

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

In accordance with Subpart C of Title 10, Part 52, of the *Code of Federal Regulations* (10 CFR Part 52), combined license (COL) applicants may incorporate by reference designs that have been certified according to Subpart B of 10 CFR Part 52 and early site permits according to Subpart A of 10 CFR Part 52. Additional guidance for COL applicants who reference a certified design and/or early site permit is provided in Section C.III of this regulatory guide. By contrast, the guidance provided in Section C.I of this regulatory guide applies to COL applicants who reference neither a certified design nor an early site permit.

The first chapter of the final safety analysis report (FSAR) should present an introduction to the report and a general description of the plant. This chapter should enable the reviewer or reader to obtain a basic understanding of the overall facility without having to refer to the subsequent chapters. Review of the detailed chapters that follow can then be accomplished with 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 present the principal aspects of the overall application, including the type of license requested, 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, as well as one or more map(s) showing the site location and plant arrangement within the site, including whether the plant is colocated with existing operating nuclear power plants.

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 (reinforced concrete, post-tensioned, etc.)].

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 or boiling-water reactor.

C.I.1.1.4 Power Output

The COL applicant should provide the net electrical output and core thermal power rating.

C.I.1.1.5 Schedule

The COL applicant should provide estimated schedules for completion of construction and start of commercial operation (estimates may be specified in duration, rather than calendar dates, based on the application submittal date).

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 conformance with regulatory guides on the format and content of a COL application (i.e., DG-1145).
- 1.1.6.2 conformance with the standard review plan (NUREG-0800) (i.e., evaluation of 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 the format, content, and numbering of text, tables, and figures included in the application, and a discussion of their use
- 1.1.6.4 format for numbering of pages in the application
- 1.1.6.5 the method by which proprietary information is identified and referenced
- 1.1.6.6 a list of 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 provide a summary description of the principal characteristics of the site and 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; the engineered safety features and emergency systems; the instrumentation, control, and electrical systems; the power conversion system; the fuel handling and storage systems; the cooling water and other auxiliary systems; and the radioactive waste management system. The general arrangement of major structures and equipment should also be indicated by the use of plan and elevation drawings in sufficient number and detail to provide a reasonable understanding of the general layout of the plant. Those features of the plant that are likely to be of special interest because of their relationship to safety should also be identified. In addition, such items as unusual site characteristics, solutions to particularly difficult engineering and/or construction problems (e.g., modular construction techniques or plans), and significant extrapolations in technology represented by the design should be highlighted.

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 principal consultants and outside service organizations (such as those providing audits of the quality assurance program) should also be identified. The division of responsibility between the reactor designer, architect-engineer, constructor, and plant operator should also be delineated.

C.I.1.5 Requirements for Further 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 differ significantly from those of evolutionary light-water reactors or utilize simplified, inherent, passive, or other innovative means to accomplish their safety functions. The requirement to provide this information is included in 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 (51 FR 24643, dated July 8, 1986), as well as the Commission's goal of resolving all safety issues before authorizing construction.

The guidance provided in this regulatory guide is based on a COL applicant who does not reference a certified design as part of the application. Instead, this guidance focuses on a COL applicant who must provide a complete design for the entire proposed facility, with the same level of design completeness information provided for a certified design. Because a COL applicant who does not reference a certified design must provide sufficient design information for a complete facility, the NRC staff anticipates that there may only be minimal requirements for further technical information to supplement the information included in the application discussions. These minimal requirements may include such items as verification of unique design concepts, for example, that may require tests and/or additional verification analyses for the first plant, first three plants, and so forth.

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

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 have been prepared by reactor designers and manufacturers, architect-engineers, or other organizations, and filed separately with the NRC in support of this application or other applications or product lines. For each topical report, this tabulation should include the report number and title, the date on which the report was submitted to the NRC, and the sections of the COL application in which the report is referenced. For any topical reports that have been withheld from public disclosure as proprietary documents pursuant to 10 CFR 2.790(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 by reference in the application. If any information submitted in connection with other applications is incorporated by reference in this application, summaries of such information should be included in appropriate sections of this application, as necessary.

Results of test and analyses may be submitted as separate reports. In such cases, these reports should be referenced in this section and summarized in the appropriate section(s) of the FSAR.

C.I.1.7 Drawings and Other Detailed Information

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

In addition, the COL applicant should provide a tabulation of system drawings and system designators that are cross-referenced to the related section(s) 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)

The guidance provided in this section of the regulatory guide is for COL applicants who do not reference a certified design as part of the application. Instead, the COL applicant who is the focus of this guide must provide a design for a complete facility, which is not limited in scope such as a certified design, but to the same level of design information as provided in a certified design. By definition, there is no interface between standard designs and site-specific designs for a complete facility design. All interfaces, such as those that may exist between certified designs, early site permits, and a COL application that references those documents, are expected to be integral to a COL application that provides a complete facility design. That is, there are no interfaces from a certified design and/or early site permit for a COL applicant who does not reference those documents.

Based on the focus of this section of the regulatory guide, there should be no interface requirements identified for a COL applicant who does not reference a certified design and/or early site permit. Likewise, a COL application that does not reference a certified design, by definition, should not include any conceptual design information for the facility. In order to facilitate the NRC staff’s review of previous applications for design certification, conceptual designs were included in their design control documents (DCDs) to provide 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, COL applicants who do not reference a certified design are expected to 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 *proposed* 10 CFR 52.79(a)(4)(i) specify that the contents of a COL application must include information on the design of the facility, including its principal design criteria. Appendix A to 10 CFR Part 50, “General Design Criteria for Nuclear Power Plants,” 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, and 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 use in implementing the general design criteria specified in Appendix A to 10 CFR Part 50. Thus, COL applicants should provide an evaluation of conformance with the guidance provided in the NRC’s regulatory guides that are in effect 6 months before the docket date of the COL application. That evaluation should also include an identification and description of any departures from the guidance contained in the NRC’s regulatory guides, as well as suitable justifications for the alternative approaches proposed by the COL applicant.

C.I.1.9.2 Conformance with the Standard Review Plan

The requirements of *proposed* 10 CFR 52.79(a)(41) specify that for applications for light-water cooled nuclear power plant combined licenses, COL applicants should provide an evaluation of the facility’s conformance with the standard review plan (SRP) in effect 6 months before the docket date of the application.¹ The evaluation required by this section should include an identification and description of any differences in design features, analytical techniques, and procedural measures proposed for the facility and those corresponding features, techniques, and measures specified in the SRP acceptance criteria. Where 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 SRP acceptance criteria.

C.I.1.9.3 Generic Issues

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

Since the inception of the generic issues program in 1976, the NRC has identified and categorized reactor safety issues. These issues were grouped into TMI action plan items, task action plan items, new generic items, human factors issues, and Chernobyl issues, and are collectively called “generic safety issues” (GSIs). Section C.IV.8 of this regulatory guide provides a list of these GSIs (i.e., those unresolved safety issues and medium- and high-priority GSIs that are identified in the version of NUREG-0933 that was current as of the date of issuance of DG-1145) for use by COL applicants. In preparing that list, the NRC staff reviewed these GSIs to determine whether they have been closed by other Commission actions or requirements. Those issues that remain open and are technically relevant to the COL applicant’s design should be addressed in the application.

¹ The SRP was issued to establish criteria that the NRC staff intends to use in evaluating whether an applicant/licensee meets the Commission’s regulations. The SRP is not a substitute for the NRC’s regulations, and compliance is not a requirement.

C.I.1.9.4 Operational Experience (Generic Communications)

The requirements of *proposed* 10 CFR 52.79(a)(37) specify that the contents of a COL application must include information to demonstrate how operating experience insights from generic letters and bulletins up to 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 operational experience from decades of nuclear power plant operation in the United States is incorporated into the designs for new/standardized nuclear power plants, the application should review and assess the highlights of this operational experience (as documented in generic NRC communications). The significance of limiting this review to generic letters and bulletins is that these documents pertain to issues that were considered to have risen to a level of safety-significance such that they required responses and resolutions from nuclear operating plant licensees. Other forms of generic communications have included circulars, information notices, and regulatory information summaries; however, these types of generic communications do not require responses or actions on the part of licensees. In addition, the issues discussed in these communications are generally of a more specific (rather than generic) nature.

A listing of generic communications (i.e., generic letters and bulletins that had been issued prior to the date of issuance of DG-1145) has been provided in Section C.IV.8, Generic Issues, of this regulatory guide for use by COL applicants. A review of these generic communications was performed to determine whether they have been superseded by other NRC generic communications, NRC actions, or requirements. Those generic communications that remain open and that are technically relevant to the COL applicants facility design should be addressed in the application.

C.I.1.9.4.1 Comparable International Operating Experience

Applicants for certified designs or combined licenses are required to address comparable international operating experience in accordance with *proposed* 10 CFR 52.47(a)(19) and 10 CFR 52.79(a)(37), respectively. To the extent that the design (or portions thereof), for which an applicant seeks a design certification or COL, originates or is based on international design, the application should address how international operating experience has contributed to the design process. Nuclear industry regulators or owners groups in countries that include nuclear reactor vendors and/or nuclear power plants (e.g., Canada, France, Germany, Japan, etc.) may track, maintain, and/or issue operating experience bulletins or reports similar to the NRC's generic letters and bulletins. Thus, the design certification or COL applicant should address how this body of operating experience has been assessed and/or incorporated into the design. Design certification and COL applicants are responsible for procuring any international operating experience information for use in this assessment.

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

This section (i.e., Section C.I) of the regulatory guide is applicable to COL applicants who do not reference a certified design. Therefore, such applicants 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. As such, COL applicants should address the licensing and policy issues developed by the NRC for advanced and evolutionary light-water reactor designs that are applicable to the proposed facility design. The following documents provide guidance to applicants on issues that should be considered and/or addressed in a COL application that does not reference a certified design; however, this list may not be comprehensive for 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” 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”