

1.0 Introduction and General Description of Plant

1.1 Introduction

This design control document (DCD) is produced by Toshiba Corporation and assigned Toshiba document number RS-5146900. Appendix 1D to this document provides a summary of changes made to the DCD. Appendix 1D also defines the use and meaning of revision bars used to show the location of changes to text, tables and figures.

1.1.1 Format and Content

Tier 2 is written in accordance with Regulatory Guide (RG) 1.70. For consistency with NUREG-0800, Tier 2 includes Section 15.8, which addresses anticipated transients without scram (ATWS), and Chapter 18, which addresses human factors. In addition, the response to TMI related matters is presented in Appendix 1A. Appendix 1C describes the ABWR station blackout considerations.

The response to the severe accident policy statement is provided in Chapter 19 of Tier 2. The response to the aircraft impact rule is provided in Tier 2, Appendix 19T. Chapter 20 is included to provide a Question and Response guide. Chapter 21 provides the engineering drawings.

1.1.2 ABWR Standard Plant Scope

The ABWR Standard Plant includes all buildings which are dedicated exclusively or primarily to housing systems and the equipment related to the nuclear system or controls access to this equipment and systems. There are five such buildings within the scope of the ABWR Standard Plant:

- (1) Reactor Building (including containment)
- (2) Service Building
- (3) Control Building
- (4) Turbine Building
- (5) Radwaste Building

In addition to these buildings and their contents, the ABWR Standard Plant provides the supporting facilities shown in Figure 1.2-1. A detailed listing of structures and systems for the ABWR Standard Plant scope of design is provided in Table 3.2-1.

The ABWR evolutionary design provides an essentially complete nuclear power plant except for site-specific elements. The site-specific elements are included as representative conceptual designs with interface requirements sufficient for the final safety analysis and design-specific probabilistic risk assessment in accordance with 10CFR52.47(a) (1) (vii) and (b) (1). Unless

otherwise noted, the following site-specific elements are outside the scope of the ABWR Standard Plant:

- (1) Ultimate heat sink (9.2.5), interfaces with reactor service water (conceptual.)
- (2) Offsite power (8.2.5), transmission (The offsite power transmission network is out of scope starting from the low voltage terminals of the main and reserve transformers, reference conceptual design is provided.)
- (3) Makeup water (9.2.8), preparation (well and treatment facilities, conceptual.)
- (4) Potable and sanitary water systems (9.2.4), partial (Portions inside the buildings of Figure 1.2-1 are in scope. All other portions are conceptual and outside scope of the standard ABWR design.)
- (5) Reactor service water (9.2.15), rejects heat to the ultimate heat sink, partial (Portions inside the buildings of Figure 1.2-1 are in scope. All other portions are conceptual [pumps, valves, pipes, strainers and other equipment (Figure 9.2-7)] and are outside the scope of the standard ABWR design.)
- (6) Turbine service water (9.2.16), rejects heat to the power cycle heat sink, partial (Portions inside the buildings of Figure 1.2-1 are in scope. All other portions are conceptual [pumps, valves, pipes, strainers and other equipment (Figure 9.2-8)] and are outside the scope of the standard ABWR design.)
- (7) Communications (9.5.2), partial (Communication equipment inside the buildings of Figure 1.2-1 are in scope. All other portions, including connections to offsite networks are outside the scope of the standard ABWR design.)
- (8) Site security (13.6.2)
- (9) Circulating water system (10.4.5), circulates water, partial (Portions inside the buildings of Figure 1.2-1 are in scope. All other portions are conceptual [pumps, valves, pipes, strainers and other equipment (Figure 10.4-3)] and are outside the scope of the standard ABWR design.) This system includes the power cycle heat sink which provides a heat sink for the Circulating Water and Turbine Service Water.
- (10) Heating, ventilating and air conditioning (9.4), partial (Involving potential need for toxic gas monitors).

A detailed listing of the above site-specific elements is also provided in Table 3.2-1.

1.1.3 Engineering Documentation

Engineering documentation for the ABWR Standard Plant is listed, controlled and structured by system.

1.1.4 Design Process

Toshiba and its associates control the review and approval of ABWR Common Engineering design documents with a procedure using the Engineering Review Memorandum (ERM). Evidence of design verification is entered into the design records of the responsible design organization. For engineering documents prepared uniquely by Toshiba for the U.S. ABWR, changes to engineering documents are entered into the design record files. A COL applicant will establish the design, including the supporting detailed design documentation, consistent with the design control document referenced in the certified design rule. See Subsection 1.1.11.1 for COL license information requirements.

1.1.5 Type of License Required

Tier 2 is submitted in support of the application for design certification (DC) for the ABWR Standard Plant.

1.1.6 Number of Plant Units

For the purpose of this document, only a single standard plant will be considered.

1.1.7 Description of Location

This plant can be constructed at any location which meets the parameters identified in Chapter 2.

1.1.8 Type of Nuclear Steam Supply

This plant will have a boiling water reactor (BWR) nuclear steam supply system (NSSS) designed and supplied by Toshiba and designated as ABWR.

1.1.9 Type of Containment

The ABWR will have a low-leakage containment vessel which comprises the drywell and pressure suppression chamber. The containment vessel is a cylindrical steel-lined reinforced concrete structure integrated with the Reactor Building. The containment nomenclature is specified in Figure 1.1-1.

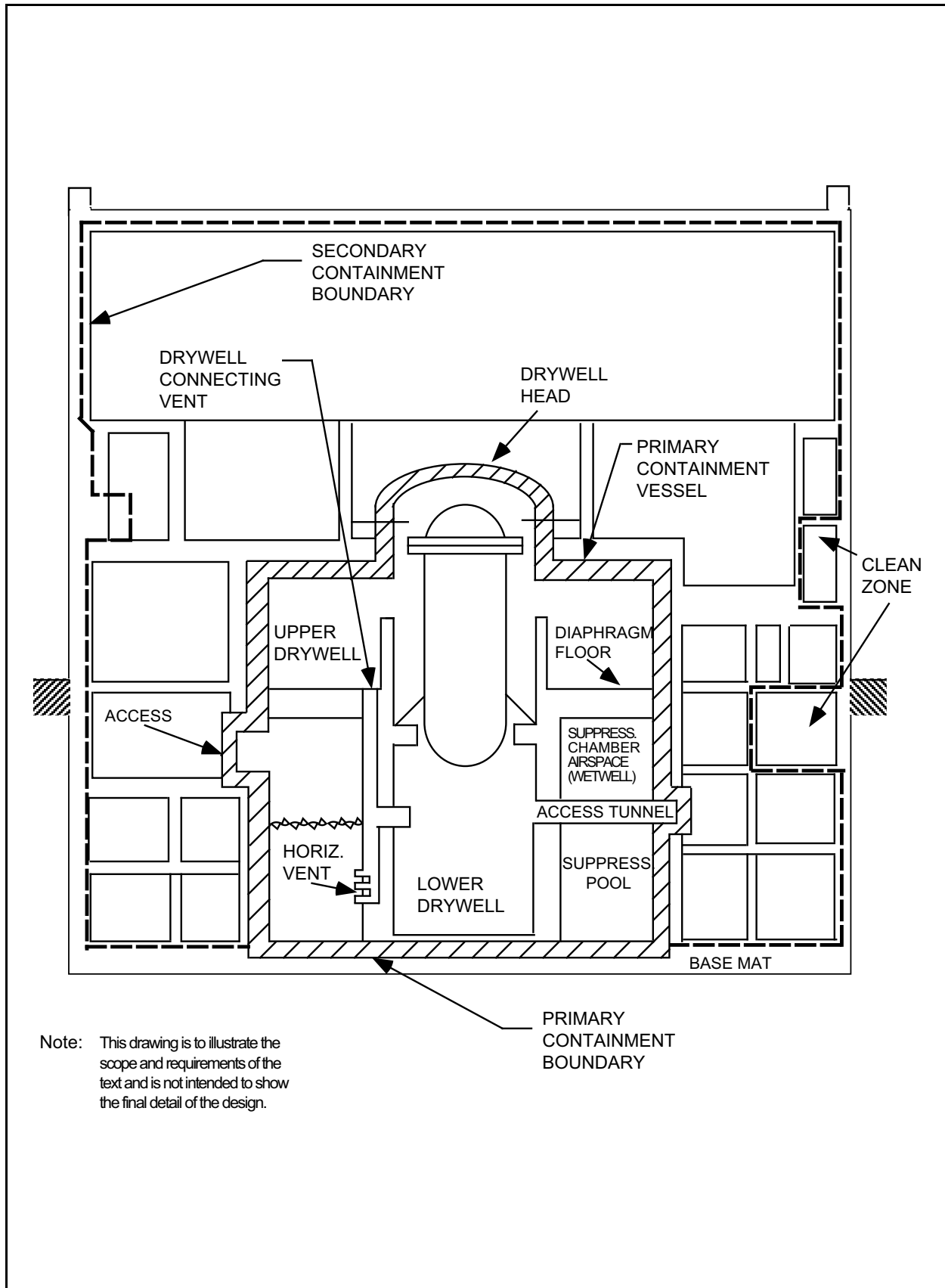
1.1.10 Core Thermal Power Levels

The information presented in Tier 2 pertains to one reactor unit with a rated power level of 3926 MWt and a design power level of 4005 MWt. The station utilizes a single-cycle, forced-circulation BWR. The heat balance for rated power is shown in Figure 1.1-2. The station is designed to operate at a gross electrical power output of approximately 1356 MWe and net electrical power output of approximately 1300 MWe.

1.1.11 COL License Information

1.1.11.1 Design Process to Establish Detailed Design Documentation

The COL applicant will provide the design process required to establish the detailed design documentation (see Subsection 1.1.4).

**Figure 1.1-1 ABWR Standard Plant Nomenclature**

