3.0 DESIGN OF STRUCTURES, COMPONENTS, EQUIPMENT, AND SYSTEMS

3.1 CONFORMANCE WITH NRC GENERAL DESIGN CRITERIA

This section briefly outlines the General Design Criteria (GDC) applicable to the reactor coolant system of the Westinghouse Advanced Pressurized Water Reactor (WAPWR) per Title 10, Code of Federal Regulations, Part 50 (10CFR50), Appendix A, "General Design Criteria for Nuclear Power Plants". As presented in this section, each criterion is listed to denote applicability to the the reactor coolant system (see Table 3.1-1).

A detailed discussion of the compliance with each criterion is provided in RESAR-SP/90 PDA Module 7, "Structural/Equipment Design".

TABLE 3.1-1

GDC APPLICABLE TO RCS

Criterion	Title
1	Quality standards and records.
2	Design bases for protection against natural phenomena
3	Fire protection
4	Environmental and missile design bases
5	Sharing of structures, systems and components
10	Reactor design
13	Instrumentation and control
14	Reactor coolant pressure boundary
15	Reactor coolant system design
19	Control room
30	Quality of reactor coolant pressure boundary
31	Fracture prevention of reactor coolant pressure boundary
32	Inspection of reactor coolant pressure boundary
44	Cooling water
45	Inspection of Cooling Water System
46	Testing of Cooling Water System
54	Piping systems penetrating containment
55	Reactor coolant pressure boundary penetrating containment

3.2 CLASSIFICATION OF STRUCTURES, COMPONENTS, AND SYSTEMS

Certain structures, components, and systems of the RCS are important to safety because they:

a. Assure the integrity of the reactor coolant pressure boundary.

b. Assure the capability to shut down the reactor and maintain it in a safe condition.

c. Assure the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the guideline exposures of 10 CFR 100.

d. Contain or may contain radioactive material.

The purpose of this section is to classify structures, systems, and components according to the importance of the item in order to provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public. Table 3.2-1 delineates each of the items in the plant which fall under the above-mentioned categories and the respective associated classification that the NRC, ANS, and industrial codes committees have developed. Each of the classification categories in Table 3.2-1 is addressed in the following sections.

The classification of specific piping runs and valves in these runs is provided in the RCS flow diagrams contained in this module. Instrumentation and electrical equipment required to shut down the plant or mitigate an accident which is associated with the RCS will be classified as 1E (or Safety Class 3 per ANS 51.1) and identified in the appropriate module.

Additional information regarding the classification of structures, components, and systems is provided in RESAR-SP/90 PDA Module 7, "Structural/Equipment Design".

3.2.1 Seismic Classification

Seismic classification criteria are set forth in 10 CFR 100 and supplemented by Regulatory Guide 1.29.

All components classified as Safety Class 1, 2, or 3 (classifications are as defined by Reference 1) are seismic Category I.

Seismic Category I structures, components, and systems are designed to withstand the Safe Shutdown Earthquake (SSE) and other applicable load combinations, as discussed in RESAR-SP/90 PDA Module 3, "Introduction and Site" and Module 7, "Structural/Equipment Design". Seismic Category I structures are sufficiently isolated or protected from the other structures to ensure that their integrity is maintained.

3.2.2 System Quality Group Classification

The components are classified according to their importance to safety, as dictated by service and functional requirements and by the consequences of their failure. The quality assurance requirements and code requirements for the RCS meet the intent of Regulatory Guide 1.26.

3.2.3 Safety Classes

Table 3.2-1 lists the safety class assigned to applicable systems and components in accordance with ANS 51.1 (Ref. 1). The criteria (of Ref. 1) are used in the plant design to provide an added degree of assurance that the plant is designed, constructed, and operated without undue risk to the health and safety of the public.

3.2.4 References

1. "Nuclear Safety Criteria for the Design of Stationary Pressurized Water Reactor Plants," ANS-51.1, November 1983.

TABLE 3.2-1

CLASSIFICATION OF STRUCTURES, SYSTEMS, AND COMPONENTS FOR THE REACTOR COOLANT SYSTEM

System/Component	Location	ANSI Safety Class	Quality Assurance	Code Class	Principal Construction Codes and Standards	Seismic Category
Reactor Vessel	IC	1	Note 1	1	ASME III	I
Steam Generators-Primary	IC	1	Note 1	1	ASME III	I
Secondary	IC	2	Note 1	2	ASME III	I
Pressurizer	IC	1	Note 1	1	ASME III	I
Reactor Coolant Pumps	IC	1	Note 1	1	ASME III	I
Pressurizer Relief Tank	IC	3	Note 2	3	ASME III	I
Piping	IC/OC	1/2/3	Note 1/2	1/2/3	ASME III	I
Valves	IC/OC	1/2/3	Note 1/2	1/2/3	ASME III	I

Note 1 - Meets "Quality Control System Requirements," Westinghouse QCS-1, which satisfies requirements of 10CFR50, Appendix B, Quality Assurance Criteria.

Note 2 - Meets "Quality Control System Requirements," Westinghouse QCS-2, which satisfies requirements of 10CFR50, Appendix B.