



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

June 9, 1995

Mr. Nicholas J. Liparulo  
Nuclear Safety and Regulatory Activities  
Westinghouse Electric Corporation  
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SUBJECT: GUIDANCE ON DESIGN CONTROL DOCUMENT PREPARATION

Dear Mr. Liparulo:

The purpose of this letter is to provide guidance on preparation of a Design Control Document (DCD) for the Westinghouse AP600 design. The DCD will be incorporated by reference in the design certification rule for the AP600.

As discussed at a senior management meeting with Westinghouse on May 3, 1995, this guidance is based on reformatting the current standard safety analysis report (SSAR) and certified design material (CDM) as the DCD. Subsequently, the DCD would be the single document describing the AP600 design. Based on the experience gained from the evolutionary design reviews, the staff believes that early preparation of the DCD is essential to maintaining the current schedule for design certification, and could save both staff and Westinghouse resources. Since the preparation of the DCD is primarily administrative in nature, it should be accomplished in the next amendment that is practical.

During the review of the evolutionary designs, many issues associated with the preparation of the DCD were resolved. These issues are listed below, and the resolutions are discussed in greater detail in the enclosure to this letter.

1. Format of the DCD
2. Treatment of proprietary and safeguards information
3. Deletion of probabilistic risk assessment information
4. Designation of Tier 2\* information in the DCD
5. Treatment of conceptual design information in the DCD
6. Treatment of Combined License action items in the DCD
7. Treatment of severe accident design alternatives
8. Treatment of secondary references in the DCD
9. Miscellaneous format issues

Conceptually, the staff proposes that any information that is required for SSAR design certification, but is not intended to be included in the DCD (e.g., proprietary information), should be submitted as a separate report that

Mr. Nicholas J. Liparulo

- 2 -

June 9, 1995

is referenced in the appropriate section of the DCD. This information should be minimized because it would not be considered resolved within the meaning of 10 CFR 52.63.

Sincerely,

original signed by:

Dennis M. Crutchfield, Associate Director  
for Advanced Reactors and License Renewal  
Office of Nuclear Reactor Regulation

Docket No. 52-003

cc w/enclosure:  
See next page

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Westinghouse Electric Corporation

Docket No. 52-003  
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## GUIDANCE ON THE PREPARATION OF A DESIGN CONTROL DOCUMENT (DCD)

The DCD is the master document that contains the Tier 1 and 2 information referenced in the design certification rule. All applicants for a combined license (COL) that reference the design certification rule must conform with the information in the DCD. Therefore, it should retain as much of the information in the design certification applicant's standard safety analysis report (SSAR) and certified design material (CDM) as possible. Information that is part of the design certification application, but not included in the DCD, should be included in separate documents that are referenced in the appropriate sections of the DCD. The information in the design certification application will be the basis for the staff's safety evaluation for the design.

### 1. Format of the DCD

The following discussion is based on the assumption that Westinghouse desires a two-tiered format for its design certification rule. Therefore, the DCD should have three sections: an introduction, the SSAR (Tier 2), and the Tier 1 design-related information.

Introduction: The introduction should describe the purpose, content overview, and COL applicant or licensee uses of the Tier 1 and Tier 2 portions of the DCD, with particular emphasis on the issues discussed in this guidance letter. The significance of designating design information as either Tier 1 or Tier 2 is that different change processes and criteria apply to each tier, as described in the design certification rule. Although the introduction is part of the DCD, it is neither Tier 1 nor Tier 2 information. Rather, the DCD introduction provides a convenient explanation of the DCD, and is non-binding. All substantive or procedural requirements described in the DCD introduction will be set forth in the design certification rule.

Tier 2: Another section of the DCD should contain the Tier 2 information. Tier 2 is the portion of the design-related information contained in the DCD that is approved by the design certification rule, but is not certified. In general, this is the information previously contained in the SSAR, and submitted in accordance with the requirements of 10 CFR 52.47. Tier 2 also includes supporting information on the inspections, tests, and analyses that will be performed to demonstrate that the acceptance criteria in the ITAAC have been met. Compliance with the more detailed Tier 2 information provides a sufficient method, but not the only acceptable method, for complying with the more general design requirements included in Tier 1. If an applicant or licensee used methods other than those described in Tier 2, then the alternative method must be evaluated using the change process in the design certification rule. The alternative methods would be open to staff review and could be a possible issue for a hearing.

Enclosure

Tier 1: A third section of the DCD should be the Tier 1 information. The Tier 1 portion of the design-related information contained in the DCD is certified by the design certification rule. This information consists of an introduction to Tier 1, the certified design descriptions and corresponding inspections, tests, analyses, and acceptance criteria (ITAAC) for systems and structures of the design, design material applicable to multiple systems of the design, significant interface requirements, and significant site parameters for the design. The information in the Tier 1 portion of the DCD is extracted from the detailed information contained in the application for design certification. While the Tier 1 information must address the complete scope of the design to be certified, the amount of design information is proportional to the safety-significance of the structures and systems of the design. Additional design material and related ITAAC are also provided in Tier 1 for selected design and construction activities that are applicable to multiple systems of the design. This additional design material is generally the information that is dependent on as-built, as-procured, or evolving technology, and the detailed design information for these areas must be completed by a COL applicant or licensee. Supporting information for the Tier 1 information should be provided along with related design information in the Tier 2 section of the DCD. In addition, a description of the methodology and criteria for how the Tier 1 information was developed should be provided in Section 14.3 of the DCD. The Tier 1 design descriptions serve as design commitments for the lifetime of a facility referencing the design certification, and the ITAAC verify that the as-built facility conforms with the approved design and applicable NRC regulatory requirements.

If the Tier 1 information uses a system-based structure, then it will be different from the analysis-based structure of the Tier 2 material. The staff is particularly interested in ensuring that the assumptions and insights from key safety and integrated plant safety analyses in the Tier 2 material, where plant performance is dependent on information from multiple chapters of the Tier 2 material, are adequately captured in the Tier 1 material. These analyses include flooding, overpressure protection, containment analyses, core cooling analyses, fire protection, transient analyses, radiological analyses, ATWS, USI/GSI's and TMI items. Cross-references for these analyses should be submitted along with the Tier 1 material and included in Section 14.3 of the Tier 2 portion of the DCD.

In addition, cross-references for where assumptions and insights from the probabilistic risk assessment and severe accident analyses are addressed in the DCD should be included along with these analyses in the related portion of the Tier 2 material. For these analyses only, the cross-references should show where each of the key assumptions and insights has been captured in the design in the Tier 1 design information, as well as in the technical specifications (including administrative controls), reliability assurance activities, emergency procedure guidelines, initial test program, and COL action items.

The Tier 1 information must include the most significant of the interface requirements for the standard design which were submitted in response to 10 CFR 52.47(a)(1)(vii). The Tier 1 information must also include the most significant of the site parameters that were submitted in response to 10 CFR 52.47(a)(1)(iii).

## 2. Treatment of Proprietary and Safeguards Information

Because of the requirement of the Office of the Federal Register that all information incorporated in the design certification rule be publicly available, proprietary and safeguards information that is withheld from public disclosure cannot be included in the DCD. Since this information is not included in the DCD, it will not have issue preclusion in a construction permit or COL proceeding. However, this information is part of the NRC staff's bases for its safety findings for the design, and the NRC considers this information to be a requirement for facilities that reference the design certification rule. Therefore, the proprietary and withheld safeguards information, or its equivalent, must be resubmitted as part of a COL application.

The maximum use of publically available information in the application is strongly recommended to facilitate resolution of issues for future COL applicants and licensees. For example, upon close examination by the evolutionary plant designers, significant portions of proprietary information were able to be reclassified as non-proprietary. Also, for one design, the SSAR and DCD were prepared using non-safeguards-sensitive (publically available) information.

After determining what material cannot be included in the DCD, and to ensure that it is clear what is required as part of a COL application, the applicant should clearly indicate in the DCD any deletions of proprietary or safeguards information for purposes of DCD preparation. The DCD should also indicate the appropriate location of the proprietary or safeguards information residing in separate, external documents.

## 3. Deletion of Probabilistic Risk Assessment (PRA) Information

For the evolutionary design reviews, industry requested deletion of certain design probabilistic risk assessment (PRA) information from the DCD because of questions on the regulatory significance of that information. The PRA was used in the design review to determine the risk significance of key structures, systems, and components. The NRC concluded that the detailed methodology and quantitative portions of the design PRA did not need to be included in the DCD but the assumptions, insights, and discussions of PRA analyses must be retained in the DCD.

If the detailed portions of the PRA are intended to be removed from the DCD, the objective should be to retain sufficient structure and detail that COL applicants or licensees may fill in detailed design information using the design certification PRA as a baseline. Essentially, only

selected quantitative portions should be removed rather than a converse approach where only a minimal amount of information would be retained in the DCD. Additional guidance is listed in the following paragraphs.

- a. The details of the PRA are necessary for the staff to evaluate the risk significance of structures, systems, and components of the design during its review. However, to facilitate the removal of the detailed quantitative portion of the PRA at the completion of the design review, the staff proposes that separate sections in the DCD or external reports should be developed for the quantitative analyses that support the qualitative discussion of the PRA.
  - b. Detailed discussions of PRA data analysis may be removed, but PRA insights, assumptions, results, sensitivity study results, and importance rankings should be retained. Any sections of information that were deleted should be indicated in the DCD, and should be contained in a separate, external report. Deterministic severe accident and shutdown risk analyses should remain in the DCD, although these may be edited to remove detailed PRA data.
  - c. The PRA analyses that demonstrate why various design features for structures, systems or components are important should be retained in the DCD. A list of risk-significant structures, systems, and components should be provided in the DCD. These analyses should be retained either in one DCD location or the appropriate sections of the DCD discussing the systems of the design. Also, cross references to other documents should be retained in the DCD if they support the information retained in the DCD.
  - d. As discussed in paragraph 1 above, cross-references for probabilistic and severe accident analyses in the SSAR showing where design features from key integrated plant safety analyses were incorporated into the design should be retained in the DCD in the same form as in the SSAR. Specific cross-references to the appropriate sections of the SSAR and CDM should be retained.
  - e. Information that is currently in the SSAR but does not involve PRA should be retained in the DCD. This includes items such as 10 CFR 50.34(f) items and unresolved and generic safety issues (USIs/GSIs).
4. Designation of Tier 2\* Information in the DCD

Tier 2\* information is that information in Tier 2 that, if considered to be changed by a combined license (COL) applicant or licensee, requires NRC approval prior to the change. The areas designated as Tier 2\* by the NRC staff were listed in the final safety evaluation reports (FSERs) for the evolutionary designs (NUREG-1503 and NUREG-1462), and these areas should be similar for the passive designs. The areas designated as Tier 2\* were generally those associated with detailed structural and equipment design; design and analysis methodology for fuel and control

rods; and supporting material for the Instrumentation & Controls, Control Room, and Piping design acceptance criteria (DAC). The requirement for prior NRC approval for many of these Tier 2\* areas may expire at the first full power operation of a facility.

The DCD should designate clearly (bracketed and italicized) the information that is determined to be Tier 2\*. Use of other markers such as asterisks and bold type may also be appropriate. A table should be provided in the DCD listing the areas of the DCD that contain Tier 2\* information. A statement should be included with the table stating that prior NRC approval is required to change the information, and the statement may be added to each Tier 2\* area in the DCD as appropriate for clarity.

#### 5. Conceptual Design Information

Conceptual design information is information that an applicant for design certification is required to submit for site-specific portions of the design by 10 CFR 52.47(a)(1)(ix). An applicant for a construction permit or COL that references the DCR must also describe those portions of the plant design which are site-specific, and demonstrate compliance with the interface requirements, as required by 10 CFR 52.79(b). The COL applicant does not need to conform with the conceptual design information in the DCD. The conceptual design information, which describes examples of site-specific design features, is required to facilitate the design certification review, is non-binding, and it is neither Tier 1 nor 2.

Conceptual design information should be retained in the DCD. The information should be clearly designated as conceptual design information in the appropriate sections of the DCD. The introduction to the DCD should identify the location of the conceptual design information, and explain that this information is included in the DCD for informational purposes only. The introduction should also state that the site-specific design information must be submitted for review as part of a COL application.

#### 6. Treatment of Combined License (COL) Action Items in the DCD

COL action items are outside the scope of the design certification but must be addressed by an applicant or licensee that references the design certification, as required by 10 CFR 52.77 and 52.79. In general, COL action items deal with programmatic or site-specific issues associated with the design.

COL action items should be specified in the Tier 2 portion of the DCD in self-contained subsections, along with the general areas of the design to which they apply. The DCD Introduction should identify the location of the COL action items in the DCD. A table should be provided in the DCD listing the design areas that contain COL action items. An appropriate discussion on the status of these items may be included.

7. Treatment of Severe Accident Design Alternatives

A design certification applicant must submit an evaluation of design alternatives for severe accidents, as required by 10 CFR 50.34(f)(1)(i). This evaluation may be retained in the DCD, or submitted in a separate report that is referenced in the appropriate section of the DCD. In addition, design certification applicants are also required to submit a separate evaluation of severe accident mitigation design alternatives (SAMDAs) to address, in part, the environmental requirements in 10 CFR Part 51 as they pertain to the design certification rulemaking. The treatment of SAMDAs in design certification rulemakings is discussed in more detail in SECY-91-229, "Severe Accident Mitigation Design Alternatives for Certified Standard Designs." The evaluation of SAMDAs need not be referenced or incorporated in the DCD.

8. Treatment of Secondary References in the DCD

Secondary references are references in the DCD to external documents outside the DCD. They typically include industry codes, standards, and topical reports, as well as NRC regulations, regulatory guides, NUREGs, and generic correspondence. These also include references to proprietary information and references to information deleted from the SSAR for purposes of DCD preparation. The DCD itself is considered a primary reference of the rule certifying the design. The following guidance is designed to ensure that the requirements of the DCD and secondary references are clear for the benefit of reactor designers, the NRC, the public, and COL applicants. The staff recognizes that additional discussion with industry on implementation of this guidance may be required.

In general, the DCD should incorporate the applicable requirements of the secondary references rather than reference the external documents containing the requirements. However, if requirements are contained in an external document, the DCD should clearly identify the specific requirements contained in the external document, or the portions of the document that constitute the requirements. Also, references to external documents must be specific as to the applicable version, edition or date.

References that are cited for informational purposes should be retained in the DCD. In addition, internal cross-references to other parts of the DCD need not be modified, even if the cross-reference is to an external document. In either case, the DCD should be clear whether the reference is intended to be a requirement or is intended for informational purposes only.

9. Miscellaneous Format Issues

- a. Section numbering should be the same in the DCD as currently in the CDM and the SSAR.

- b. Guidelines for preparation of emergency procedures are required to be in the DCD as Tier 2 information.
- c. Technical Specifications are required to be in the DCD as Tier 2 information.
- d. Documentation of requests for additional information (RAIs) should be included in the DCD as a separate section if the information in the RAIs is not otherwise described in the appropriate Tier 1 or Tier 2 portions of the DCD.
- e. Any currently copyrighted material in the SSAR will need to be the subject of further discussion between the staff and the applicant.