Enclosure 2

MFN 15-063

GEH Response to Item #5 - Minimize Contamination

ABWR DCD DRAFT Revision 6 Markups

Table 1.8-20 NRC Regulatory Guides Applicable to ABWR (Continued)

RG No.	Regulatory Guide Title	Appl. Rev.	Issued Date	ABWR Applicable?	Comments
1.142	Safety-Related Concrete Structures for Nuclear Power Plants (Other Than Reactor Vessels and Containments)	1	11/81	Yes	
1.143	Guidance for Radioactive Waste Management Systems, Structures, and Components Installed in Light-Water-Cooled Nuclear Power Plants	1	10/79	Yes	
1.144	Auditing of Quality Assurance Programs Nuclear Power Plants		Super-ceded		See Table 17.0-1
1.145	Atmospheric Dispersion Models for Potential Accident Consequences Assessments at Nuclear Power Plants	1	12/82	Yes	
1.146	Qualification of Quality Assurance Program Audit Personnel for Nuclear Power Plants		Super-ceded		See Table 17.0-1
1.147	Inservice Inspection Code Case Acceptability-ASME Section XI, Division 1	8	11/90	Yes	
1.148	Functional Specifications for Active Valve Assemblies in Systems Important to Safety in Nuclear Power Plants	0	4/81	Yes	
1.149	Nuclear Power Plant Simulation Facilities for Use in Operator License Examinations	1	5/87	---	COL Applicant
1.150	Ultrasonic Testing of Reactor Vessel Welds	1	2/83	Yes	
4.21	Minimization of Contamination and Radioactive Waste Generation: Life-Cycle Planning		6/08	Yes	COL Applicant
[	*System Software in Safety-Related Systems of Nuclear Power Plants*				
[*1.153*	*Criteria for Power, Instrumentation, and Control Portions of Safety Systems*	*0*	*12/85*	*Yes*][(4)]	
1.154	Format and Contents of Plant-Specific Pressurized Thermal Shock Safety Analysis Reports for Pressurized Water Reactors	0	3/87	No	PWR only
1.155	Station Blackout	0	8/88	Yes	
1.160	Monitoring the Effectiveness of Maintenance at Nuclear Power Plants	0	6/93	Yes	
5.1	Serial Numbering of Fuel Assemblies for Light-Water-Cooled Nuclear Power Plants	0	12/72	Yes	
5.7	Control of Personnel Access to Protected Areas, Vital Areas, and Material Access Areas	1	5/80	Yes	

Table 1.9-1 Summary of ABWR Standard Plant COL License Information (Continued)

Item No.	Subject	Subsection
12.7	Operational Considerations	12.7.3.2
12.8	Requirements of 10CFR70.24	12.3.7.3
12.9	Radiation Protection Program	12.5.3.1
12.10	Compliance With Para. 50.34(f)(xxvii) of 10CFR50 and NUREG-0737 Item III.D.3.3	12.5.3.2
12.8a	Requirement of 10 CFR 20.1406	12.3.7.5
13.2	Emergency Plans	13.3.1.1
13.2a	Review and Audit	13.4.1
13.3	Plant Operating Procedures Development Plan	13.5.3.1
13.4	Emergency Procedures Development	13.5.3.2
13.5	Implementation of the Plan	13.5.3.3
13.6	Procedures Included in Scope of Plan	13.5.3.4
13.7	Physical Security Interfaces	13.6.3
14.1	Other Testing	14.2.13.1
14.2	Test Procedures/Startup Administrative Manual	14.2.13.2
14.3	Not Used	14.2.13.3
15.1	Anticipated Operational Occurrences (AOO)	15.0.5.1
15.2	Operating Limits	15.0.5.2
15.3	Design Basis Accidents	15.0.5.3
15.4	Radiological Effects of MSIV Closure	15.2.10.1
15.5	Mislocated Fuel Bundle Accident	15.4.11.1
15.6	Misoriented Fuel Bundle Accident	15.4.11.2
15.7	Iodine Removal Credit	15.6.7.1
15.8	Not Used	
15.9	Radiological Consequences of Non-Line Break Accidents	15.7.6.1
16.1	COL Information Required for Plant Specific Technical Specifications	16.1.1
17.1	QA Programs For Construction And Operation	17.0.1.1
17.2	Policy and Implementation Procedures for D-RAP	17.3.13.1
17.3	D-RAP Organization	17.3.13.2
17.4	Provision for O-RAP	17.3.13.3
18.1	HSI Design Implementation Process	18.8.1
18.2	Number of Operators Needing Controls Access	18.8.2

source of radiation for the system. Each train includes high efficiency particulate filters and charcoal filters for removal of radioactivity prior to exhausting air to the outside environment.

All components are located in the Reactor Building, and personnel access to the shielded rooms for inspection or maintenance is on a controlled basis. A remote charcoal filter removal capability is provided to minimize exposures, which requires entry into the filter area only during the initial connection of the unit to the charcoal removal system. Sufficient space is provided around the filter unit to allow easy removal and bagging of the high efficiency filters.

insert A (Subsection 12.3.1.5)

The SGTS filter shielding is adequate to reduce the radiation level in fuel areas of the Reactor Building to less than 10 μGy/h following an isolation scram event with containment purge.

12.3.2 Shielding

12.3.2.1 Design Objectives

The primary objective of the radiation shielding is to protect operating personnel and the general public from radiation emanating from the reactor, the power conversion systems, the radwaste process systems, and the auxiliary systems, while maintaining appropriate access for operation and maintenance. The radiation shielding is also designed to keep radiation doses to equipment below levels at which disabling radiation damage occurs. Specifically, the shielding requirements in the plant are designed to perform the following functions:

(1) Limit the exposure of the general public, plant personnel, contractors, and visitors to levels that are ALARA and within 10CFR20 requirements

(2) Limit the radiation exposure of personnel, in the unlikely event of an accident, to levels that are ALARA and which conform to the limits specified in 10CFR50 Appendix A, Criterion 19 to ensure that the plant is maintained in a safe condition during an accident

(3) Limit the radiation exposure of critical components within specified radiation tolerances, to assure that component performance and design life are not impaired

12.3.2.2 Design Description

12.3.2.2.1 General Design Guides

In order to meet the design objectives, the following design guides are used in the shielding design of the ABWR:

(1) All systems containing radioactivity are identified and shielded based on access and exposure level requirements of surrounding areas. The radiation zone maps described in Subsection 12.3.1.3 indicate design radiation levels for which shielding for equipment contributing to the dose rate in the area is designed.

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12.3.1.5 Minimization of Contamination and Radioactive Waste Generation

This subsection addresses the ABWR design features and operational procedures that aid in the minimization of contamination of the facility and environment, facilitate decommissioning, and aid in the minimization of the generation of radioactive waste. This subsection addresses the compliance with Title 10, Section 20.1406, "Minimization of Contamination," of the Code of Federal Regulations (10 CFR 20.1406) (Reference 12.3-11).

Design concepts associated with Regulatory Position C.1 through C.4 of Regulatory Guide 4.21 (Reference 12.3-12) are also addressed in this subsection. The COL license information in 12.3.7.5 requires the COL Applicant to address operational procedures and program concepts associated with the Regulatory Position. A summary of the relevant design and operational requirements from the Regulatory Position are described in the following subsections.

Not all of the ABWR systems have significant design features that address 10 CFR 20.1406 requirements. The Standby Liquid Control and Turbine Generator systems do not have significant contamination during normal operation and have little propensity for significant radioactive leakage leading to resultant contamination of the facility or environment. High-energy systems associated with the reactor coolant pressure boundary such as Nuclear Steam Supply, Reactor Water Cleanup, Shutdown Cooling, Main Steam, and Feedwater were determined to present a low probability of plant contamination in which any system leakage would be quickly detected. Leakage in these systems is identified by flow, level, temperature, pressure and other parameters monitored by numerous plant systems and action would be immediately taken to correct the condition. For example, the Leak Detection and Isolation System would also serve to detect any leakage near the reactor coolant pressure boundary. Table 12.3-8 shows design features in the specified DCD chapters and subsections that address the requirements of 10 CFR 20.1406.

12.3.1.5.1 Design Considerations

The following design objectives summarize the objectives contained in Regulatory Position C.1 through C.4 of Regulatory Guide 4.21:

- Objective 1 - Minimize leaks and spills and provide containment in areas where such events may occur.

- Objective 2 - Provide adequate leak detection capability to provide prompt detection of leakage from any structure, system, or component that has the potential for leakage.

- Objective 3 - Use leak detection methods (e.g., instrumentation, automated samplers) capable of early detection of leaks in areas where it is difficult (inaccessible) to conduct regular inspections (such as spent fuel pools, tanks that are in contact with the ground, and buried, embedded, or subterranean piping) to avoid release of contamination.

- Objective 4 - Reduce the need to decontaminate equipment and structures by decreasing the probability of any release, reducing any amounts released, and decreasing the spread of the contaminant from the source.

- Objective 5 - Facilitate decommissioning by (1) minimizing embedded and buried piping, and (2) designing the facility to facilitate the removal of any equipment or components that may require removal or replacement during facility operation or decommissioning.

- Objective 6 - Minimize the generation and volume of radioactive waste during operation and decommissioning (by minimizing the volume of components and structures that become contaminated during plant operation).

ABWR design features that address the above design objectives are described in individual DCD sections and subsections. Table 12.3-8 provides a cross reference of applicable DCD chapters and subsections for structures/systems that address the six design objectives. Note that the systems/structures that employ the subject design features are of varied construction and purpose and can provide differing functions. As such, not all of the above design concepts are present as a design feature in each system/structure. Additionally, examples of generic and specific design features present in the ABWR are listed below.

Generic ABWR design features used to minimize contamination, generation of radioactive waste, and facilitate decommissioning include the following:

- Design of equipment to minimize the buildup of radioactive material and to facilitate flushing of crud traps;
- Provisions of design features such as the CUW and the condensate demineralizer to minimize crud buildup;
- Provisions for draining, flushing, and decontaminating equipment and piping;
- Penetrations through outer walls of a building containing radiation sources are sealed to prevent miscellaneous leaks to the environment;
- The equipment drain sump vents are fitted with charcoal canisters or piped directly to the radwaste HVAC System to remove airborne contaminants evolved from discharges to the sump;
- Appropriately sloped floors around floor drains in areas where the potential for a spill exists to limit the extent of contamination;
- Provisions for decontaminable epoxy-type wall and floor coverings, which provide smooth surfaces to ease decontamination;
- Equipment and floor drain sumps are stainless steel lined to reduce crud buildup and to provide surfaces easily decontaminated;
- For all areas with the potential for airborne radioactivity, the ventilation systems are designed such that during normal and maintenance operations, airflow between areas is always from an area of lower potential contamination to an area of higher potential contamination;

- The ABWR is designed to limit the use of cobalt bearing materials on moving components that have historically been identified as major sources of radioactivity in reactor coolant;
- To facilitate decommissioning, the Reactor Building, Turbine Building, and Radwaste Building are designed for large equipment removal, consisting of entry doors from the outside and numerous cubicles with equipment hatches inside the buildings;
- To facilitate decommissioning and ease of access, the radwaste process pumps are rack-mounted and located in the Radwaste Building, can be readily replaced; and
- For some piping, feed-throughs with short sections, the piping may be embedded in concrete as discussed in DCD Subsection 12.3.1.2. Minimization of embedded piping to the extent practicable facilitates the dismantlement of the systems and decommissioning.
- To the extent practical underground piping is avoided in the ABWR design. The following piping contain segments that will have to run underground:
  - Condensate Storage Tank (CST) Piping and CST Retention Area Drain
  - Radwaste Effluent Discharge Pipeline
  - Cooling Tower Blowdown Line

  As such, these lines will be kept as short and direct as practicable.

  The underground piping associated with these lines will be designed to preclude inadvertent or unidentified leakage to the environment. They are enclosed and are accessible for visual inspections via a trench or tunnel. Threaded and flanged connections will be kept to a minimum. Other joints will be welded or otherwise permanently bonded depending on the piping material. Furthermore, fittings will be kept to a minimum and no in-line components (e.g., valves) will be incorporated into these lines. These features substantially reduce the potential for unmonitored and uncontrolled releases to the environment and support compliance with RG 4.21.

Specific ABWR design features used to minimize the generation of radioactive waste include the following:

- Liquid waste management system is divided into several subsystems, so liquid wastes from various sources can be segregated and processed separately, based on the most efficient process for each specific type of impurity and chemical content. This segregation allows for efficient processing and minimization of overall liquid waste.
- During liquid processing by liquid waste management system, radioactive contaminants are removed and the bulk of the liquid is purified and either returned to the condensate storage tank or discharged to the environment, minimizing overall liquid waste. The radioactivity removed from liquid waste is concentrated in filter media ion exchange resins and concentrated waste. The filter sludge, ion exchange resins and concentrated waste are discharged to solid waste management system for further processing.
- Solid waste management system is designed to segregate and package wet and dry types of radioactive solid waste for off-site shipment and storage. This segregation allows for efficient processing and minimization of overall quantity of solid waste.
- For management of gaseous radioactive waste, the Offgas System minimizes and controls the release of radioactive material into the atmosphere by delaying release of the offgas

process stream initially containing radioactive isotopes of krypton, xenon, iodine, nitrogen, and oxygen.

12.3.1.5.2 Operational/Programmatic Considerations

Operational programs and procedures that address the requirements of 10 CFR 20.1406 are necessary adjuncts to the design features. The following operational and post-construction objectives summarize Regulatory Guide 4.21 Positions C.1 through C.4 and are addressed by the COL Applicants:

- Periodically review operational practices to ensure operating procedures reflect the installation of new or modified equipment, personnel qualification and training are kept current, and facility personnel are following the operating procedures.
- Facilitate decommissioning by maintenance of records relating to facility design and construction, facility design changes, site conditions before and after construction, onsite waste disposal and contamination and results of radiological surveys.
- Develop a conceptual site model (based on site characterization and facility design and construction) that aids in the understanding of the interface with environmental systems and the features that control the movement of contamination in the environment.
- Evaluate the final site configuration after construction to assist in preventing the migration of radionuclides offsite via unmonitored pathways.
- Establish and perform an onsite contamination monitoring program along the potential pathways from the release sources to the receptor points.

The COL Applicant will address the operational and post-construction objectives of Regulatory Guide 4.21 (see Subsection 12.3.7.5 for COL license information).

12.3.7.5 Requirement of 10 CFR 20.1406
The COL Applicant will address the operational and post-construction objectives of Regulatory Guide 4.21 to meet the requirement of 10 CFR 20.1406 (Subsection 12.3.1.5.2).

12.3

The COL applicant shall address state-of-the-art developments in material selection options for maintaining exposure ALARA.

12.3.8 References

12.3-1 N. M. Schaeffer, "Reactor Shielding for Nuclear Engineers", TID-25951, U.S. Atomic Energy Commission (1973).

12.3-2 J. H. Hubbell, "Photon Cross Sections, Attenuation Coefficients, and Energy Absorption Coefficients from 10 KeV to 100 GeV", NSRDS-NBS 29, U.S. Department of Commerce, August 1969.

12.3-3 "Radiological Health Handbook", U.S. Department of Health, Education, and Welfare, Revised Edition, January 1970.

12.3-4 "Reactor Handbook", Volume III, Part B, E.P. Blizzard, U.S. Atomic Energy Commission (1962).

12.3-5 Lederer, Hollander, and Perlman, "Table of Isotopes", Sixth Edition (1968).

12.3-6 M.A. Capo, "Polynomial Approximation of Gamma Ray Buildup Factors for a Point Isotropic Source", APEX-510, November 1958.

12.3-7 Reactor Physics Constants, Second Edition, ANL-5800, U.S. Atomic Energy Commission, July 1963.

12.3-8 ENDF/B-III and ENDF/B-IV Cross Section Libraries, Brookhaven National Laboratory.

12.3-9 PDS-31 Cross Section Library, Oak Ridge National Laboratory.

12.3-10 DLC-7, ENDF/B Photo Interaction Library.

12.3-11 10 CFR 20.1406, "Minimization of Contamination," Title 10 Code of Federal Regulations, Part 20.1406.

12.3-12 USNRC RG 4.21, "Minimization of Contamination and Radioactive Waste Generation: Life Cycle Planning," Regulatory Guide 4.21, June 2008.

Table 12.3-7 Area Radiation Monitors Turbine Building

No.	Location & Description	Figure #	Sensitivity Range	Local Alarms
1	Condensate Pump Maintenance Area	12.3-70	M	
2	Condensate Sampling & Control Area	12.3-70	M	X
3	Offgas Sample & Control Area	12.3-70	M	X
4	RFP 1A, 1B & 1C Area	12.3-70	H	X
5	Filter Maintenance Area	12.3-71	M	X
6	Demineralizer Area	12.3-71	H	
7	SJAE A & Recombiner Area	12.3-71	H	
8	SJAE B & Recombiner Area	12.3-71	H	
9	HP Heaters & Drain Tank Area 1	12.3-71	H	
10	HP Heaters & Drain Tank Area 2	12.3-71	H	
11	MSR 1A & 1C Area	12.3-72	H	
12	MSR 1B & 1D Area	12.3-72	H	
13	Turbine Building Operating Floor	12.3-73	H	X
14	Equipment Main Access Area	12.3-73	H	X

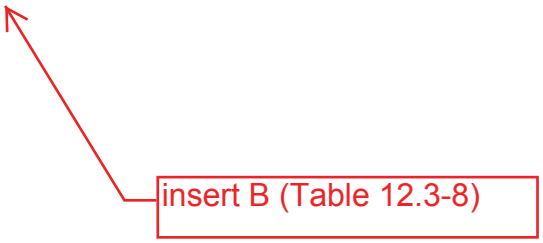

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Table 12.3-8

Regulatory Guide 4.21 Design Objective and Applicable DCD Subsection Information

Design Objective	DCD Subsection
Objective 1 Minimize leaks and spills and provide containment in areas where such events may occur	3.1.2.2.5 Criterion 14 — Reactor Coolant Pressure Boundary 3.4.1.1.1 Flood Protection From External Sources 3.4.1.1.2 Compartment Flooding from Postulated Component Failures 3.7.3.12 Buried Seismic Category I Piping and Tunnels 3.8.1.1.1 Concrete Containment 3.8.1.1.2 Containment Liner Plate 3.8.1.4.1.4 Corrosion Prevention 3.8.4.2.6.3 Welding of Refuel Cavity and Spent Fuel Pool Liners 4.6.2.3.4 CRD Maintenance 5.2.1.2 Applicable Code Cases 5.2.5.5.3 Criteria to Evaluate the Adequacy and Margin of Leak Detection System 5.3.1.2 Special Procedures Used for Manufacturing and Fabrication 5.4.8.2 System Description 6.1.2.1 Protective Coatings 6.2.4.2.2 Instrument Lines Penetrating Containment 6.5.3 Fission product Control Systems 9.1.2.4 Summary of Radiological Considerations 9.1.3.2 Fuel Pool Cooling and Cleanup System Description 9.1.4.2.9 Under-Reactor Vessel Servicing Equipment 9.3.2.6 Process and Post-Accident Sampling System Safety Evaluation-Operator Safety 9.3.3.1.1 Non-Radioactive Drains Safety Design Bases 9.3.3.1.3 Non-Radioactive Drains System Description 9.4.4 Turbine Island HVAC System

Table 12.3-8

Regulatory Guide 4.21 Design Objective and Applicable DCD Subsection Information

Design Objective	DCD Subsection
Objective 1 Minimize leaks and spills and provide containment in areas where such events may occur	9.4.6.1 Radwaste Building HVAC System Design Bases 10.3.2.1 Main Steam Supply System General Description 10.4.1.2.3 Main Condenser System Operation 10.4.2 Main Condenser Evacuation System 10.4.3.3 Turbine Gland Sealing System Evaluation 10.4.7.3 Condensate and Feedwater System Evaluation 11.1.5 Process Leakage Sources 11.2.1 Liquid Waste Management System Design Bases 11.3.4.2.11 Offgas System Charcoal Adsorber Bypass 11.3.4.3.1 Offgas System Materials 11.3.4.3.4 Offgas System Maintenance Access 11.3.4.3.7 Offgas System Valves 11.3.4.3.16 Offgas System Construction of Process Systems 11.4.1 Design Bases 11.5.1.1.2 Radiation Monitors Required for Plant Operation 12.3.1.1.1.(4) Facility Design Features Valves 12.3.1.1.1.(7) Facility Design Features Floor Drains 12.3.1.2.(6) Facility Design Features Contamination Control 12.3.1.4.4 Facility Design Features Main Steam System

Table 12.3-8

Regulatory Guide 4.21 Design Objective and Applicable DCD Subsection Information

Design Objective	DCD Subsection
Objective 2 Provide adequate leak detection capability to provide prompt detection of leakage from any structure, system, or component that has the potential for leakage	5.2.5.5.3 Criteria to Evaluate the Adequacy and Margin of Leak Detection System 9.1.3.3 Fuel Pool Cooling and Cleanup System Safety Evaluation 9.2.11.3 Reactor Building Cooling Water System Safety Evaluation 9.2.15.1.4 Reactor Service Water System Safety Evaluation 10.4.2.2 Main Condenser Evacuation System Description 11.5 Process and Effluent Radiological Monitoring and Sampling Systems 11.5.1.1.1 Radiation Monitors Required for Safety and Protection

Table 12.3-8

Regulatory Guide 4.21 Design Objective and Applicable DCD Subsection Information

Design Objective	DCD Subsection
Objective 3 Use leak detection methods (e.g., instrumentation, automated samplers) capable of early detection of leaks in areas where it is difficult (inaccessible) to conduct regular inspections (such as spent fuel pools, tanks that are in contact with the ground and buried, embedded, or subterranean piping) to avoid release of contamination	5.2.5.2.3 Leak Detection Instrumentation and Monitoring Summary 5.2.5.5.3 Criteria to Evaluate the Adequacy and Margin of Leak Detection System 9.1.3.2 Fuel Pool Cooling and Cleanup System Description 9.1.3.3 Fuel Pool Cooling and Cleanup System Safety Evaluation 9.2.11.2 Reactor Building Cooling Water System Description 9.3.2.1.1 Process and Post-Accident Sampling System Safety Design Bases 9.3.2.2.1 Process and Post-Accident Sampling System General Description 9.3.3.1.2 Non-Radioactive Drains Safety Power Generation Design Bases 9.4.4.1.2 Turbine Island HVAC System Power Generation Design Bases 9.4.5.6.5 Reactor Building HVAC System Instrumentation 10.4.2.2 Main Condenser Evacuation System Description 10.4.3.5.1.3 Turbine Gland Sealing System Effluent Monitoring 10.4.5.6 Circulating Water System Flood Protection 11.2.1.2 Liquid Waste Management System Design Criteria 11.2.5.1 Liquid Waste Management System Plant-Specific Liquid Radwaste Information 11.3.4.2.10 Offgas System Redundancy 11.5.2.1.2 Reactor Building HVAC Radiation Monitoring 11.5.2.1.5 Drywell Sumps Discharge Radiation Monitoring 11.5.2.2.1 Offgas Pre-Treatment Radiation Monitoring 11.5.2.2.2 Offgas Post-Treatment Radiation Monitoring 11.5.2.2.8 Turbine Building Ventilation Exhaust Monitoring

Table 12.3-8

Regulatory Guide 4.21 Design Objective and Applicable DCD Subsection Information

Design Objective	DCD Subsection	
Objective 4 Reduce the need to decontaminate equipment and structures by decreasing the probability of any release, reducing any amounts released, and decreasing the spread of the contaminant from the source	3.8.4.1.5	Seismic Category I HVAC Ducts and Supports
	4.1.2	Reactor Internal Components
	5.1	Summary Description
	5.2.3.2.2.3	Sources of Impurities
	5.2.3.2.3	Compatibility of Construction Materials with Reactor Coolant
	5.2.3.3.2	Control of Welding
	5.3.3.1.1	Description
	5.3.3.1.4.4	Reactor Vessel Insulation
	5.4.8.1	Reactor Water Cleanup System Design Basis
	5.4.8.2	Reactor Water Cleanup System Description
	6.1.2.1	Protective Coatings
	6.2.3.2	System Design
	6.2.4.3.2.1.2	Effluent Lines
	6.5.3	Fission Product Control Systems
	6.5.3.1	Primary Containment
	6.5.3.2	Secondary Containment
	9.1.1.1.5	New Fuel Storage Material Considerations
	9.1.1.3.2	New Fuel Storage Structural Design
	9.1.2.1.3	Spent Fuel Storage Mechanical and Structural Design
	9.1.2.1.5	Spent Fuel Storage Material Considerations
	9.1.3.2	Fuel Pool Cooling and Cleanup System Description
	9.1.4.2.4	Servicing Aids
	9.2.8.2	Makeup Water Preparation System Power Generation Design Bases
	9.2.9.2	Makeup Water Condensate System Description
	9.2.10.1	Makeup Water Purified System Design Bases

Table 12.3-8

Regulatory Guide 4.21 Design Objective and Applicable DCD Subsection Information

Design Objective	DCD Subsection	
Objective 4 Reduce the need to decontaminate equipment and structures by decreasing the probability of any release, reducing any amounts released, and decreasing the spread of the contaminant from the source	9.2.14.2.3	Turbine Building Cooling Water System Operation
	9.3.2.2.3	Provisions for Obtaining Representative Samples
	9.3.2.6	Safety Evaluation
	9.4.1.1.1	Control Room Habitability Area HVAC Design Basis
	9.4.1.1.4	Control Room Habitability Area HVAC Safety Evaluation
	9.4.4.1.2	Turbine Island HVAC System Power Generation Design Bases
	9.4.4.2.1	T/B HVAC General Description
	9.4.4.2.1.2	Turbine Building Exhaust (TBE) System
	9.4.4.2.1.3	Turbine Building Compartment Exhaust (TBCE) System
	9.4.5.1.1.1	R/B Secondary Containment HVAC System Safety Design Bases
	9.4.5.1.1.2	R/B Secondary Containment HVAC System Power Generation Design Bases
	9.4.5.6.2	R/B Primary Containment Supply/Exhaust System Description
	9.4.5.7.1.1	R/B Main Steam Tunnel HVAC System Safety Design Bases
	9.4.6.2.2	Radwaste Building Process Area HVAC System Description
	9.4.6.5.2	Radwaste Building Process Area HVAC Instrumentation Application
	9.4.8.2	Service Building HVAC System Description
	10.3.2.2	Main Steam Supply System Component Description
	10.4.1.2.3	Main Condenser System Operation
	10.4.3.3	Turbine Gland Sealing System Evaluation
	10.4.6	Condensate Purification System
	10.4.6.1.2	Condensate Purification System Power Generation Design Bases
	10.4.6.2.1	Condensate Purification System General Description
	10.4.6.3	Condensate Purification System Evaluation
	10.4.7.2.1	Condensate and Feedwater System General Description
	11.2.1.1	Liquid Waste Management System Design Objective

Table 12.3-8

Regulatory Guide 4.21 Design Objective and Applicable DCD Subsection Information

Design Objective	DCD Subsection
Objective 4 Reduce the need to decontaminate equipment and structures by decreasing the probability of any release, reducing any amounts released, and decreasing the spread of the contaminant from the source	11.3.1 General 11.3.4.2.7 Offgas System Air Supply 11.3.4.3.2 Offgas System Pressure Relief 11.3.4.3.3 Offgas System Equipment Room Ventilation Control 11.3.4.3.6 Offgas System Vents and Drains 11.3.4.3.11 Offgas System Recombiners 11.3.4.3.12 Offgas System Charcoal Adsorber Vessels 11.4.1.2 Solid Waste Management System Design Criteria 11.4.2.2.1 General Requirements 11.4.2.2.2 Spent Resins and Sludges 11.4.2.2.4 Environmental and Exposure Control 11.5.2.2.5 Radwaste Liquid Discharge Radiation Monitoring 12.3.1 Facility Design Features 12.3.1.1.1(1) Equipment Design Pumps 12.3.1.1.1(2) Equipment Design Instrumentation 12.3.1.1.1(3) Equipment Design Heat Exchangers 12.3.1.1.1(4) Equipment Design Valves 12.3.1.1.1(5) Equipment Design Piping 12.3.1.1.1(7) Equipment Design Floor Drains 12.3.1.2(2) Plant Design for Maintaining Exposure (ALARA) Sample Stations 12.3.1.2(4) Plant Design for Maintaining Exposure (ALARA) Piping 12.3.1.2(6) Plant Design for Maintaining Exposure (ALARA) Contamination Control 12.3.1.4.3 Implementation of ALARA Fuel Pool Cooling and Cleanup System 12.3.3.2 Design Description

Table 12.3-8

Regulatory Guide 4.21 Design Objective and Applicable DCD Subsection Information

Design Objective	DCD Subsection
Objective 5 Facilitate the decommissioning by (1) minimizing embedded and buried piping, and (2) designing the facility to facilitate the removal of any equipment or components that may require removal or replacement during facility operation or decommissioning	3.8.1.1.1 Concrete Containment 3.8.4 Other Seismic Category I Structures 3.8.4.1.1 Reactor Building Structure 4.5.1.1 Material Specifications 4.6.2.3.4 CRD Maintenance 6.1 Engineered Safety Feature Materials 6.1.2.1 Protective Coatings 9.1.4.2.4 Servicing Aids 9.4.1.1.1 Control Room Habitability Area HVAC Design Basis 12.3.1.1.1(1) Equipment Design Pumps 12.3.1.1.1(5) Equipment Design Piping 12.3.1.2(4) Plant Design for Maintaining Exposure (ALARA) Piping

Table 12.3-8

Regulatory Guide 4.21 Design Objective and Applicable DCD Subsection Information

Design Objective	DCD Subsection
Objective 6 Minimize the generation and volume of radioactive waste during operation and decommissioning (by minimizing the volume of components and structures that become contaminated during plant operation)	3.1.2.6.1.2 Evaluation Against Criterion 60 4.6.2.3.4 CRD Maintenance 6.1 Engineered Safety Feature Materials 6.1.2.1 Protective Coatings 9.1.4.2.4 Servicing Aids 9.2.9.2 Makeup Water Condensate System Description 9.3.3.1.1 Non-radioactive Drainage System Safety Design Bases 9.3.3.1.3 Non-radioactive Drainage System Description 9.4.4.3 Turbine Island HVAC System Evaluation 11.2.2 Liquid Waste Management System Description 11.2.3 Liquid Waste Management Estimated Releases 11.3.3.3 Gaseous Waste Management System Process Facility 12.3.1.2(4) Plant Design for Maintaining Exposure (ALARA) Piping 12.3.1.4 Implementation of ALARA