they should consider and, as appropriate, address in a COL application that does not reference a certified design (i.e., a custom design); however, this list may not be comprehensive, and some of the references may not apply to all potential COL applicants:

SECY-89-013, "Design Requirements Related to the Evolutionary Advanced Light-Water Reactors (ALWRs)"

SECY-90-016, "Evolutionary Light-Water Reactor (ELWR) Certification Issues and Their Relationship to Current Regulatory Requirements"

SECY-90-241, "Level of Detail Required for Design Certification under Part 52"

SECY-90-377, "Requirements for Design Certification under 10 CFR Part 52"

SECY-91-074, "Prototype Decisions for Advanced Reactor Designs"

SECY-91-178, "ITAAC for Design Certifications and Combined Licenses"

SECY-91-210, "ITAAC Requirements for Design Review and Issuance of FDA"

SECY-91-229, "Severe Accident Mitigation Design Alternatives for Certified Standard Designs"

SECY-91-262, "Resolution of Selected Technical and Severe Accident Issues for Evolutionary Light-Water Reactor (LWR) Designs"

SECY-92-053, "Use of Design Acceptance Criteria During the 10 CFR Part 52 Design Certification Reviews"

SECY-92-092, "The Containment Performance Goal, External Events Sequences, and the Definition of Containment Failure for Advanced LWRs"

SECY-93-087, "Policy, Technical, and Licensing Issues Pertaining to Evolutionary and Advanced Light-Water Reactor (ALWR) Designs"

SECY-94-084, "Policy and Technical Issues Associated with the Regulatory Treatment of Non-Safety Systems in Passive Plant Design (RTNSS)"

SECY-94-302, “Source-Term-Related Technical and Licensing Issues Relating to Evolutionary and Passive Light-Water-Reactor Designs”

SECY-95-132, “Policy and Technical Issues Associated with Regulatory Treatment of Non-Safety Systems in Passive Plant Designs”