DG-1145, Section C.I.1, Introduction and General Description of the Plant

Combined license (COL) applicants per 10 CFR 52, Subpart C, may incorporate by reference designs that have been certified per 10 CFR 52, Subpart B, and early site permits per 10 CFR 52, Subpart A. The guidance provided in DG-1145, Section C.I, is applicable to a combined license applicant that references neither a certified design nor an early site permit. Additional guidance for COL applicants referencing a certified design and/or early site permit is provided in Section C.III of this document.

The first chapter of the 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 with recognition of the relative safety significance of each individual item to the overall plant design.

1.1 Introduction

In this section, the COL applicant should present briefly the principal aspects of the overall application, including the type of license requested, the number of plant units, a brief description of the proposed location of the plant, the type of the nuclear steam supply system or certified plant design and its designer, the type of containment structure and its designer, the core thermal power levels, both rated and design, and the corresponding net electrical output for each thermal power level, the scheduled completion date and anticipated commercial operation date of each unit. The COL applicant should provide a general description or summary level information on the following areas of the application:

1.1.1 Plant Location

The COL applicant should provide plant location information such as state, county, map(s) showing site location and plant arrangement within site, including whether plant is co-located with existing operating nuclear power plants.

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, shield building type - reinforced concrete, post-tensioned, etc.).

1.1.3 Reactor Type

The COL applicant indicate nuclear steam supply system designer and model and whether reactor is a pressurized water reactor or boiling water reactor.

1.1.4 Power Output

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

1.1.5 Schedule

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

1.1.6 Format and Content

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

1.1.6.1 Compliance with regulatory guides on format and content of a combined license application (i.e., DG-1145).
1.1.6.2 Compliance with the standard review plan (NUREG-0800) for technical guidance and acceptance criteria. Guidance on providing compliance evaluations with individual SRPs is discussed in C.I.1.9 of this regulatory guide.
1.1.6.3 The format, content, and numbering for text, tables, and figures included in the application and a discussion on their use should be provided in the application.
1.1.6.4 Format for numbering of pages should be discussed in the application.
1.1.6.5 The method by which proprietary information is identified and referenced should be discussed.
1.1.6.6 A list of acronyms used in the application should be provided.

1.2 General Plant Description

In this section, the COL applicant should include 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 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 likely to be of special interest because of their relationship to safety should be identified. 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.

1.3 Comparisons with other facilities

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

1.4 Identification of Agents and Contractors

In this section, the COL applicant should identify the prime 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

be identified. The division of responsibility between the reactor designer or certified plant designed, architect-engineer, constructor, and plant operator should be delineated.

1.5 Requirements for Further Technical Information

COL applicants that do not reference a certified design should provide information in this section that demonstrates the performance of new safety features for nuclear power plants that differ significantly from 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 safety analysis report, (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 to COL applicants in this regulatory guide is based on a COL applicant that does not reference a certified design as part of the application. Instead, this guidance focuses on a COL applicant that must provide a complete design for the entire proposed facility and with the same level of design completeness information provided for a certified design. Because a COL applicant that 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. That is, information in addition to that provided in accordance with the discussion. 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, etc.

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

1.6 Material Referenced

In this section, the COL applicant should provide a tabulation of 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, reactor manufacturers, architect-engineers, or other organizations and filed separately with the NRC in support of this application or of other applications or product lines. This tabulation should include, for each topical report, the title, the report number, the date 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 pursuant to Section 2.790(b) of 10 CFR Part 2 as proprietary documents, nonproprietary summary descriptions of the general content of such reports should also be referenced. 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 in the

application by reference. 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.

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 of the FSAR.

1.7 Drawings and Other Detailed Information

The COL applicant should provide a tabulation of all instrument and control functional diagrams, electrical one-line diagrams cross-referenced to application section, 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 applicable section of the application. The information should include the applicable drawing legends and notes.

1.8 Interfaces (with Standard Designs and Early Site Permits)

The guidance provided in this regulatory guide is for a COL applicant that does not reference a certified design as part of the application. Instead, the COL applicant that is the focus of this guide must provide a design for a complete facility, not limited in scope such as a certified design, but to the same of level of design information as provided in a certified design. By definition, there no interface between standard designs and site-specific designs for a complete facility design. All interfaces, such as those which may exist between certified designs, early site permits and a COL application that references these 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 that does not reference these documents. Based on the focus of this guidance document, there should be no interface requirements identified for a COL applicant that 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 NRC staff review of previous applicants 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 intended to be and were not certified by the NRC. These conceptual designs typically included portions of the balance-of-plant. COL applicants that do not reference a certified design are expected to provide complete designs for the facility without reliance on conceptual designs.

1.9 Compliance with Regulatory Criteria

1.9.1 Compliance with Regulatory Guides

The requirements of *proposed* 10 CFR 52.79(a)(4)(i) specify that the contents of a combined license application must include information on the design of the facility, including the principal design criteria for the facility. Appendix A to part 50 of this chapter, “General Design Criteria for

Nuclear Power Plants," establishes minimum requirements for the principal design criteria for water-cooled nuclear power plants similar in design and location to plants for which construction permits have previously been issued by the Commission and provides guidance to applicants in establishing principal design criteria for other types of nuclear power units. Regulatory Guides, in general, describe methods acceptable to the NRC staff for implementing the criteria associated with the General Design Criteria. COL applicants should provide an evaluation of compliance with the guidance provided in the NRC's Regulatory Guides that are in effect 6 months before the docket date of the application. The evaluation should also include an identification and description of any departures from the guidance contained in NRC Regulatory Guides and suitable justifications provided for the alternative approach proposed by the COL applicant.

1.9.2 Compliance with 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 against the Standard Review Plan (SRP) in effect 6 months before the docket date of the application. The evaluation required by this section shall include an identification and description of all differences in design features, analytical techniques and procedural measures proposed for a facility and those corresponding features, techniques and measures given in the SRP acceptance criteria. Where a difference exists, the evaluation shall 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. 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 regulations, and compliance is not a requirements.

1.9.3 Generic Issues

The requirements of *proposed* 10 CFR 52.79(a)(20) specify that the contents of a combined license application must include the proposed technical resolutions of those **unresolved safety issues** and medium- and high- priority generic safety issues that are identified in the version of NUREG-0933 current on the date 6 months before application and that 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. These safety 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)**. A listing of these GSIs (i.e., those unresolved safety issues and medium- and high- priority generic safety issues that are identified in the version of NUREG-0933 that was current on the date of issuance of DG-1145) has been provided in Section C.IV.8, *Generic Issues*, for use by COL applicants. A review of these GSIs was performed to determine whether they have been closed by other NRC actions or requirements. Those issues that remain open and which are technically relevant to the COL applicants design should be addressed in the application.

1.9.4 Operational Experience (Generic Communications)

The requirements of *proposed* 10 CFR 52.79(a)(37) specify that the contents of a combined license application must include the information which demonstrates 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 in the designs for new/standardized nuclear power plants, the highlights of this operational experience as documented in generic NRC communications must be reviewed and assessed. The significance of limiting this review to generic letters and bulletins is that these documents pertained to issues that were considered to have risen to the 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 response or action on the part of the licensee. In addition, the issues discussed in these communications were generally of a more specific nature rather than a generic nature.

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

Comparable international operating experience

Applicants for certified design and applicants for a combined license are required to address comparable international operating experience in accordance with *proposed* 10 CFR 52.49(a)(19) and 10 CFR 52.79(a)(37), respectively. To the extent that the design or portions of the design for which a combined license or a design certification is sought originates or is based on international design, the COL application or design certification application should address how international operating experience has contributed to the design process. Nuclear industry regulators or industry 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 NRCs generic letters and bulletins. The COL applicant or design certification applicant should address how this body of operating experience information has been assessed and/or incorporated into the design. In addition, international experience relative to the operational aspects of both international and domestically designed nuclear reactors should be considered and assessed by COL applicants. Applicants for design certification and/or a combined license are responsible for procuring any international operating experience information for use in this assessment.

1.9.4 Advanced and Evolutionary Light Water Reactor Design Issues

Part I of this guidance document is applicable to COL applicants that do not reference a certified design. Therefore, COL applicants that do not reference a certified design must provide sufficient information on the complete design for their proposed facility, including those portions of the facility design that are typically provided by reactor vendors or applicants for reactor design certification per Subpart B of the 10 CFR 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 their proposed facility design. The following list provides guidance to a COL applicant on issues that should be considered and/or addressed in a COL application that does not reference a certified design, however, it does not represent a comprehensive listing 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

DG-1145, Section C.I.1, Introduction and General Description of the Plant

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