GE Nuclear Energy

General Electric Company
175 Curtner Avenue, San Jose, CA 95125

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Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Charles L. Miller, Director
Standardization and Non-Power Reactor Project Directorate

Subject: **Summary Status of GE/NRC March 4-6, 1991, Meeting on Plant Systems Open Items**

Reference: Summary Status of GE/NRC March 4-6, 1991, Meeting on Plant Systems Open Items (Proprietary Information), MFN No. 029-91, dated March 28, 1991

Enclosed are thirty four (34) copies of the GE responses to the subject open items. Nearly half of the open issues presented at the meeting are either resolved, have been addressed by recent amendments or are responded to in this letter. It is planned to transmit the remaining responses in mid-April.

Responses to the open items pertaining to Appendix 3I and Section 11.4 contain information that is designated as General Electric Company proprietary information. These responses are being submitted under separate cover (Reference).

It is intended that GE will amend the SSAR, where appropriate, with these response in a future amendment.

Sincerely,

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SUMMARY STATUS OF GE/NRC MARCH 4-6, 1991 MEETING ON
PLANT SYSTEMS OPEN ISSUES

Item Number	Subject	Action	Comments
	3.11 EQUIPMENT QUALIFICATION		(A modified version of Section 3.11 and Appendix 3I were distributed at the meeting.)
3.11(1)	Time Margin	GE	Response provided on page 3.11-1.1 attached.
3.11(2)	IEEE Edition	GE	Response provided on page 1.8-62 and 3.11-1.1 attached.
3.11(3)a	Gammma Accident Dose	GE	Response provided on pages 3.11-1; and 3I.3-10,11,12,13, 14,22,23,24 and 25 (Appendix 3I is proprietary information, provided under separate cover).
3.11(3)b	Worst Case Expected Environment	GE	Response provided on page 3.11-1.1 attached.
	CLARIFICATION OF PAST ISSUES AND RESPONSES FOR APPENDIX 3I		
	Chemical Environmental Conditions		See Subsections 3.11.5.1 and 3I3.2.3 (Amendment 14). (Appendix 3I is proprietary information, provided under separate cover).
	Spray and/or Submergence Enviroment Data		See Subsection 3.11.5.1 and last paragraph of Subsection 3I.3.2.3 (Amendment 14). (Appendix 3I is proprietary information, provided under separate cover).
	Beta Radiation Enviromemt Data		See Item 3.11(3)b above.
	Limiting Accident Scope		See Item 3.11(1) above.
	Significant Enveloping Abnormal		See 5th paragraph of Subsection 3.11.1 and Subsection 3I.3.1.1 and 3I.3.1.2 (Amentment 14). (Appendix 3I is proprietary information, provided under separate cover).

SUMMARY STATUS OF GE/NRC MARCH 4-6, 1991 MEETING ON
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Item Number	Subject	Action	Comments
	CLARIFICATION OF PAST ISSUES AND RESPONSES FOR APPENDIX 3 (Continued)		
	Environmentally Mild or Harsh Zones		Mild environment:4th paragrath of Subection 3.11.2 (associated normal and abnormal conditions) (Amendment 14). Harsh enviroment:1st paragraph of Subsection 3I.1 (associated with accident conditions) (Amentment 14). (Appendix 3I is proprietary information, provided under separate cover).
	Typical Equipment Located in Zones		Typical equipment referenced to arrangement figures in the change to the 3rd paragraph of Subsection 3.11.1 (attached).
	Limited Locations of Safety-Related Equipment		Scpoe of locations of installed safety-related equipment is provided in the 2nd paragraph Subsection 3I.2.2 (Amendment 14) reduced the number of figures of evnironmental data. (Appendix 3I is proprietary information, provided under separate cover).
	Inconsistancy in Presssure Units		Pressure units were clarified in changes to Appendix 3I tables in Amendment 14. Figures 3I.3-11 through 3I.3.22 were corrected in the handout at the meeting(Proprietary information provided under separate cover).
	Deletion of Tables		See Subsection 3I.2.1 relative to Table 3I.2-1. See Subsection 3I.2.2 relative to Tables 3I.6-6,7,8 and 18.

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Item Number	Subject	Action	Comments
	3.5.1.1 PROTECTION OF SAFETY-RELATED EQUIPMENT		
3.5.1.1 (1)	Separation of Satety-Related and non Safety-Related Equipment	GE	Response provided on page 20.3-82.1 attached.
3.5.1.4	DESIGN BASIS TORNADO		
(1)	ANS 2.3 to SRP	GE	GE still evaluating impact. Also, pursuing E-7 recurrence interval.
	3.5.2 PROTECTION OF CHARCOAL DELAY TANKS		
3.5.2 (1)	Relative position of tanks in turbine building.	None	Closed.
	3.6.1 WORST CASE FLOODING		
3.6.1 (1)	Total failure of non-Seismic Piping Systems	NRC	NRC committed to providing a reference regulatory basis.
	3.6.1 STEAM TUNNEL		
3.6.1 (1)	Analysis of Steam Tunnel for Pipe Breaks	GE	Response will be submitted in April.
	3.6.1 HIGH ENERGY PIPING LINES		
3.6.1 (1)	Exemption of Selected High Energy Pipes	GE	Response provided on page 3.6-32 (Table 3.6-4) attached.
	3.6.1 DBA RUPTURE OF HIGH OR MODERATE ENERGY LINE		
3.6.1 (1)	Habitability of Control Room Due to Pipe Break and DBA Analysis	GE	Response will be submitted in April.
	6.2.6 CONTAINMENT LEAKAGE TESTING		
6.2.6 (1)	Systems not Vented or Drained (Type A)	GE	Response provided on page 6.2-42 attached.
6.2.6 (2)	Systems not be be Vented or Drained	GE	Response provided in Table 6.2-7 attached.*
6.2.6 (3)	Type B Tests at Power	GE	Response Provided on page 6.2-42 attached.

* Revised somewhat from draft provided in San Jose.

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Item Number	Subject	Action	Comments
6.2.6 (4)	Air Lock Seal Testing	GE	See item 6.2.6(3) above.
6.2.6 (5)	Penetrations	GE	Response provided in Table 6.2-8 attached.
6.2.6 (7)	ECCS Isolation Valve Test Type C	GE	Response provided on page 6.2-43 attached.
6.2.6 (8)a	List of CIVs for C Testing	GE	See item 6.2.6(2) above.
6.2.6 (8)b	List of Valves Reverse Tested	GE	See item 6.2.6(2) above.
6.2.6 (8)c	Testing of valves with no 30-Day Seal	GE	See item 6.2.6(2) above.
6.2.6 (8)d	Containment Purge Isolation Time	NRC	NRC will consider further and will discuss with GE at a later time.
6.2.6 (9)	Secondary Containment Inleakage/ Bypass	GE	Response provided in Table 6.2-10 and Page 6.5-2 attached.
6.2.6 (10)	Hydrogen Recombiner System Effects on ILRT	GE	See item 6.2.6(7) above.
6.2.6 (11)	Control of Test, Vents, and Drains	GE	See item 6.2.6(2) above.
6.2.6 (12)	ESF System Leak Testing	GE	See item 6.2.6(2) above.
6.2.6 (13)	Type C Tests for Containment Boundary Lines	None	Resolved.

SUMMARY STATUS OF GE/NRC MARCH 4-6, 1991 MEETING ON
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Item Number	Subject	Action	Comments
	6.5.3 FISSION PRODUCT CONTROL SYSTEMS & STRUCTURES		
6.5.3 A(1)	Supression Pool Scrubbing Factor	None	Resolved.
6.5.3 A(2)	Standby Gas Treatment Single Filter Train	GE	Response will be provided in April.
6.5.3 B(2)(1)	Single filter reliability, Availability	GE	See item 6.5.3 A(2) above.
6.5.3 B(2)(2)	SGTS Instrumentation	NRC	This item is to be revisited.
6.5.3 B(2)(3)	Effects of Routine Operational use of the SGTS on its Reliability and Availability for use During Post-Accident Conditions	GE	Response will be provided in April in conjunction with the item 6.5.3 A(2).
	6.5.1 ESF ATMOSPHERE CLEANUP SYSTEM		
6.5.1 (1)	Normal Air Handling System	NRC	Provided on Amendment 16. NRC will review.
6.5.1 CI(1)	Confirmatory Item (1) - Intake Design Capacity	GE	Response will be provided in April.
6.5.1 (2)	Fire Protection for CR ESF Filter System	None	Resolved.
6.5.1 (3)	ESF Components List	NRC	Provided on Amendment 16. NRC will review.
6.5.1 CI(2)	Redundancy of ESF Filter Trains for CR Intake	None	Resolved.

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Item Number	Subject	Action	Comments
	6.4 CONTROL ROOM HABITABILITY SYSTEMS		
6.4 (1)	Location of Makeup Air Inlets	GE	Resolved pending recalculating all of the Chapter 15 radiological accidents.
6.4 (2)	Protection from Confined Area Releases	None	Resolved.
6.4 (3)	Instrumentation	NRC	Provided on Amendment 16. NRC will review.
6.4 (4)	Positive Pressure in Control and Mechanical equipment Rooms	GE	Response provided on page 6.4-3 attached.
6.4 CI(1)	Thickness of Charcoal Adsorber	GE	Response provided on page 9.4-1 attached.
	15.7.3 LIQUID RADWASTE TANK FAILURE		
15.7.3	Design of Radwaste Substructure	GE	Response will be provided in April.
	9.2.9 MAKEUP WATER SYSTEM (CONDENSATE)		
9.2.9 (1)	Automatic Switchover of Suction from CST to SP	NRC	NRC will review and evaluate.
9.2.9 (2)	Auto Switchover for SP Cleanup Pump Suction	GE	Response provided on page 20.3-177.
9.2.9 (3)	Analysis for Potential Flooding From Failure of MUWC System	GE	Response will be provided in April.
9.2.9 (4)	Required CST Inventory	GE	Response will be provided in April.

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Item Number	Subject	Action	Comments
	9.2.10 MAKEUP WATER WATER SYSTEM (PURIFIED)		
9.2.10 (1)	MUWP interface with SR Systems	GE	Response provided on pages 9.2-3, 9.2-13 and 9.2-15.1 attached.
9.2.10 (4)	Demineralized Water Makeup and Storage Tank Capacities	GE	Response will be provided in April.
9.2.10 (5b)	Water Supply Specifications	GE	Response provided on page 9.2-2 attached.
9.2.10 (5c)	Applicant Scope	GE	Response will be provided in April.
	9.2.11 REACTOR BUILDING COOLING WATER SYSTEM (RCW)		
9.2.11 (1)	Missile Protection	None	Resolved.
9.2.11 (2)	Heat Exchangers	GE	Response will be provided in April.
		NRC	Will reexamine the basis for need to address 4 hour shutdown heat load.
9.2.11 (3)	Sizing of Heat Exchangers	GE	Response will be provided in April.
9.2.11 (4)	Four Hour Shutdown with Loss of AC Power	None	Resolved in Amendment 14.
9.2.11 (5)	Protection of RCW from HELB/MELB	GE	Response provided on page 3.6-30 attached.
9.2.11 (7)	Service Water System Description and Interface with Sea Water	GE	Response will be provided in April.

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Item Number	Subject	Action	Comments
	9.2.12 HVAC NORMAL COOLING WATER SYSTEM		
9.2.12 (1)	HVAC Isolation Valves Seismic Category		
	Part a: Secondary Containment Isolation Valves	None	Resolved.
	Part b: Seismic Category I Class. of Primary Containment Penetrations	GE	Response provided on page 9.2.7 attached.
	Part c: Leakage Concerns	NRC	NRC will review.
9.2.12 (2)	Number of Chillers and Pumps in the System	GE	Response will be provided in April.
	9.2.13 HVAC EMERGENCY COOLING WATER SYSTEMS		
9.2.13 (1)	Missile Protection	GE	Response provided on page 3.5-2 attached.
9.2.13 (2)	Protection from Water Hammer	GE	Response provided on page 9.2-9 attached.
9.2.13 (5)	Chemical Feed Tank	GE	Response will be provided in April.
9.2.13 (6)	Number of Divisions and Associated Cooling for EDG	GE	Response will be provided in April.
9.2.13 (7)	Referenced Number of P&IDs	GE	Response will be provided in April.
9.2.13 (8)	Pressure and Functional Testing	GE	Response provided on page 9.2-9 attached.

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Item Number	Subject	Action	Comments
	10.2 TURBINE GENERATOR		
10.2 (1)	Periodic Tests of Turbine Valves	GE	Response will be provided in April.
	10.3 MAIN STEAM SUPPLY SYSTEM		
10.3 (1)	Main Steam Line Classification	GE	GE is still dicsussing with Mechanical Engineering Branch.
	10.4.2 MAIN CONDENSER EVAUATION SYSTEM		
10.4.2 (1)	Radiation Monitoring of Exhaust	GE	Response will be provided in April.
	104.3 TURBINE GLAND SEAL SYSTEM		
10.4.3 (1)	Local Exhaust Radiation Monitoring	GE	Response will be provided in April.
10.4.3 (2)	Interface Regarding the Switch-over to Auxiliary Steam Supply	GE	Response will be provided in April.
	10.4.4 TURBINE BYPASS SYSTEM		
10.4.4 (1)	Turbine Bypass Valves	GE	Response will be provided in April.
	10.4.5 CIRCULATING WATER SYSTEM		
10.4.5 (1)	CWS SSAR Table Reference	GE	Response will be provided in April.
10.4.5 (2)	Flooding Protection	GE	Response will be provided in April.

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Item Number	Subject	Action	Comments
	10.4.7 CONDENSATE AND FEEDWATER SYSTEM		
10.4.7 (1)	Size of Feedwater Line	GE	Resolved.
10.4.7 (2)	Power Source for Motor Operated Gate Valve.	NRC	NRC will provide further guidance.
10.4.7 (3)	CFS Seismic Category and Group Classifications	NRC	Amendment 14 addressed this item. NRC will review.
	9.1.3 SPENT FUEL POOL COOLING AND CLEANUP SYSTEM		
9.1.3 (1)	Isolation of FPC from Suppression Pool Cleanup System	GE	Response will be provided in April.
9.1.3 (2)	Emergency Source of SPF Water	NRC	NRC will evaluate GE's response to previous questions.
9.1.3 (3)	FPC Design Seismic Classification	NRC	NRC will reevaluate previous similar information.
9.1.3 (4)	FPC Design-single Active Failure, LOOP Sizing of Heat Exchangers	GE	Response will be provided in April.
9.1.3 (5)	Provision of a FPC System Components Description Table	GE	Response will be provided in April.
	9.1.5 OVERHEAD HEAVY LOAD HANDLING SYSTEM		
9.1.5 (A.1)	OHLHS Design/RG 1.29 and RG 1.13	GE	Response will be provided in April.
9.1.5 (A.2)	Non-Seismic Category I Load Handling Equipment	GE	Response will be provided in April.
9.1.5 (A.3)	Refueling Bridge Crane References and Seismic Classifications	GE	Response will be provided in April.
9.1.5 (A.4)	Housing of Load Handling Equipment for Steam Tunnel Servicing	GE	Response will be provided in April.
9.1.5 (B.1)	Spent Fuel Crane Lifting Height	GE	Response will be provided in April.

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Item Number	Subject	Action	Comments
9.1.5 (B.2)	Control of Heavy Load Movement Over Spent Fuel Pool	GE	Response will be provided in April.
9.1.5 (B.3)	Protection of Safety-Related Equipment During Heavy Load Oper.	GE	Response will be provided in April.
9.1.5 (C.1)	Additional Details Concerning Hoists	GE	Response will be provided in April.
9.1.5 (C.2)	Single-Failure Criteria for Hoists and lifting Devices	GE	Response will be provided in April.
9.1.5 (C.3)	Limit and Safety Devices and OHLHS FMEA	GE	Response will be provided in April.
9.1.5 (C.4)	Heavy Load Operations in the Control Building	GE	Response will be provided in April.
	11.3.1 GASEOUS WASTE MANAGEMENT		
11.3.1 (1)	Monitoring of the Exhaust from the Turbine Building	GE	Response will be provided in April.
11.3.1 (2)	Sensitivity of Secondary Cont. Exhaust Monitoring	GE	Response will be provided in April.
11.3.1 (3)	Relative Location of the Plant Release Point	NRC	Provided in Amendment 16. NRC will evaluate.
	11.4.1 SOLID WASTE MANAGEMENT SYSTEM		
11.4.1 (1)	Compliance with 10CFR61	GE	Response provided on page 11.4-4 (Proprietary information provided under separate cover).
	11.4.2 EVALUATION FINDINGS		
11.4.2 (1)	Radwaste Storage Capacity	GE	Response provided on page 11.4-4 (Proprietary information provided under separate cover).
11.4.2 (5)	Cement Glass as a Waste Solidification Agent	GE	Response provided on page 11.4-4 (Proprietary information provided under separate cover).
11.4.2 (5)(1)	Incinerator Description	GE	Response provided on page 11.4-3 (Proprietary information provided under separate cover).
11.4.2 (5)(2)	Inconsistencies in Addressing Estimated Waste Shipments	GE	Response will be provided in April.
11.4.2 (5)(3)	Illegible P&IDs	None	Resolved.

11.5.1 PROCESS AND EFFLUENT RADIOLOGICAL MONITORING AND SAMPLING SYSTEM

11.5.1 (1.a)	Classification of Exhausts as Non-Radioactive	GE	Response will be provided in April.
11.5.1 (1.b)	Direct Effluent Release Paths to the Environment	GE	Response will be provided in April.
11.5.1 (1.c)	Reactor Service Water Effluent Monitoring	GE	Response provided on next three pages.
11.5.1 (2)	Continuous Monitors Channel Ranges and Sensitivities	GE	Response will be provided in April.
11.5.1 (3)	RB Fuel Area Vent Exhaust Monitoring	GE	Response will be provided in April.
11.5.1 (4)	Plant Vent Exhaust Sampling	GE	Response will be provided in April.
11.5.1 (5)	Design and Qualification of Accident Monitoring Instrumentation	GE/NRC	Both NRC and GE will review the adequacy of the info. provided in Amendment 16.

11.2 LIQUID WASTE MANAGEMENT SYSTEM

(This additional open item was not discussed during the meeting)

	Local Alarm Capability for the Condensate Storage Tank	GE	Response will be provided in April.

RESPONSE TO OPEN ITEM 11.5.1(1.c)

Continuous radiation monitors are not required for the three ABWR reactor service water (RSW) divisions for the following reasons.

As illustrated in the attached figure, heat is removed from systems, such as the reactor water cleanup (CUW) system, which potentially contain significant amounts of radioactive materials, by the reactor cooling water (RCW) system which is the intermediate loop. The heat in the RCW system is removed by the reactor service water (RSW) system, which then transfers that heat to the ultimate heat sink (UHS). Since the RSW system is not used to directly remove heat from any systems that normally contain radioactive materials, the passing of significant amounts of radioactive materials from a highly radioactive system to the UHS, requires two leaks present at the same time - (1) from the highly radioactive system into the RCW and then (2) from RCW to RSW (RCW is at the higher pressure).

If the first leak occurs, the continuous radiation monitor in the affected RCW division would alarm. The alarm set point of these monitors is set very low so that only a very small amount of radioactivity can enter the RCW system before alarm occurs. The following actions would be taken concurrently:

(1) The operators would respond by sampling the RCW water to determine the leaking heat exchanger.

(2) The affected RCW division would be taken out of service to minimize the spread of radioactivity.

(3) In accordance with 10 CFR 20.106(d) and Reg. Guide 1.21, grab samples would be taken to determine if an abnorma[illegible] lease to an unrestricted area had occurred.

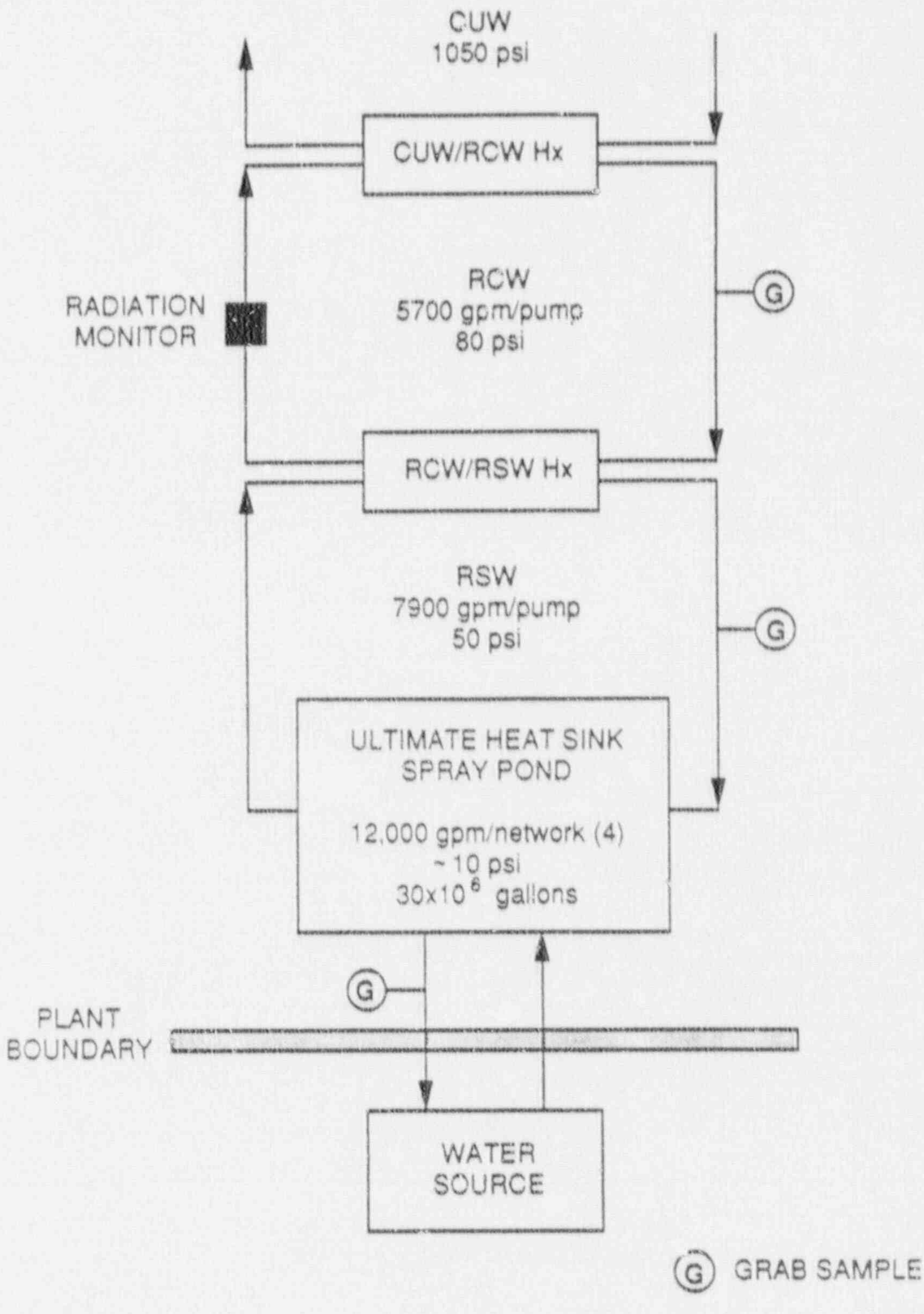
If the second leak occurs (water is flowing from RCW to RSW), the level will drop in the RCW surge tank. It will be automatically replaced by demineralized water from the makeup - water - purified (MUWP) system. There are flow meters in this makeup line to alert the operators that unusual makeup is occurring. During normal operation the RCW

RESPONSE TO OPEN ITEM 11.5.1(1.c) (CONTINUED)

system will be maintained in a low-leak condition. The surge tank is sized and the RCW system leak rate will be minimized to permit system operation during an accident for thirty days without makeup. Thus the allowable system leak rate from RCW to RSW will be kept low.

It is concluded that the intermediate loop, the RCW system, is an adequate barrier to the spread of radioactivity. The radiation monitors and grab sampling capabilities provided for the ABWR are adequate to detect any radioactive leaks before significant amounts are released to an unrestricted area. Therefore, continuous radiation monitors are not required in the RSW system.

RESPONSE TO OPEN ITEM 11.5.1 (1.c) CONTINUED



ABWR HEAT REMOVAL SYSTEM

TABLE 1.8-21 (Continued)

INDUSTRIAL CODES AND STANDARDS
APPLICABLE TO ABWR

Code or Standard Number	Year	Title
IEEE		
279	1971	Criteria for Protection Systems for NGPS
308	1980	Criteria for Class 1E Power Systems for NPGS
317	1983	Electrical Penetration Assemblies in Containment Structures for NPGS
323	~~1983~~ 1974	Qualifying class 1E Equipment for NPGS
334	1974	Motors for NPGS, Type Tests of Continuous Duty class 1E
338	1977	Criteria for the Periodic Testing of NPGS Safety Systems
344	1987	Recommended Practices for Seismic Qualifications of Class 1E Equipment for NPGS
379	1977	Standard Application of the Single Failure Criterion to NPGS Safety Systems
382	1985	Qualification of Actuators for Power Operated Valve Assemblies with Safety-Related Functions for NPP
383	1974	Type Test of Class 1E Cables; Field Splices and Connections for NPGS
384	1981	Criteria for Independence of Class 1E Equipment and Circuits
387	1984	Criteria for Diesel-Generator Units Applied as Standby Power Supplies for NPGS
450	1987	Practice for Maintenance, Testing, and Replacement of Large lead Storage Batteries for Generating Stations and Substations
484	1987	Recommended Practice for the Installation Design and Installation of Large Lead Storage Batteries for NPGS

3.11 (2)

(1) Location of the system or component in an individual missile-proof structure;

(2) Physical separation of redundant systems or components of the system for the missile trajectory path or calculated range;

(3) Provision of localized protection shields or barriers for systems or components;

(4) Design of the particular structure or component to withstand the impact of the most damaging missile;

(5) Provision of design features on the potential missile source to prevent missile generation; and/or

(6) Orientation of the potential missile source to prevent unacceptable consequences due to missile generation.

The following criteria have been adopted to provide an acceptable design basis for the plant's capability to withstand the statistically significant missiles postulated inside the reactor building.

(1) No loss of containment function as a result of missiles generated internal to containment.

(2) Reasonable assurance that a safe plant shutdown condition can be achieved and maintained.

(3) Offsite exposure within the 10CFR100 guidelines for those potential missile damage events resulting in radiation activity release.

The systems requiring protection are:

(1) Reactor coolant pressure boundary;

(2) Re[illegible] heat removal system;

(3) High pressure core flooder system;

(4) Reactor core isolation cooling system;

(5) Reactor building cooling water system;

(6) Automatic depressurization system relief valves;

(7) Standby diesel generator system;

(8) CRD scram system (hydraulic and electrical);

(9) Fuel pool cooling and cleanup system;

(10) Remote shutdown panel;

(11) Reactor protection system;

(12) All containment isolation valves;

(13) HVAC Emergency Chilled Water System; (9.2.13 (1))

~~(13)~~ 14 HVAC systems required during operation of items (1) through (12); and

~~(14)~~ 15 Electrical and control systems and wiring required for operation of items (1) through (13).

The following general criteria are used in the design, manufacture, and inspection of equipment:

(1) All pressurized equipment and sections of piping that may periodically become isolated under pressure are provided with pressure-relief valves acceptable under ASME Code Section III. The valves ensure that no pressure buildup in equipment or piping sections exceeds the design limits of the materials involved.

(2) Components and equipment of the various systems are designed and built to the standards established by the ASME Code or other equivalent industrial standard. A stringent quality control program is also enforced during manufacture, testing, and installation.

(3) Volumetric and ultrasonic testing where required by code coupled with periodic inservice inspections of materials used in components and equipment add further assurance that any material flaws that could permit the generation of missiles are detected.

Table 3.6-2

ESSENTIAL SYSTEMS, COMPONENTS, AND EQUIPMENT* FOR POSTULATED PIPE FAILURES OUTSIDE CONTAINMENT

1. Containment Isolation System and containment boundary.

2. Reactor Protection System (SCRAM signals)

3. Core Cooling systems

   (a) HPCF (B or C) or RCIC

   (b) RHR-LPFL (A or B or C) + ADS

   (c) RHR shutdown cooling mode (two loops)

   (d) RHR suppression pool cooling mode (two loops)

4. Flow restrictors

5. Control room habitability

6. Spent fuel pool cooling

7. Standby gas treatment

8. The following equipment/systems or portions thereof required to assure the proper operation of those essential items listed in items 1 through 7.

   (a) Class 1E electrical systems, ac and dc (including diesel generator system, 6900, 480 and 120V ac, and 125V dc emergency buses, motor control centers, switchgear, batteries, auxiliary shutdown control panel, and distribution systems).

   (b) Reactor Building Cooling water to the following:

      (1) Room coolers

      (2) Pump coolers (motors and seals)

      (3) Diesel generator ~~jacket~~ auxiliary system coolers

      (4) Electrical switchgear coolers

      (5) RHR heat exchangers

      (6) FPC heat exchangers

      (7) HECW refrigerators

   (c) HVAC

   (d) Instrumentation (including post accident monitoring)

9.2.11 (5)

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* The essential items listed in this table are protected in accordance with Subsection 3.6.1 consistent with the particular pipe break evaluated.

Table 3.6-4

HIGH ENERGY PIPING OUTSIDE CONTAINMENT

Piping System *

Main Steam

Main Steam Drains

Steam supply to RCIC Turbine

Feedwater

CRD (to and from HCU)

RHR (injection to feedwater from nearest check valves in the RHR lines)

Reactor Water Cleanup (to Feedwater via RHR and to first inlet valve to RPV head spray)

Reactor Water Cleanup (pumps suction and discharge)

3.6.1 (1)

* Fluid systems operating at high-energy levels less than two percent of the total time the system operates at moderate-energy standby levels are identified as moderate-energy systems, i.e. FPCF, RCIC, SAM and SLCS.

3.11 ENVIRONMENTAL QUALIFICATION OF SAFETY-RELATED MECHANICAL AND ELECTRICAL EQUIPMENT

This section defines the environmental conditions with respect to limiting design conditions for all the safety-related mechanical and electrical equipment, and documents the qualification methods and procedures employed to demonstrate the capability of this equipment to perform safety-related functions when exposed to the environmental conditions in their respective locations. The safety-related equipment within the scope of this section are defined in Subsection 3.11.1. Dynamic qualification is addressed in Sections 3.9 and 3.10 for Seismic Category I mechanical and electrical equipment, respectively.

Limiting design conditions include the following:

(1) Normal Operating Conditions - planned, purposeful, unrestricted reactor operating modes including startup, power range, hot standby (condenser available), shutdown, and refueling modes;

(2) Abnormal Operating Conditions - any deviation from normal conditions anticipated to occur often enough that the design should include a capability to withstand the conditions without operational impairment;

(3) Test Conditions - planned testing including pre-operational tests;

(4) Accident Conditions - a single event not reasonably expected during the course of plant operation that has been hypothesized for analysis purposes or postulated from unlikely but possible situations or that has the potential to cause a release of radioactive material (a reactor coolant pressure boundary rupture may qualify as an accident; a fuel cladding defect does not); and

(5) Post-Accident Conditions - during the length of time the equipment must perform its safety-related function and must remain in a safe mode after the safety-related function is performed.

3.11.1 Equipment Identification and Environmental Conditions

Safety-related electrical equipment within the scope of this section includes all three categories of 10CFR50.49(b) (Reference 1). Safety-related mechanical equipment (e.g., pumps, motor-operated valves, safety-relief valves, and check valves) are as defined and identified in Section 3.2.

A list of all safety-related electrical and mechanical equipment that is located in a harsh environment area will be included in the Environmental Qualification Document (EQD) to be prepared as mentioned in Subsection 3.11.6.

Environmental conditions for the zones where safety-related equipment is located are calculated for normal, abnormal, test, accident and post-accident conditions and are documented in Appendix 3I, Equipment Qualification Environmental Design Criteria (EQEDC). Environmental conditions are tabulated by zones, each zone defining a specific area in the plant. Typical equipment in the noted zones is shown in the figures in Section 6.2 and 12.3. Environmental parameters include temperature, pressure, relative humidity, gamma radiation dose, dose rate and neutron dose. Where applicable, these parameters are given in terms of a time-based profile.

The magnitude and 60-year frequency of occurrence of significant deviations from normal plant environments in the zones have insignificant effects on equipment total thermal normal aging or accident aging. Abnormal conditions are overshadowed by the normal or accident conditions in the Appendix 3I tables.

Margin is defined as the difference between the most severe specified service conditions of the plant and the conditions used for qualification. Margins shall be included in the qualification parameters to account for normal variations in commercial production of equipment and reasonable errors in defining satisfactory performance. The environmental parameters shown in the Appendix 3I tables do not include margins.

Some equipment may be required by the design to perform a safety function within only a short

Insert 3.11.1a

FP

Environmental parameters include temperature, pressure, relative humidity, and neutron dose rate and integrated dose. Radiation dose for gamma and beta data for both normal and accident conidtions will be provided by the applicant referencing the ABWR design ~~referencing applicant~~ in accordance with the interface requirement in Subsection 12.2.3.1 ~~12.2.4~~. The radiation requirements are site specific documentation owing to the need to model specific equipment which is applicant determined, the HVAC detailed modeling, and the evolving considerations in the area of accident source terms which are expected to generate significantly differing radiation requirments. Where applicable, these parameters are given in terms of time-based profiles.

time period into the event (i.e., within seconds or minutes), and once its function is complete, sunsequent failure is shown not to be determental to plant safey. For such equipment, qualification to the safety function time plus margin rather than the event time plus margin is acceptable so long as such equipment is not sunsequently applied and considered qualified for longer times; unless it can be shown that the equipment's thermal time constant was less than 0.1 x the period tested and the longer period temperature is commensurately lower. For all other equipment, the 10% time margin will be used.

INSERT 3.11 b

3.11 (1)

The environmental conditions shown in the Appendix 3I tables are upper-bound envelopes used to establish the environmental design and qualification bases of safety-related equipment. The upper bound envelopes indicate that the zone data reflects the worse case expected environment produced by a compendium of accident conditions. Estimated chemical environmental conditions are also reported is Appendix 3I.

3.11 (3) b

3.11.2 Qualification Tests and Analyses

Safety-related electrical equipment that is located in a harsh environment is qualified by test or other methods as described in IEEE 323

INSERT 3.11b

Some mechanical and electrical equipment may be required to perform an intended safety function between minutes of the occurrence of the event but less than 10 hours into the event. Such equipment shall be shown to remain functional in the accident environment far a period of at least 1 hour in excess of the time assumed in the accident analysis unless a time margin of less than one hour cab be justified. Such justifications will include for each piece of equipment: (1) consideration of a spectrum of breaks; (2) the potential need for the equipment later in the event or during recovery operations; (3) a determination that failure of the equipment after performance of its safety function will not be detrimental to plant safety or mislead the operator; and (5) determination that the margin applied to the minimum operability, time, when combined with other test margins, will account for the uncertainties associated with the use of analytical techniques in the derivation of environmental parameter, the number of units tested, production tolerances, and test equipment inaccuracies.

and permitted by 10CFR50.49(f) (Reference 1). Equipment type test is the preferred method of qualification.

Safety-related mechanical equipment that is located in a harsh environment is qualified by analysis of materials data which are generally based on test and operating experience.

The qualification methodology is described in detail in the NRC approved licensing Topical Report on GE's environmental qualification program (Reference 2). This report also addresses compliance with the applicable portions of the General Design Criteria of 10CFR50, Appendix A, and the Quality Assurance Criteria of 10CFR50, Appendix B. Additionally, the report describes conformance to NUREG-0588 (Reference 3), and Regulatory Guides and IEEE Standards referenced in Section 3.11 of NUREG-0800 (Standard Review Plan).

Mild environment equipment is that equipment which, during or after a design basis event (DBE, as defined in Reference 2), does not experience an environment that is significantly more severe than that existing during normal and abnormal events. Additionally, equipment that experiences the environment of a DBE can be treated as if it were in a mild environment if the equipment falls into either of the following categories:

(1) The equipment accomplishes its safety function prior to experiencing the environment of the DBE and the equipment will not fail in a manner detrimental to plant safety, or

(2) The equipment is not needed to mitigate the DBE and the equipment will not fail in a manner detrimental to plant safety.

The vendors of mild environment equipment are required to submit a certificate of compliance certifying that the equipment has been qualified for the requirements specified to assure its required safety-related function in its applicable environment. This equipment is qualified for dynamic loads as addressed in Sections 3.9 and 3.10. Further, a surveillance and maintenance program will be developed to ensure equipment operability during its designed life.

3.11.3 Qualification Test Results

The results of qualification tests for safety-related equipment will be documented, maintained, and reported as mentioned in Subsection 3.11.6.

3.11.4 Loss of Heating, Ventilating, and Air Conditioning

To ensure that loss of heating, ventilating, and air conditioning (HVAC) system does not adversely affect the operability of safety-related controls and electrical equipment in buildings and areas served by safety-related HVAC systems, the HVAC systems serving these areas meet the single-failure criterion. Section 9.4 describes the safety-related HVAC systems including the detailed safety evaluations. The loss of ventilation calculations are based on maximum heat loads and consider operation of all operable equipment regardless of safety classification.

3.11.5 Estimated Chemical and Radiation Environment

3.11.5.1 Chemical Environment

Equipment located in the containment drywell and wetwell is potentially subject to water spray modes of the RHR system. In addition, equipment in the lower portions of the containment is potentially subject to submergence. The chemical composition and resulting pH to which safety-related equipment is exposed during normal operation and design basis accident conditions is reported in Appendix 3I.

Sampling stations are provided for periodic analysis of reactor water, refueling and fuel storage pool water, and suppression pool water to assure compliance with operational limits of the plant technical specifications.

3.11.5.2 Radiation Environment

Safety-related systems and components are designed to perform their safety-related function when exposed to the normal operational radiation levels and accident radiation levels.

The normal operational exposure is based on the radiation sources provided in Chapter 12.

Radiation sources associated with the DBA and developed in accordance with NUREG-0588 (Reference 3) are provided in Chapter 15.

Integrated doses associated with normal plant operation and the design basis accident condition for various plant compartments are described in Appendix 3I.

3.11.6 Interfaces

3.11.6.1 Environmental Qualification Document

The EQD shall be prepared summarizing the qualification results for all safety-related equipment. The EQD shall include the following:

(1) The test environmental parameters and the methodology used to qualify the equipment located in harsh as well as mild environments shall be identified.

(2) A summary of environmental conditions and qualified conditions for the safety-related equipment located in a harsh environment zone shall be presented in the system component evaluation work (SCEW) sheets as described in Table I-1 of GE's environmental qualification program (Reference 2). The SCEW sheets shall be compiled in the EQD.

3.11.6.2 Environmental Qualification Records

The results of the qualification tests shall be recorded and maintained in an auditable file.

3.11.7 References

(1) Code of Federal Regulations, Title 10, Chapter I, Part 50, Paragraph 50.49, Environmental Qualification of Electric Equipment Important to Safety for Nuclear Power Plant.

(2) General Electric Environmental Qualification Program,NEDE-24326-1-P, Proprietary Document, January 1983.

(3) Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment, NUREG-0588.

(5) Systems that are normally filled with water and operating under post-LOCA conditions need not be vented.

6.2.6 (1)

(6) LLRT results from items 4 and 5 above shall be added to the ILRT results.

6.2.6.2 Containment Penetration Leakage Rate Test (Type B)

6.2.6.2.1 General

Containment penetrations whose designs incorporate resilient seals, bellows, gaskets, or sealant compounds, airlocks and lock door seals, equipment and access hatch seal and electrical canisters, and other such penetrations are leak tested during preoperational testing and at periodic intervals thereafter in conformance to Type B leakage rate tests defined in Appendix J of 10CFR50. A list of all containment penetrations is provided in Table 6.2-8. The leak tests ensure the continuing structural and leak integrity of the penetrations. 430.49d & c

To facilitate local leak testing, a permanently installed system may be provided, consisting of a pressurized gas source (nitrogen or air) and the manifolding and valving necessary to subdivide the testable penetrations into groups of two to five. Each group is then pressurized, and if any leakage is detected (by pressure decay or flow meter), individual penetrations can be isolated and tested until the source and nature of the leak is determined. All Type B tests are performed at containment peak accident pressure, Pa. The local leak detection tests of Type B and Type C (Subsection 6.2.6.3) must be completed prior to the preoperational or periodic Type A tests.

6.2.6.2.2 Acceptance Criteria

The combined leakage rate of all components subject to Type B and Type C tests shall not exceed 60% of L_a (cfm). If repairs are required to meet this limit, the results shall be reported in a separate summary to the NRC. The summary shall include the structural conditions of the components which contributed to failure.

430.49C All Type B tests are performed at containment peak accident pressure P_A. The acceptance criteria is given in Chapter 16.

6.2.6.2.3 Retest Frequency

In compliance with the requirement of Section III.D.2(a) of Appendix J to 10CFR Part 50, type B tests (except for air locks) are performed during each reactor shutdown for major fuel reloading, or other convenient intervals, but in no case at intervals greater than two years.* Air locks opened when containment integrity is required will be tested in manual mode within 3 days of being opened. If the air lock is to be opened more frequently than once every 3 days, the air lock will be tested at least once every 3 days during the period of frequent openings. Air locks will be tested at initial fuel loading, and at least once every 6 months thereafter. Airlocks may be tested at full power so as to avoid shutting down. These airlocks contain no inflatable seals. 430.49a & b

6.2.6 (3)

6.2.6 (4)

Main control room readout of time to next test, test completion and test results is provided. An alarm sounds if the specified interval passes without a test being effected. No direct, safety-related function is served by the seal test instrumentation system.

6.2.6.2.4 Design Provisions for Periodic Pressurization

In order to assure the capability of the containment to withstand the application of peak accident pressure at any time during plant life for the purpose of performing ILRTs, close attention is given to certain design and maintenance provisions. Specifically, the effects of corrosion on the structural integrity of the containment are compensated for by the inclusion of a 60-yr service life corrosion allowance, where applicable. Other design features that have the potential to deteriorate with age, such as flexible seals, are carefully inspected and tested as outlined in Subsection 6.2.6.2.2. In this manner, the structural and leakage integrity of the containment remains essentially the same as originally accepted.

In compliance with the requirement of Section III.D.2(b)(iii) of Appendix J to 10CFR Part 50

6.2.6.3 Containment Isolation Valve Leakage Rate Test (Type C)

6.2.6.3.1 General

430.50a Type C tests will be performed on all containment isolation valves required to be tested per 10CFR50 Appendix J. All testing is performed pneumatically, except hydraulic testing may be performed on iso- lation valve Type C tests using water as a seal- ant provided that the valves will be demonstrated to exhibit leakage rates that do not exceed those in the ABWR standard technical specifications.

Type C tests (like Type B test) are performed by local pressurization using either pressure decay or flowmeter method. The test pressure is applied in the same direction as when the valve is required to perform its safety function, unless it can be shown that results from tests with pressure applied in a different direction are equivalent or conservative. For the pressure decay method, test volume is pressurized with air or nitrogen to at least P_a. The rate of decay of pressure of the known test volume is monitored to calculate leakage rate. For the flowmeter method, required pressure is maintained in the test volume by making up air, nitrogen or water (if applicable) through a calibrated flowmeter. The flowmeter fluid flow rate is the isolation valve (or Type B test volume) leakage rate.

All isolation valve seats which are exposed to containment atmosphere subsequent to a LOCA are tested with air or nitrogen at containment peak accident pressure, P_a.

430.50c MSIVs and isolation valves isolated from a sealing system will use a test pressure of at least P_a.

Those valves which are in lines designed to be, or remain, filled with a liquid for at least 30 days subsequent to a loss-of-coolant accident are leakage rate tested with that liquid. The liquid leakage measured is not converted to equivalent air leakage nor added to the Type B and C test total.

6.2.6 (11)

INSERT 6.2.6.3.1 →

For Type C testing of containment penetrations, all testing, ~~with the exception of the ECCS systems~~ will be done in the correct direction unless it can be shown that testing in the reverse direction is equivalent, or more conservative. The correct direction for this design is defined as flow from inside the containment to outside the containment.

6.2.6 (7)

6.2.6.3.2 Acceptance Criteria

The combined leakage rate of all components subject to Type B and Type C (Subsection 6.2.6.3) tests shall not exceed 60% of L_a. If repairs are required to meet this limit, the results shall be reported in a separate summary to the NRC, to include the structural conditions of the components which contributed to the failure.

6.2.6.4 Scheduling and Reporting of Periodic Tests

The periodic leakage rate test schedules for Type A, B and C tests are described in Chapter 16.

Type B and C tests may be conducted at any time during normal plant operations or during shutdown periods, as long as the time interval between tests for any individual Type B or C tests does not exceed 2 years. Each time a Type B or C test is completed, the overall total leakage rate for all required Type B and C tests is updated to reflect the most recent test results. In addition to the periodic tests, any major modification, replacement of component which is part of the primary reactor containment boundary, or resealing a seal welded door, performed after the preopertional leakage rate test will be followed by either a Type A, Type B, or Type C test as applicable for the area effected by the modification. Type A, B and C test results shall be submitted to the NRC in the summary report approximately three months after each test. 430.50e 430.51

Included in the leak rate test summary report will be, a report detailing the containment inspection, a report detailing any repairs necessary to pass the tests, and the leak rate test results.

6.2.6.5 Special Testing Requirements

The maximum allowable leakage rate into the secondary containment and the means to verify

6.2.6
(11)

INSERT 6.2.6.3.1

All test connections, vent lines, or drainlines consisting of double barrier (e.g. 2-valves in series, one valve and a cap, or one valve and a flanged) connected in between isolation valves and form a part of the primary contaiment boundary need not be Type-C tested due to their infrequent used and multiple barriers as long as the barrier configurations are maintained using an administrative control program.

TABLE 6.2-7

CONTAINMENT ISOLATION VALVE INFORMATION

This table responds to NRC Questions 430.35,430.50b. 430.50c, 430.50d and 430.50f regarding containment isolation provisions for fluid system lines and for fluid instrument lines penetrating containment within the scope of the ABWR Standard Plant. The containment information is presented separately for each system for the MPL numbers given below.*

MPL	SYSTEM	PAGE
B21	Nuclear Boiler	6.2-50.15
B31	Reactor Recirculation	6.2-50.2
C41	Standby Liquid Control	6.2-50.3
D23	Containment Atmospheric Monitoring	6.2-50.3a
E11	Residual Heat Removal	6.2-50.4
E22	High Pressure Core Flooder	6.2-50.12
E31	Leak Detection & Isolation	6.2-50.46
E51	Reactor Core Isolation Cooling	6.2-50.20
G31	Reactor Water Cleanup	6.2-50.35
G51	Suppression Pool Cleanup	6.2-50.39
K17	Radwaste	6.2-50.47
P11	Makeup Water (Purified)	6.2-50.45
P21	Reactor Building Cooling Water	6.2-50.40
P24	HVAC Normal Cooling Water	6.2-50.41
P51	Service Air	6.2-50.42
P52	Instrument Air	6.2-50.43
P54	High Pressure Nitrogen Gas Supply	6.2-50.44
T31	Atmospheric Control	6.2-50.25
T49	Flammability Control	6.2-50.33

* See last two pages of this table for notes.

CHANGES TO TABLE 6.2-7 ADDRESS
ACTION ITEMS
6.2.6(2),
6.2.6(8) a, b & c
6.2.6(10), 6.2.6(12)

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR RECIRCULATION SYSTEM
RIP PURGE

Valve No.	B31-F008A-H/J/K	B31-F009A-H/J/K
SSAR Fig	5.4-4b	5.4-4b
Applicable Basis	GDC 55, RG 1.11, SRP 6.2.4	GDC 55, RG 1.11, SRP 6.2.4
Fluid	Demin. Reactor Water	Demin. Reactor Water
Line Size	15A	15A
ESF	No	No
Leakage Class	(a)	(a)
Location	I	O
Type C Leak Test	No (d)	No (d)
Valve Type	Swing Check	Swing Check
Operator	N/A	N/A
Pri. Actuation	Gravity	Gravity
Sec. Actuation	Backflow	Backflow
Normal Position	Open	Open
Shutdown Position	Shut	Shut
Post Acc Position	Shut	Shut
Pwr Fail Position	Shut	Shut
Cont. Iso. Sig.[c]	N/A	N/A
Closure Time (sec)	<1	<1
Pwr Source (Div)	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

STANDBY LIQUID CONTROL SYSTEM

Valve No.	C41-F007/F008	C41-F006A	C41-F006B
SSAR Fig	9.3-1	9.3-1	9.3-1
Applicable Basis	GDC 55	GDC 55	GDC 55
Fluid	Boron/Water	Boron/Water	Boron/Water
Line Size	40A	40A	40A
ESF	No	No	No
Leakage Class	(a)	(a)	(a)
Location	O/I	O	O
Type C Leak Test	Yes	Yes	Yes
Valve Type	Swing Check	Globe	Globe
Operator	N/A	Motor	Motor
Pri. Actuation	Self	Elect	Elect
Sec. Actuation	N/A	Man	Man
Normal Position	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is
Cont. Iso. Sig.[c]	N/A	N/A	N/A
Closure Time (sec)	Inst	24	24
Pwr Source (Div)	N/A	I	II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

CONTAINMENT ATMOSPHERE MONITORING

Valve No.	D23-F001A/B	D23-F004A/B	D23-F005A/B	D23-F006A/B	D23-F007A/B	D23-F008A/B
SSAR Fig	7.6-7c	7.6-7c	7.6-7c	7.6-7c	7.6-7c	7.6-7c
Applicable Basis	GDC 56 R6.1(1)	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56
Fluid	DW Atmos	DW Atmos	DW Atmos	WW Atmos	WW Atmos	WW Atmos
Line Size	20A	20A	20A	20A	20A	20A
ESF	No	No	No	No	No	No
Leakage Class	(a)	(a)	(a)	(a)	(a)	(a)
Location	O	O	O	O	O	O
Type C Leak Test	No (m)	No (f)	No (f)	No (f)	No (f)	No (f)
Valve Type	Gate	Globe	Globe	Globe	Globe	Globe
Operator	Solenoid	Manual	Manual	Manual	Manual	Manual
Pri. Actuation	Elec.	Elec.	Elec.	Elec.	Elec.	Elec.
Sec. Actuation	N/A	N/A	N/A	N/A	N/A	N/A
Normal Position	Open	Shut	Shut	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut	Shut	Shut	Shut
Post Acc Position	Open	Open	Open	Open	Open	Open
Pwr Fail Position	As is	As is	As is	As is	As is	As is
Cont. Iso. Sig.[c]	N/A	N/A	N/A	N/A	N/A	N/A
Closure Time (sec)	N/A	N/A	N/A	N/A	N/A	N/A
Pwr Source (Div)	I/II	I/II	I/II	I/II	I/II	I/II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

CONTAINMENT ATMOSPHERE MONITORING (Continued)

Valve No.	D23-F009A/B	D23-F010A/B	D23-F011A/B	D23-F012A/B	D23-F013A/B	D23-F014A/B
SSAR Fig	7.6-7c	7.6-7c	7.6-7c	7.6-7c	7.6-7c	7.6-7c
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56
Fluid	DW Atmos	DW Atmos	DW Atmos	WW Atmos	WW Atmos	WW Atmos
Line Size	20A	20A	20A	20A	20A	20A
ESF	No	No	No	No	No	No
Leakage Class	(a)	(a)	(a)	(a)	(a)	(a)
Location	O	O	O	O	O	O
Type C Leak Test	No (f)	No (f)	No (f)	No (f)	No (f)	No (f)
Valve Type	Globe	Globe	Globe	Globe	Globe	Globe
Operator	N/A	N/A	N/A	N/A	N/A	N/A
Pri. Actuation	Manual	Manual	Manual	Manual	Manual	Manual
Sec. Actuation	N/A	N/A	N/A	N/A	N/A	N/A
Normal Position	Open	Open	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open	Open	Open
Post Acc Position	Open	Open	Open	Open	Open	Open
Pwr Fail Position	N/A	N/A	N/A	N/A	N/A	N/A
Cont. Iso. Sig.[c]	N/A	N/A	N/A	N/A	N/A	N/A
Closure Time (sec)	N/A	N/A	N/A	N/A	N/A	N/A
Pwr Source (Div)	N/A	N/A	N/A	N/A	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

RESIDUAL HEAT REMOVAL SYSTEM
WETWELL SPRAY

Valve No.	E11-F019B	E11-F019C
SSAR Fig	5.4-10e	5.4-10g
Applicable Basis	GDC 56	GDC 56
Fluid	Water	Water
Line Size	100A	100A
ESF	Yes	Yes
Leakage Class	(a)	(a)
Location	O	O
Type C Leak Test	No(d) (g)	No(d) (g)
Valve Type	Gate	Gate
Operator	Motor	Motor
Pri. Actuation	Elec.	Elec.
Sec. Actuation	Manual	Manual
Normal Position	Closed	Closed
Shutdown Position	Closed	Closed
Post Acc Position	Closed	Closed
Pwr Fail Position	As is	As is
Cont. Iso. Sig.[c]	N/A	N/A
Closure Time (sec)	20	20
Pwr Source (Div)	II	III

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

RESIDUAL HEAT REMOVAL SYSTEM (Continued)
DRYWELL SPRAY

Valve No.	E11-F017B	E11-F018B	E11-F017C	E11-F018C
SSAR Fig	5.4-10e	5.4-10e	5.4-10g	5.4-10g
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Fluid	Water	Water	Water	Water
Line Size	250A	250A	250A	250A
ESF	Yes	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)	(a)
Location	O	O	O	O
Type C Leak Test	No(d)	No(d)	No(d)	No(d)
Valve Type	Globe	Gate	Globe	Gate
Operator	Motor	Motor	Motor	Motor
Pri. Actuation	Elec	Elec	Elec	Elec
Sec. Actuation	Manual	Manual	Manual	Manual
Normal Position	Shut	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is	As is
Cont. Iso. Sig.[c]	N/A	N/A	N/A	N/A
Closure Time (sec)	50	50	50	50
Pwr Source (Div)	II	II	III	III

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

RESIDUAL HEAT REMOVAL SYSTEM (Continued)
MINIMUM FLOW LINE

Valve No.	E11-F021A	E11-F021B	E11-F021C
SSAR Fig	5.4-10c	5.4-10d	5.4-10f
Applicable Basis	GDC 56	GDC 56	GDC 56
Fluid	Water	Water	Water
Line Size	100A	100A	100A
ESF	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)
Location	O	O	O
Type C Leak Test	No(~~d~~) g (h)	No(~~d~~) g (h)	No(~~d~~) g (h)
Valve Type	Gate	Gate	Gate
Operator	Motor	Motor	Motor
Pri. Actuation	Elec.	Elec.	Elec.
Sec. Actuation	Manual	Manual	Manual
Normal Position	Open	Open	Open
Shutdown Position	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is
Cont. Iso. Sig.(c)	N/A	N/A	N/A
Closure Time (sec)	20	20	20
Pwr Source (Div)	I	II	III

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

RESIDUAL HEAT REMOVAL SYSTEM (Continued)
S/P COOLING

Valve No.	E11-F008A	E11-F031A	E11-F008B	E11-F031B	E11-F008C	E11-F031C
SSAR Fig	5.4-10c	5.4-10c	5.4-10d	5.410d	5.4-10f	5.4-10f
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56
Fluid	Water	Water	Water	Water	Water	Water
Line Size	200A	100A	200A	100A	200A	100A
ESF	Yes	Yes	Yes	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)	(a)	(a)	(a)
Location	O	O	O	O	O	O
Type C Leak Test	No(d) (j)	No(d) (j)	No(d) (j)	No(d) (j)	No(d) (j)	No(d) (j)
Valve Type	Globe	Globe	Globe	Globe	Globe	Globe
Operator	Motor	Motor	Motor	Motor	Motor	Motor
Pri. Actuation	Elec	Elec.	Elec.	Elec.	Elec.	Elec
Sec. Actuation	Manual	Manual	Manual	Manual	Manual	Manual
Normal Position	Shut	Shut	Shut	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is	As is	As is	As is
Cont. Iso. Sig.(c)	N/A	N/A	N/A	N/A	N/A	N/A
Closure Time (sec)	50	20	50	20	50	20
Pwr Source (Div)	I	I	II	II	III	III

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

RESIDUAL HEAT REMOVAL SYSTEM (Continued)
S/P SUCTION (LPFL)

Valve No.	E11-F001A	E11-F001B	E11-F001C
SSAR Fig	5.4-10c	5.4-10d	5.4-10f
Applicable Basis	GDC 56	GDC 56	GDC 56
Fluid	Water	Water	Water
Line Size	450A	450A	450A
ESF	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)
Location	O	O	O
Type C Leak Test	No(g) (i)	No(g) (i)	No(g) (i)
Valve Type	Gate	Gate	Gate
Operator	Motor	Motor	Motor
Pri. Actuation	Elec.	Elec.	Elec.
Sec. Actuation	Manual	Manual	Manual
Normal Position	Open	Open	Open
Shutdown Position	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is
Cont. Iso. Sig.[c]	N/A	N/A	N/A
Closure Time (sec)	90	90	90
Pwr Source (Div)	I	II	III

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

RESIDUAL HEAT REMOVAL SYSTEM (Continued)
INBOARD SHUTDOWN COOLING

Valve No.	E11-F010A	E11-F010B	E11-F010C
SSAR Fig	5.4-10b	5.4-10b	5.4-10b
Applicable Basis	GDC 55	GDC 55	GDC 55
Fluid	Water	Water	Water
Line Size	350A	350A	350A
ESF	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)
Location	I	I	I
Type C Leak Test	Yes(e) NO(n)	Yes(e) NO(n)	Yes(e) NO(n)
Valve Type	Gate	Gate	Gate
Operator	Motor	Motor	Motor
Pri. Actuation	Elec.	Elec.	Elec.
Sec. Actuation	Manual	Manual	Manual
Normal Position	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is
Cont. Iso. Sig.(c)	A, M, U, RM,Z	A, M, U, RM,Z	A, M, U, RM,Z
Closure Time (sec)	70	70	70
Pwr Source (Div)	I	II	III

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

RESIDUAL HEAT REMOVAL SYSTEM (Continued)
OUTBOARD SHUTDOWN COOLING

Valve No.	E11-F011A	E11-F011B	E11-F011C
SSAR Fig	5.4-10b	5.4-10b	5.4-10b
Applicable Basis	GDC 55	GDC 55	GDC 55
Fluid	Water	Water	Water
Line Size	350A	350A	350A
ESF	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)
Location	O	O	O
Type C Leak Test	~~Yes(e)~~ NO(n)	~~Yes(e)~~ NO(n)	~~Yes(e)~~ NO(n)
Valve Type	Gate	Gate	Gate
Operator	Motor	Motor	Motor
Pri. Actuation	Elec.	Elec.	Elec.
Sec. Actuation	Manual	Manual	Manual
Normal Position	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is
Cont. Iso. Sig.[c]	A, M, U, RM,Z	A, M, U, RM,Z	A, M, U, RM,Z
Closure Time (sec)	70	70	70
Pwr Source (Div)	II	III	I

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

RESIDUAL HEAT REMOVAL SYSTEM (Continued)
INJECTION AND TESTABLE CHECK

Valve No.	E11-F005B	E11-F006B	E11-F005C	E11-F006C
SSAR Fig	5.4-10e	5.4-10e	5.4-10g	5.4-10g
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55
Fluid	Water	Water	Water	Water
Line Size	250A	250A	250A	250A
ESF	Yes	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)	(a)
Location	I	O	I	O
Type C Leak Test	Yes(e)	Yes(e)	Yes(e)	Yes(e)
Valve Type	Gate	Check	Gate	Check
Operator	Motor	N/A	Motor	N/A
Pri. Actuation	Elec	Self	Elec	Self
Sec. Actuation	Manual	N/A	Manual	N/A
Normal Position	Shut	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut	Shut
Pwr Fail Position	As is	N/A	As is	N/A
Cont. Iso. Sig.[c]	N/A	N/A	N/A	N/A
Closure Time (sec)	10	Inst	10	Inst
Pwr Source (Div)	II	N/A	III	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

HIGH PRESSURE CORE FLOODER SYSTEM
S/P SUCTION

Valve No.	E22-F006B	E22-F006C
SSAR Fig	6.3-7b	6.3-7b
Applicable Basis	GDC 56	GDC 56
Fluid	Water	Water
Line Size	400A	400A
ESF	Yes	Yes
Leakage Class	(a)	(a)
Location	O	O
Type C Leak Test	No(g) (i)	No(g) (i)
Valve Type	Gate	Gate
Operator	Motor	Motor
Pri. Actuation	Elec.	Elec.
Sec. Actuation	Manual	Manual
Normal Position	Shut	Shut
Shutdown Position	Shut	Shut
Post Acc Position	Shut	Shut
Pwr Fail Position	As is	As is
Cont. Iso. Sig.[c]	N/A	N/A
Closure Time (sec)	80	80
Pwr Source (Div)	II	III

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

HIGH PRESSURE CORE FLOODER SYSTEM (Continued)
TEST AND MINIMUM FLOW

Valve No.	E22-F009B	E22-F010B	E22-F009C	E22-F010C
SSAR Fig	6.3-7b	6.3-7b	6.3-7b	6.3-7b
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Fluid	Water	Water	Water	Water
Line Size	100A	75A	100A	75A
ESF	Yes	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)	(a)
Location	O	O	O	O
Type C Leak Test	No(g) (h)	No([illegible]) (h)	No([illegible]) (h)	No([illegible]) (h)
Valve Type	Globe	Gate	Globe	Gate
Operator	Motor	Motor	Motor	Motor
Pri. Actuation	Elec	Elec	Elec	Elec
Sec. Actuation	Manual	Manual	Manual	Manual
Normal Position	Shut	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is	As is
Cont. Iso. Sig.(c)	N/A	N/A	N/A	N/A
Closure Time (sec)	20	20	20	20
Pwr Source (Div)	II	II	III	III

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

HIGH PRESSURE CORE FLOODER SYSTEM INJECTION (Continued)
INJECTION ~~AND TESTABLE CHECK~~ LINE

Valve No.	E22-F003B	E22-F004B	E22-F003C	E22-F004C
SSAR Fig	6.3-7a	6.3-7a	6.3-7a	6.3-7a
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55
Fluid	Water	Water	Water	Water
Line Size	200A	200A	200A	200A
ESF	Yes	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)	(a)
Location	O	I	O	I
Type C Leak Test	~~Yes(e)~~ NO(K)	~~Yes(e)~~ NO(K)	~~Yes(e)~~ NO(K)	~~Yes(e)~~ NO(K)
Valve Type	Gate	Check	Gate	Check
Operator	Motor	N/A	Motor	N/A
Pri. Actuation	Elec.	Self	Elec.	Self
Sec. Actuation	Manual	N/A	Manual	N/A
Normal Position	Shut	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut	Shut
Pwr Fail Position	As is	N/A	As is	N/A
Cont. Iso. Sig.(c)	N/A	N/A	N/A	N/A
Closure Time (sec)	36	Inst.	36	Inst.
Pwr Source (Div)	II	N/A	III	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

NUCLEAR BOILER SYSTEM
MAIN STEAM LINES A, B, C AND D

Valve No.	B21-F008A/B C/D	B21-F009A/B C/D
SSAR Fig	5.1-3c	5.1-3c
Applicable Basis	GDC 55	GDC 55
Fluid	Steam	Steam
Line Size	700A	700A
ESF	Yes	Yes
Leakage Class	(b)	(b)
Location	I	O
Type C Leak Test	Yes(f) (e) (t)	Yes(f) (e) (t)
Valve Type	Globe	Globe
Operator	Pneum	Pneum
Pri. Actuation	N2 to open N2 and/or Spring to close	N2 to open N2 and/or Spring to close
Sec. Actuation	N/A	N/A
Normal Position	Open	Open
Shutdown Position	Shut	Shut
Post Acc Position	Shut	Shut
Pwr Fail Position	Shut	Shut
Cont. Iso. Sig.(e)	C, D, E, F, H, N, BB, RM	C, D, E, F, H, N, BB, RM
Closure Time (sec)	3-4.5	3-4.5
Pwr Source (Div)	I/II	I/II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

NUCLEAR BOILER SYSTEM (Continued)
MAIN STEAM LINE DRAINS

Valve No.	B21-F011	B21-F012	B21-F035
SSAR Fig	5.1-3c	5.1-3c	5.1-3c
Applicable Basis	GDC 55	GDC 55	GDC 55
Fluid	Steam/Water	Steam/Water	Steam/Water
Line Size	80A	80A	20A
ESF	Yes	Yes	Yes
Leakage Class	(b)	(b)	(a)
Location	I	O	O
Type C Leak Test	Yes(f)	Yes(f)	Yes(f)
Valve Type	Gate	Gate	Globe/Bellows Seal
Operator	Motor	Motor	Manual
Pri. Actuation	Elec.	Elec.	Manual
Sec. Actuation	Manual	Manual	N/A
Normal Position	Open	Open	Shut
Shutdown Position	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	As is	As is	Shut
Cont. Iso. Sig.(e)	C, D, E, F, H, N, BB, J	C, D, E, F, H, N, BB, RM	N/A
Closure Time (sec)	15	15	15
Pwr Source (Div)	II	I	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

DELETED

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

NUCLEAR BOILER SYSTEM (Continued)
FEEDWATER LINE A AND B

Valve No.	B21-F004A/B	B21-F003A/B	B21-F031A/B
SSAR Fig	5.1-3d	5.1-3d	5.1-3d
Applicable Basis	GDC 55	GDC 55	GDC 55
Fluid	Water	Water	Water
Line Size	550A	550A	20A
ESF	Yes	Yes	No
Leakage Class	(b)	(b)	(a)
Location	I	O	O
Type C Leak Test	Yes (f)	Yes (f)	No(d)
Valve Type	Check	Spring Check	Globe/Bellows Seal
Operator	N/A	Pneum.	Man.
Pri. Actuation	Self	Air to open	N/A
Sec. Actuation	N/A	N/A	N/A
Normal Position	Open	Open	Shut
Shutdown Position	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	N/A	N/A	N/A
Cont. Iso. Sig.(c)	N/A	N/A	N/A
Closure Time (sec)	Inst	Inst	N/A
Pwr Source (Div)	N/A	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

NUCLEAR BOILER SYSTEM (Continued)
INSTRUMENT LINES

Valve No.	Various
SSAR Fig	5.1-3b,e,f,g,h
Applicable Basis	RG 1.11
Fluid	Air/Water
Line Size	20A
ESF	No
Leakage Class	(a)
Location	O
Type C Leak Test	No (jj)
Valve Type	Excess Flow Check
Operator	N/A
Pri. Actuation	Self
Sec. Actuation	N/A
Normal Position	Open
Shutdown Position	Open
Post Acc Position	Open
Pwr Fail Position	Open
Cont. Iso. Sig.(c)	N/A
Closure Time (sec)	N/A
Pwr Source (Div)	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR CORE ISOLATION COOLING SYSTEM STEAM SUPPLY

Valve No.	E51-F035	E51-F048	E51-F036
SSAR Fig	5.4-8b	5.4-8b	5.4-8b
Applicable Basis	GDC 55	GDC 55	GDC 55
Fluid	Steam	Steam	Steam
Line Size	150A	25A	150A
ESF	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)
Location	I	I	O
Type C Leak Test	Yes(g) (e) (t)	Yes (e) (t)	Yes (t)
Valve Type	Gate	Globe	Gate
Operator	Motor	Motor	Motor
Pri. Actuation	Elec.	Elec.	Elec.
Sec. Actuation	Remote Manual	Remote Manual	Remote Manual
Normal Position	Open	Shut	Open
Shutdown Position	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is
Cont. Iso. Sig.(c)	S, T, RM,Z	S, T, RM,Z	S, T, RM,Z
Closure Time (sec)	< 30	< 30	< 30
Pwr Source (Div)	I	I	II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR CORE ISOLATION COOLING SYSTEM (Continued)
MIN. FLOW AND TEST RETURN

Valve No.	E51-F011	E51-F009
SSAR Fig	5.4-8a	5.4-8a
Applicable Basis	GDC 56	GDC 56
Fluid	Water	Water
Line Size	50A	100A
ESF	Yes	Yes
Leakage Class	(a)	(a)
Location	O	O
Type C Leak Test	Yes(e) NO(h)	Yes(e) NO(h)
Valve Type	Globe	Globe
Operator	Motor	Motor
Pri. Actuation	Elec.	Elec.
Sec. Actuation	Remote Manual	Remote Manual
Normal Position	Shut	Shut
Shutdown Position	Shut	Shut
Post Acc Position	Shut	Shut
Pwr Fail Position	As is	As is
Cont. Iso. Sig.(c)	RM	RM
Closure Time (sec)	<5	<60
Pwr Source (Div)	I	I

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR CORE ISOLATION COOLING SYSTEM (Continued)
S/P SUCTION

Valve No.	E51-F006
SSAR Fig	5.4-8a
Applicable Basis	GDC 56
Fluid	Water
Line Size	200A
ESF	Yes
Leakage Class	(a)
Location	O
Type C Leak Test	Yes(d) NO(i)
Valve Type	Gate
Operator	Motor
Pri. Actuation	Elec
Sec. Actuation	Remote Manual
Normal Position	Shut
Shutdown Position	Shut
Post Acc Position	Shut
Pwr Fail Position	As is
Cont. Iso. Sig.(c)	RM
Closure Time (sec)	<30
Pwr Source (Div)	I

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR CORE ISOLATION COOLING SYSTEM (Continued)
TURBINE EXHAUST

Valve No.	E51-F039	E51-F038
SSAR Fig	5.4-8a	5.4-8a
Applicable Basis	GDC 56	GDC 56
Fluid	Steam	Steam
Line Size	350A	350A
ESF	Yes	Yes
Leakage Class	(a)	(a)
Location	O	O
Type C Leak Test	Yes(f) (g) (t)	Yes(f) (t)
Valve Type	Gate	Check
Operator	Motor	Self Actuating
Pri. Actuation	Elec	N/A
Sec. Actuation	Manual	N/A
Normal Position	Locked Open	Shut
Shutdown Position	Open	Open
Post Acc Position	Shut	Shut
Pwr Fail Position	As is	N/A
Cont. Iso. Sig.(c)	RM	N/A
Closure Time (sec)	< 70	Inst
Pwr Source (Div)	I	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR CORE ISOLATION COOLING SYSTEM (Continued)
VACUUM PUMP DISCHARGE

Valve No.	E51-F047	E51-F046
SSAR Fig	5.4-8a	5.4-8a
Applicable Basis	GDC 56	GDC 56
Fluid	Steam	Steam
Line Size	50A	50A
ESF	Yes	Yes
Leakage Class	(a)	(a)
Location	O	O
Type C Leak Test	NO(1) Yes(f)	NO(1) Yes(f)
Valve Type	Gate	Check
Operator	Motor	Self-Actuating
Pri. Actuation	Elec	N/A
Sec. Actuation	Manual	N/A
Normal Position	Locked Open	Shut
Shutdown Position	Open	Open
Post Acc Position	Shut	Shut
Pwr Fail Position	As is	N/A
Cont. Iso. Sig.[c]	RM	N/A
Closure Time (sec)	< 10	Inst.
Pwr Source (Div)	I	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

ATMOSPHERIC CONTROL SYSTEM

Valve No.	T31-F001	T31-F002	T31-F003	T31-F004	T31-F005	T31-F006
SSAR Fig	6.2-39a	6.2-39a	6.2-39a	6.2-39a	6.2-39a	6.2-39a
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56
Fluid	Air	Air or N2	Air or N2	DW ATMOS	DW ATMOS	WW ATMOS
Line Size (mm)	550A	550A	550A	550A	50A	550A
ESF	Yes	Yes	Yes	Yes	Yes	Yes
Leakage Class	(b)	(b)	(b)	(b)	(b)	(b)
Location	O	O	O	O	O	O
Type C Leak Test	Yes	Yes (c)	Yes (c)	Yes (c)	Yes (c)	Yes (c)
Valve Type	Butterfly	Butterfly	Butterfly	Butterfly	Globe	Butterfly
Operator	Pneum	Pneum	Pneum	Pneum	Pneum	Pneum
Pri. Actuation	Air	Air	Air	Air	Air	Air
Sec. Actuation	N/A	N/A	N/A	N/A	N/A	N/A
Normal Position	Shut	Shut	Shut	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut	Shut	Shut	Shut
Pwr Fail Position	Shut	Shut	Shut	Shut	Shut	Shut
Cont. Iso. Sig.(c)	A,K	A,K	A,K	A,K	A,K	A,K
Closure Time (sec)	< 30	< 30	< 30	< 30	< 15	< 30
Pwr Source (Div)	I	II	II	II	II	II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

ATMOSPHERIC CONTROL SYSTEM (Continued)

Valve No.	T31-F008	T31-F009	T31-F025	T31-F039	T31-F040	T31-F041	T31-F720A/B
SSAR Fig	6.2-39a	6.2-39a	6.2-39a	6.2-39a	6.2-39a	6.2-39a	6.2-39b
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56	GDC 57
Fluid	PCV ATMOS	PCV ATMOS	N2	N2	N2	N2	N2
Line Size	250A	550A	400A	50A	50A	50A	20A
ESF	Yes	Yes	Yes	Yes	Yes	Yes	No
Leakage Class	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Location	O	O	O	O	O	O	O
Type C Leak Test	Yes	Yes	Yes	Yes	Yes (e)	Yes (e)	~~No~~ Yes
Valve Type	Butterfly	Butterfly	Butterfly	Globe	Globe	Globe	Gate
Operator	Pneum	Pneum	Pneum	Pneum	Pneum	Pneum	Soleniod
Pri. Actuation	Air	Air	Air	Air	Air	Air	Elec.
Sec. Actuation	-	-	-	-	-	-	-
Normal Position	Shut	Shut	Shut	Open	Open	Open	Shut
Shutdown Position	Shut	Shut	Shut	Shut	Shut	Shut	Shut
Post Acc Position	Shut	Shut	Shut	Shut	Shut	Shut	Shut
Pwr Fail Position	Shut	Shut	Shut	Shut	Shut	Shut	Shut
Cont. Iso. Sig.[c]	A,K	A,K	A,K	A,K	A,K	A,K	A,K
Closure Time (sec)	< 30	< 30	< 30	< 15	< 15	< 15	< 5
Pwr Source (Div)	I	I	I	I	II	II	II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

ATMOSPHERIC CONTROL SYSTEM (Continued)

Valve No.	T31-F730	T13-F732A/B	T13-F734A-D
SSAR Fig	6.2-39b	6.2-39b	6.2-39b
Applicable Basis	GDC56 RG 1.11	GDC 56 RG 1.11	GDC 56 RG 1.11
Fluid	DW ATMOS	DW ATMOS	DW ATMOS
Line Size	20A	20A	20A
ESF	No	No	No
Leakage Class	(a)	(a)	(a)
Location	O	O	O
Type C Leak Test	No (m)	No (m)	No (m)
Valve Type	Globe	Globe	Globe
Operator	N/A	N/A	N/A
Pri. Actuation	Manual	Manual	Manual
Sec. Actuation	N/A	N/A	N/A
Normal Position	Open	Open	Open
Shutdown Position	Open	Open	Open
Post Acc Position	Open	Open	Open
Pwr Fail Position	N/A	N/A	N/A
Cont. Iso. Sig.[c]	N/A	N/A	N/A
Closure Time (sec)	N/A	N/A	N/A
Pwr Source (Div)	N/A	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

ATMOSPHERIC CONTROL SYSTEM (Continued)

Valve No.	T31-F736A/B	T31-F738A-D	T31-F740A-D	T31-F742A/B
SSAR Fig	6.2-39b	6.2-39b	6.2-39b	6.2-39b
Applicable Basis	GDC 56 RG 1.11	GDC 56 RG 1.11	GDC 56 RG 1.11	GDC 56 RG 1.11
Fluid	WW ATMOS	WW ATMOS	SP H_2O	WW ATMOS
Line Size	20A	20A	20A	20A
ESF	No	No	No	No
Leakage Class	(a)	(a)	(a)	(a)
Location	O	O	O	O
Type C Leak Test	No (M)	No (M)	No (M)	No (M)
Valve Type	Globe	Globe	Globe	Globe
Operator	Manual	Manual	Manual	Manual
Pri. Actuation	N/A	N/A	N/A	N/A
Sec. Actuation	N/A	N/A	N/A	N/A
Normal Position	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open
Post Acc Position	Open	Open	Open	Open
Pwr Fail Position	N/A	N/A	N/A	N/A
Cont. Iso. Sig.[c]	N/A	N/A	N/A	N/A
Closure Time (sec)	N/A	N/A	N/A	N/A
Pwr Source (Div)	N/A	N/A	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

ATMOSPHERIC CONTROL SYSTEM (Continued)

Valve No.	T31-F744A/B	T31-F800A/B	T31-F802A/B
SSAR Fig	6.2-39b	6.2-39b	6.2-39b
Applicable Basis	GDC 57 RG 1-11	GDC 56 RG 1-11	GDC 56 RG 1-11
Fluid	SP H_2O	DW ATMOS	DW ATMOS
Line Size	20A	20A	20A
ESF	No	No	No
Leakage Class	(b)	(b)	(b)
Location	O	O	O
Type C Leak Test	No (m)	No (m)	No (m)
Valve Type	Globe	Globe	Globe
Operator	Manual	Manual	Manual
Pri. Actuation	N/A	N/A	N/A
Sec. Actuation	N/A	N/A	N/A
Normal Position	Open	Open	Open
Shutdown Position	Open	Open	Open
Post Acc Position	Open	Open	Open
Pwr Fail Position	N/A	N/A	N/A
Cont. Iso. Sig.(c)	N/A	N/A	N/A
Closure Time (sec)	N/A	N/A	N/A
Pwr Source (Div)	N/A	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

ATMOSPHERIC CONTROL SYSTEM (Continued)

Valve No.	T31-F804A/B	T31-D001	T31-D002
SSAR Fig	6.2-39b	6.2-39a	6.2-39a
Applicable Basis	GDC 56 RG 1.11	GDC 56	GDC 56
Fluid	WW ATMOS	WW ATMOS	DW ATMOS
Line Size	20A	350A	350A
ESF	No	Yes	Yes
Leakage Class	(a)	N/A	N/A
Location	O	O	O
Type C Leak Test	No (m)	No (c)	No (c)
Valve Type	Globe	Rupture Disk	Rupture Disk
Operator	Manual	Self	Self
Pri. Actuation	N/A	N/A	N/A
Sec. Actuation	N/A	N/A	N/A
Normal Position	Open	Shut	Shut
Shutdown Position	Open	Shut	Shut
Post Acc Position	Open	Open	Open
Pwr Fail Position	N/A	N/A	N/A
Cont. Iso. Sig.(c)	N/A	N/A	N/A
Closure Time (sec)	N/A	N/A	N/A
Pwr Source (Div)	N/A	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

DELETED

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

DELETED

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

FLAMMABILITY CONTROL SYSTEM

Valve No.	T49-F001A	T49-F001B	T49-F002A	T49-F002B
SSAR Fig	6.2-40	6.2-40	6.2-40	6.2-40
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Fluid	DW ATMOS	DW ATMOS	DW ATMOS	DW ATMOS
Line Size	4'	4'	4'	4'
ESF	Yes	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)	(a)
Location	O	O	O	O
	NC(u)	NO(u)	NO(u)	NO(u)
Type C Leak Test	Yes	Yes	Yes	Yes
Valve Type	Gate	Gate	Gate	Gate
Operator	Motor	Motor	Motor	Motor
Pri. Actuation	Elec.	Elec.	Elec.	Elec.
Sec. Actuation	Manual	Manual	Manual	Manual
Normal Position	Shut	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut	Shut
Post Acc Position	Open	OPen	Open	Open
Pwr Fail Position	As is	As is	As is	As is
Cont. Iso. Sig.(c)	A,K	A,K	A,K	A,K
Closure Time (sec)	< 30	< 30	< 30	< 30
Pwr Source (Div)	I	II	I	II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

FLAMMABILITY CONTROL SYSTEM (Continued)

Valve No.	T49-F006A	T49-F006B	T49-F007A	T49-F007B
SSAR Fig	6.2-40	6.2-40	6.2-40	6.2-40
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Fluid	DW ATMOS	DW ATMOS	DW ATMOS	DW ATMOS
Line Size	6"	6"	6"	6"
ESF	Yes	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)	(a)
Location	O	O	O	O
Type C Leak Test	Yes	Yes	Yes	Yes
Valve Type	Gate	Gate	Gate	Gate
Operator	Motor	Motor	Motor	Motor
Pri. Actuation	Elec.	Elec.	Elec.	Elec.
Sec. Actuation	Manual	Manual	Manual	Manual
Normal Position	Shut	Shut	Shut	Shut
Shutdown Position	Shut	Shut	Shut	Shut
Post Acc Position	Open	OPen	Open	OPen
Pwr Fail Position	As is	As is	As is	As is
Cont. Iso. Sig.[c]	A,K	A,K	A,K	A,K
Closure Time (sec)	< 30	< 30	< 30	< 30
Pwr Source (Div)	I	II	I	II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR WATER CLEANUP SYSTEM

Valve No.	G31-F002	G31-F003	G31-F017
SSAR Fig	5.4-12a	5.4-12a	5.4-12a
Applicable Basis	GDC 55	GDC 55	GDC 55
Fluid	RPV H2O	RPV H2O	RPV H2O
Line Size	200A	200A	150A
ESF	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)
Location	I	O	O
Type C Leak Test	Yes (t)	Yes (t)	Yes (t)
Valve Type	Gate	Gate	Gate
Operator	Motor	Motor	Motor
Pri. Actuation	Elec	Elec	Elec
Sec. Actuation	Manual	Manual	Manual
Normal Position	Open	Open	Shut
Shutdown Position	Open	Open	Shut
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is
Cont. Iso. Sig.[c]	A,F,V,Z,AA	A,F,V,Z,CC,AA	A,F,V,Z,CC,AA
Closure Time (sec)	< 30	< 30	< 30
Pwr Source (Div)	II	I	I

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR WATER CLEANUP SYSTEM (Continued)

Valve No.	G31-F018	G31-F071	G31-F072
SSAR Fig	5.4-12a	5.4-12a	5.4-12a
Applicable Basis	GDC 55	GDC 55	GDC 55
Fluid	RPV H2O	RPV H2O	RPV H2O
Line Size	150A	20A	20A
ESF	Yes	No	No
Leakage Class	(a)	(a)	(a)
Location	I	I	O
Type C Leak Test	Yes(f) (t)	[illegible] YES [illegible] (t)	[illegible] YES (t)
Valve Type	Check	Globe	Globe
Operator	Self	No	AO
Pri. Actuation	N/A	Elec	Elec
Sec. Actuation	N/A	N/A	N/A
Normal Position	Shut	Open	Open
Shutdown Position	Open	Shut	Shut
Post Acc Position	Shut	Open	Open
Pwr Fail Position	N/A	Shut	Shut
Cont. Iso. Sig.[c]	N/A	N/A	N/A
Closure Time (sec)	Inst	N/A	N/A
Pwr Source (Div)	N/A	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR WATER CLEANUP SYSTEM (Continued)

Valve No.	G31-F700A/B	G31-F701A/B	G31-F702A/B	G31-F703A/B
SSAR Fig	5.4-12a	5.4-12a	5.4-12a	5.4-12a
Applicable Basis	GDC 55 RG 1.11	GDC 55 RG 1.11	GDC 55 RG 1.11	GDC 55 RG 1.11
Fluid	RPV H2O	RPV H2O	RPV H2O	RPV H2O
Line Size	20A	20A	20A	20A
ESF	No	No	No	No
Leakage Class	(a)	(a)	(a)	(a)
Location	O	O	O	O
Type C Leak Test	No(d) (m)	No(d) (m)	No(d) (m)	No(d) (m)
Valve Type	Globe	Globe	XS Check	XS Check
Operator	Manual	Manual	Self	Self
Pri. Actuation	N/A	N/A	N/A	N/A
Sec. Actuation	N/A	N/A	N/A	N/A
Normal Position	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open
Post Acc Position	Shut	Shut	Shut	Shut
Pwr Fail Position	N/A	N/A	N/A	N/A
Cont. Iso. Sig.[c]	N/A	N/A	N/A	N/A
Closure Time (sec)	N/A	N/A	N/A	N/A
Pwr Source (Div)	N/A	N/A	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

DELETED

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

SUPPRESSION POOL CLEANUP SYSTEM

Valve No.	G51-F001	G51-F002	G51-F006	G51-F007
SSAR Fig	9.5-1	9.5-1	9.5-1	9.5-1
Applicable Basis	GDC 57	GDC 57	GDC 57	GDC 57
Fluid	Water	Water	Water	Water
Line Size	200A	200A	250A	250A
ESF	Yes	Yes	Yes	Yes
Leakage Class	(a)	(a)	(a)	(a)
Location	O	O	O	O
Type C Leak Test	No(d)	No(d)	No(d)	No(d)
Valve Type	Gate	Gate	Check	Gate
Operator	Motor	Motor	N/A	Motor
Pri. Actuation	Elec	Elec	N/A	Elec
Sec. Actuation	Manual	Manual	N/A	Manual
Normal Position	Shut	Shut	Open	Shut
Shutdown Position	Open	Open	Open	Open
Post Acc Position	Shut	Shut	N/A	Shut
Pwr Fail Position	As is	As is	N/A	As is
Cont. Iso. Sig.(c)	A,K	A,K	N/A	A,K
Closure Time (sec)	< 30	< 30	Inst	< 30
Pwr Source (Div)	II	I	N/A	II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

REACTOR BUILDING COOLING WATER SYSTEM

Valve No.	P21-F075A /F076A	P21-F081A /F080A	P21-F075B /F076B	P21-F081B /F080B
SSAR Fig	9.2-1c	9.2-1c	9.2-1f	9.2-1f
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55
Fluid	Water	Water	Water	Water
Line Size (mm)	200A	200A	200A	200A
ESF	Yes	Yes	Yes	Yes
Leakage Class	(b)	(b)	(b)	(b)
Location	O/I	O/I	O/I	O/I
Type C Leak Test	NO(5) Yes(e)	NO(5) Yes(e)	NO(5) Yes(e)	NO(5) Yes(e)
Valve Type	Gate/Check	Gate/Gate	Gate/Check	Gate/Gate
Operator	Motor/NA	Motor/Motor	Motor/NA	Motor/Motor
Pri. Actuation	Elect.	Elect.	Elect.	Elect.
Sec. Actuation	HW/N/A	HW/N/A	HW/N/A	HW/N/A
Normal Position	Open	Open	Open	[illegible]
Shutdown Position	Open	Open	Open	Open
Post Acc Position	Shut	Shut	Shut	Shut
Pwr Fail Position	As is	As is	As is	As is
Cont. Iso. Sig.(c)	CX,K	CX,K	CX,K	CX,K
Closure Time (sec)	80/N/A	80/80	80/N/A	80/80
Pwr Source (Div)	I/N/A	I/II	I/N/A	I/II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

HVAC NORMAL COOLING WATER SYSTEM

Valve No.	P24-F053	P24-F054	P24-F0142	P21-F0141
SSAR Fig	9.2-2b	9.2-2b	9.2-2b	9.2-2b
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55
Fluid	Water	Water	[illegible]	Water
Line Size	100A	100A	100A	100A
ESF	No	No	No	No
Leakage Class	(b)	(b)	(b)	(b)
Location	O	I	O	I
Type C Leak Test	No(e) YES(t)	No(e) YES(t)	No(e) YES(t)	No(e) YES(t)
Valve Type	Gate	Check	Gate	Gate
Operator	Motor	N/A	Motor	Motor
Pri. Actuation	Elect	N/A	Elec	Elec
Sec. Actuation	HW	N/A	HW	N/A
Normal Position	[illegible]	Open	Open	Open
Shutdown Position	Open	Open	Open	Open
Post Acc Position	Shut	N/A	Shut	Shut
Pwr Fail Position	As is	N/A	As is	As is
Cont. Iso. Sig.[c]	CX,K	N/A	CX,K	CX,K
Closure Time (sec)	25	Inst	25	25
Pwr Source (Div)	I	N/A	I	II

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

SERVICE AIR SYSTEM

Valve No.	P51-F131	P51-F132
SSAR Fig	9.3-7	9.3-7
Applicable Basis	GDC 55	GDC-55
Fluid	Air	Air
Line Size	25A	25A
ESF	No	No
Leakage Class	(b)	(b)
Location	O	I
Type C Leak Test	YES No	YES No
Valve Type	Globe	Check
Operator	Manual	N/A
Pri. Actuation	Manual	N/A
Sec. Actuation	N/A	N/A
Normal Position	Shut	N/A
Shutdown Position	Open	N/A
Post Acc Position	Shut	N/A
Pwr Fail Position	N/A	N/A
Cont. Iso. Sig.(c)	N/A	N/A
Closure Time (sec)	N/A	N/A
Pwr Source (Div)	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

INSTRUMENT AIR SYSTEM

Valve No.	P52-F276	P52-F277
SSAR Fig	9.3-6	9.3-6
Applicable Basis	GDC 55	GDC 55
Fluid	Air	Air
Line Size	50A	50A
ESF	No	No
Leakage Class	(b)	(b)
Location	O	I
Type C Leak Test	No (Yes)	No (Yes)
Valve Type	Globe	Check
Operator	Motor	N/A
Pri. Actuation	Elect.	N/A
Sec. Actuation	W	N/A
Normal Position	Open	Open
Shutdown Position	Open	Open
Post Acc Position	Open	Open
Pwr Fail Position	As is	N/A
Cont. Iso. Sig.(c)	RM	N/A
Closure Time (sec)	20	N/A
Pwr Source (Div)	1	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

HIGH PRESSURE NITROGEN GAS SUPPLY SYSTEM

Valve No.	P54-F007A/F008A	P54-F007B/F008B	P54-F200/F209
SSAR Fig	6.7-1	6.7-1	6.7-1
Applicable Basis	GDC 55	GDC 55	GDC 55
Fluid	N2	N2	N2
Line Size (mm)	50A	50A	50A
ESF	Yes	Yes	Yes
Leakage Class	(b)	(b)	(b)
Location	O/I	O/I	O/I
Type C Leak Test	No (r)	No (r)	~~No~~ Yes
Valve Type	Globe/Check	Globe/Check	Globe/Check
Operator	Motor/N/A	Motor/N/A	Motor/N/A
Pri. Actuation	Elect./N/A	Elect./N/A	Elect./N/A
Sec. Actuation	HW/N/A	HW/N/A	HW/N/A
Normal Position	Open	Open	Open
Shutdown Position	Open	Open	Open
Post Acc Position	Shut	Shut	Shut
Pwr Fail Position	As Is/N/A	As Is/N/A	As Is/N/A
Cont. Iso. Sig.[c]	G.G.	G.G.	G.G.
Closure Time (sec)	30/N/A	30/N/A	30/N/A
Pwr Source (Div)	II/N/A	I/N/A	I/N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

MAKEUP WATER SYSTEM (PURIFIED)

Valve No.	P11-F141	P11-F142
SSAR Fig	9.2-5b	9.2-5b
Applicable Basis	GDC 55	GDC 55
Fluid	Water	Water
Line Size	50A	50A
ESF	No	No
Leakage Class	(b)	(b)
Location	O	I
Type C Leak Test	No(d) (Yes)	No(d) (Yes)
Valve Type	Globe	Check
Operator	Manual	Self
Pri. Actuation	N/A	N/A
Sec. Actuation	N/A	N/A
Normal Position	Shut	Shut
Shutdown Position	Open	Open
Post Acc Position	Shut	Shut
Pwr Fail Position	N/A	N/A
Cont. Iso. Sig.(c)	N/A	N/A
Closure Time (sec)	N/A	N/A
Pwr Source (Div)	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

LEAK DETECTION & ISOLATION SYSTEM

Valve No.	E31-F002	E31-FOO3	E31-F004	E31-F005	E31-F009/ F010	E31-F701/ F703 A/B/C/D	E31-F702/ F704 A/B/C/D
SSAR Fig	5.2-8i	5.2-8i	5.2-8i	5.2-8i	5.2-8h	5.2-8f	5.2-8f
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55	GDC 55	RG 1.11	RG 1.11
Fluid	Air	Air	Air	Air	Water	Steam	Steam
Line Size	32A	32A	32A	32A	20A	20A	20A
ESF	Yes	Yes	Yes	Yes	Yes	No	No
Leakage Class	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Location	O	O	O	O	O	O	O
Type C Leak Test	Yes (e)	Yes (e)	Yes (e)	Yes (e)	Yes (e) (t)	No (d) (m)	No (m)
Valve Type	Globe	Globe	Globe	Globe	Globe	Globe/Bellows Seal	Excess Flow Check
Operator	Pneum	Pneum	Pneum	Pneum	N/A	Man.	N/A
Pri. Actuation	Air	Air	Air	Air	Manual	N/A	Self
Sec. Actuation	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Normal Position	Open	Open	Open	Open	Shut	Open	Open
Shutdown Position	Shut	Shut	Shut	Shut	Shut	Open	Open
Post Acc Position	Shut	Shut	Shut	Shut	Shut	Open	Open
Pwr Fail Position	Shut	Shut	Shut	Shut	N/A	N/A	Open
Cont. Iso. Sig.[c]	B,K	B,K	B,K	B,K	N/A	N/A	N/A
Closure Time (sec)	< 15	< 15	< 15	< 15	N/A	N/A	N/A
Pwr Source (Div)	I	II	II	I	N/A	N/A	N/A

TABLE 6.2-7 (Continued)

CONTAINMENT ISOLATION VALVE INFORMATION

RADWASTE SYSTEM

Valve No.	K17-F003	K17-F004	K17-F103	K17-F104
SSAR Fig	11.2-2cc	11.2-2cc	11.2-2ee	11.2-2ee
Applicable Basis	GDC 57	GDC 57	GDC 57	GDC 57
Fluid	LCW H20	LCW H20	LCW H20	LCW H20
Line Size	65A	65A	65A	65A
ESF	No	No	No	No
Leakage Class	(b)	(b)	(b)	(b)
Location	I	O	I	O
Type C Leak Test	No (V)	No (V)	No (V)	No (V)
Valve Type	Gate	Gate	Gate	Gate
Operator	Motor	Motor	Motor	Motor
Pri. Actuation	Elec	Elec.	Elec.	Elec.
Sec. Actuation	Manual	Manual	Manual	Manual
Normal Position	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open
Post Acc Position	Shut	Shut	Shut	Shut
Pwr Fail Position	AS Is	As Is	As Is	As Is
Cont. Iso. Sig.(c)	A/FF	FF	A/FF	FF
Closure Time (sec)	< 30	< 30	< 30	< 30
Pwr Source (Div)	II	I	II	I

TABLE 6.2-7 (Continued)

NOTES

(a) Termination Region: Secondary Containment

(b) Termination Region: Main Condenser, Turbine Bldg., Bypass Leakage Barrier: Redundant Primary Cont. Iso. Valves.

(c) Isolation Signal Codes

Signal	Description
A	Reactor vessel low water level - level 3.
B	Reactor vessel low water level - level 2.
C	Reactor vessel low water level - level 1.5.
CX	Reactor vessel low water level - level 1.
D	High radiation - main steamline.
E	Line break - main steamline (steamline high steam flow).
F	Line break - main steamline (steamline high tunnel temperature).
H	Line break - main steamline (steamline high turbine building temperature.
J	Turbine building high temperature.
K	High drywell pressure.
L	RHR injection valve low pressure.
M	Line break in RHR shutdown.
N	Low main condenser vacuum.
S	Line break in RCIC system steamline to turbine (low steamline pressure).
T	High pressure RCIC turbine exhaust diaphragm.
V	Close-through electrical interlocks with other valves or pump motors.
W	Condensate storage tank low level.
X	Suppression pool low level.
Y	RCIC.
Z	Equipment area temp high.

TABLE 6.2-7 (Continued)

NOTES (Continued)

(c) Isolation Signal Codes (continued)

Signal	Description
AA	Differential mass flow high
BB	Low main steamline pressure at inlet to turbine (RUN mode only).
CC	Line break in reactor water cleanup system (high space temperature).
DD	Containment pressure.
EE	High differential flow in the reactor water cleanup system.
FF	High Radiation-Process Line
RM	Remote manual switch from control room (All automatic initiated isolation valves are capable of remote manual operation from the control room).
GG	Low Nitrogen pressure.

(d) Remains water filled during Type A test.

(e) Type C tests shall be performed with water at pressure 1.1 P_A.

(f) Type A testing is performed in a conventional manner.

(g) These valves are tested in the reverse direction for gate valves and under the seat for globe valves. Results are conservative since test pressure tends to lift the plug from the seat of the globe valves.

TABLE 6.2-7 (Continued)

NOTES:

(d) This line is filled with water and pressurized higher than 110% of the post accident peak containment pressure. Line is small and postulated failure is considered less severe than instrument line.

(e) Leakage testing may be performed in the reverse direction in the absence of test connections and/or isolable test boundaries in the upstream side of the valve relative to the leakage flow direction (i.e. from inside to outside primary containment). The results are conservative or equivalent to the normal direction as described below:

(1) For globe valves including MSIV's, testing in the reverse direction is conservative since the test pressure tends to lift the plug from the seat.

(2) For gate valves and butterfly valves, leakage characteristics for these type of valves are similar in both directions provided seat construction is design for sealing on either side

(f) These lines are CAM system sample lines that continuously monitor (sample) post accident containment atmosphere. These lines are safety grade closed loop extension of the primary containment. Sampled gases (or leakage if any) are returned to the primary containment. In addition these lines are subject to periodic Type-A test whose leaktight integrity can be verified.

(g) The RHR drywell and wetwell spray lines are always filled with water in the outboard side thereby providing water seal. The seal is maintained at a pressure higher than 110% of the post accident peak containment pressure by jockey pumps and/or hydrostatic head; thus precluding leakage.

Furthermore, these valves are required to open post LOCA to provide containment cooling function. When this function is activated, flow direction is towards the containment.

TABLE 6.2-7 (Continued)

NOTES: (Continued)

(h) The ECCS (RHR, HPCF and RCIC) test return and minimum flow lines terminate below the suppression pool water level and are sealed from the containment atmosphere by the suppression pool water. The outboard side of the valve (away from the containment) is always filled with water and pressurized higher than 110% of the post accident peak containment pressure as in (g) above.

(i) The ECCS (RHR, HPCF and RCIC) suction lines are always filled with water since the suction lines are located below the suppression pool water level and are sealed from the containment atmosphere.

(j) The RHR suppression pool cooling discharge line is the same line used for system flow or pump flow testing. See (h) above.

(k) The ECCS (RHR, HPCF and RCIC) injection lines are always filled with water up to the outboard isolation valves thereby forming water seal. These water seal are kept pressurized higher than 110% of the post accident containment pressure as in (g) above. Furthermore, these valves are subject to ASME section XI IWV leak rate tests.

(l) RCIC vacuum pump discharge line terminates below the suppression pool water level and is sealed from the containment atmosphere.

(m) Instrument lines that penetrate the primary containment conform to Regulatory Guide 1.11. The lines that connect to the reactor pressure boundary include a restricting orifice inside containment, are Seismic Category I, and terminate in Seismic Category I instruments. The instrument lines also include manual isolation valves and excess flow check valves or equivalent. These lines are normally open, and are considered extension of the primary containment whose integrity is continuously demonstrated during normal operation. In addition these lines are subject to periodic Type-A test. Leaktight integrity is also verified during functional and surveillance activities as well as visual observations during operator tours

TABLE 6.2-7 (Continued)

NOTES: (Continued)

(n) The outboard side of the RHR shutdown cooling suction valves is sealed with water since RHR pump and suction line are located below the suppression pool water level. This is a closed loop water seal since RHR is a closed loop system always filled with water.

Furthermore, these valves are subject to ASME Section XI IWV leak rate tests.

(o) Rupture disc are normally closed and sealed from leakage. The opening setpoint of these rupture discs is higher than the primary containment test pressures. Additionally, these rupture discs are subject to the Type-A test.

(p) SPCU suction line is always filled with water since it is located below the suppression pool water level and is sealed from the containment atmosphere.

(q) SPCU return line terminates below the suppression pool water level and is sealed from the containment atmosphere.

(r) The outboard side of these valves is always pressurized with nitrogen gas at a pressure higher than the post accident peak containment pressure. The nitrogen supply in these lines is required for post accident mitigating function.

(s) The outboard side of these valves is always filled with water and pressurized above 110% post accident peak containment pressure. These lines are kept charged with cooling water for cooling emergency equipment necessary for post accident mitigation

(t) All test connections, vent lines, or drainlines consisting of double barrier (e.g. 2-valves in series, one valve and a cap, or one valve and a flanged) connected in between isolation valves and form a part of the primary contaiment boundary need not be Type-C tested due to their infrequent used and multiple barriers as long as the barrier configurations are maintained using an administrative control program.

(t) ~~(u)~~ Line will be drained and tested with air.

TABLE 6.2-7 (Continued)

NOTES: (Continued)

(u) ~~(w)~~ Flammability Control is a closed loop, safety-grade system required to be functional post accident. Whatever is leaking (if any) is returned to the primary containment. In addition during ILRT, these valves are opened and the lines are subjected to Type-A test.

(v) ~~(w)~~ These lines terminate below the drywell sumps water level and are sealed from the containment atmosphere.

(w) ~~(x)~~ The outboard side of these valves is provided with water leg. In addition, these valves are subject to ASME Section XI IWV leak tests.

Table 6.2-8 Primary Containment Penetration List [2]

Penetration Number	Name	Elevation (mm)	Azimuth (deg)	Offset (mm)	Diameter (mm)	Barrier Type	Testing[1,3]
X-1	U/D Equipment Hatch	19170	130	0	2600	Door	~~A~~ B
X-2	U/D Personnel Hatch	19170	230	0	2400	Door	~~A~~ B
X-3	ISI Hatch	19000	221	0	200	Door	~~A~~ B
X-4	Wetwell Access Hatch	6400	45	0	2000	Door	~~A~~ B
X-5	L/D Personnel Hatch	-650	0	0	2400	Door	~~A~~ B
X-6	L/D Equipment Hatch	-900	180	0	2400	Door	~~A~~ B
X-10A	Mainsteam Line	16300	0	1400	1100		A
X-10B	Mainsteam Line	16300	0	4200	1100		A
X-10C	Mainsteam Line	16300	0	-4200	1100		A
X-10D	Mainsteam Line	16300	0	-1400	1100		A
X-11	Mainsteam Drain	13650	0	5200	600		A
X-12A	Feedwater Line	13810	0	2800	950		A
X-12B	Feedwater Line	13810	0	-2800	950		A
X-22	Borated Water Injection	15250	275	0	40		A
X-30A	Drywell Spray	14500	260	-3400	200		A
X-30B	Drywell Spray	14500	100	3400	200		A
X-31A	HPCF (B)	14500	260	0	600		A
X-31B	HPCF (C)	14500	100	0	600		A
X-32A	LPFL (B)	14500	260	-2000	650		A
X-32B	LPFL (C)	14500	100	-1800	650		A
X-33A	RHR Suction (A)	14550	80	-800	750		A
X-33B	RHR Suction (B)	14550	260	1800	750		A
X-33C	RHR Suction (C)	14550	100	2000	750		A
X-37	RCIC Turbine Steam	14450	80	1200	550		A
X-38	RPV Head Spray	14450	310	1500	550		A
X-50	CUW Pump Feed	14480	310	0	600		A
X-60	MUWP Suction	13550	275	0	50		A
X-61	RCW Suction (A)	13550	45	-2000	200		A
X-62	RCW Return (A)	13550	45	-3000	200		A
X-63	RCW Suction (B)	13550	225	2400	200		A
X-64	RCW Return (B)	13550	225	3400	200		A
X-65	HNCW Suction	13550	225	400	150		A
X-66	HNCW Return	13550	225	1400	150		A
X-69	SA	19000	42	0	25		A
X-70	IA	9000	46	0	50		A
X-71A	ADS Accumulator (A)	19000	50	0	50		A
X-71B	ADS Accumulator (B)	19000	296.5	1000	50		A
X-72	Relief Valve Accumulator	19000	296.5	2000	50		A
X-80	Drywell Purge Suction	13700	68	0	550		A
X-81	Drywell Purge Exhaust	19000	216	0	550		A
X-82	FCS Suction	20100	221	0	100		A
X-90	Spare	20100	46	0	400		A
X-91	Spare	20100	296.5	1000	400		A
X-92	Spare	16400	45	12700	400		A
X-93	Spare	16400	300	0	400		A

6.2.6 (5)

Table 6.2-8 Primary Containment Penetration List [2] (Continued)

6.2.6 (5)

Penetration Number	Name	Elevation (mm)	Azimuth (deg)	Offset (mm)	Diameter (mm)	Barrier Type	Testing[1,3]
X-100A	IP Power	13500	55	-1100	450	O-ring	B
X-100B	IP Power	13500	180	2650	450	O-ring	B
X-100C	IP Power	13500	180	-6550	450	O-ring	B
X-100D	IP Power	13500	280	0	450	O-ring	B
X-100E	IP Power	13500	180	-2650	450	O-ring	B
X-101A	LP Power	16400	45	0	300	O-ring	B
X-101B	LP Power	16400	180	50	300	O-ring	B
X-101C	LP Power	16400	180	-1350	300	O-ring	B
X-101D	FMCRD Power	19000	285	-1350	300	O-ring	B
X-101E	FMCRD Power	19000	75	1350	300	O-ring	B
X-101F	FMCRD Power	19000	257	1350	300	O-ring	B
X-101G	FMCRD Power	19000	103	-1350	300	O-ring	B
X-102A	C & I	16400	45	-1350	300	O-ring	B
X-102B	C & I	16400	180	1350	300	O-ring	B
X-102C	C & I	16400	180	-2650	300	O-ring	B
X-102D	C & I	16400	280	0	300	O-ring	B
X-102E	C & I	[illegible]	45	2700	300	O-ring	B
X-102F	C & I	16400	180	2650	300	O-ring	B
X-102G	C & I	13500	180	-1350	300	O-ring	B
X-102H	FMCRD Control	19000	75	2700	300	O-ring	B
X-102J	FMCRD Control	19000	257	2700	300	O-ring	B
X-103A	C & I	16400	45	1350	300	O-ring	B
X-103B	C & I	13500	180	50	300	O-ring	B
X-103C	C & I	16400	180	-5250	300	O-ring	B
X-104A	FMCRD Position Indicator	19000	75	0	300	O-ring	B
X-104B	FMCRD Position Indicator	19000	257	0	300	O-ring	B
X-104C	FMCRD Position Indicator	19000	103	0	300	O-ring	B
X-104D	FMCRD Position Indicator	19000	285	0	300	O-ring	B
X-104E	FMCRD POsition Indicator	19000	75	-1350	300	O-ring	B
X-104F	FMCRD Position Indicator	19000	257	-1350	300	O-ring	B
X-104G	FMCRD Position Indicator	19000	103	1350	300	O-ring	B
X-104H	FMCRD Position Indicator	19000	285	1350	300	O-ring	B
X-105A	Neutron Detection	13500	55	1000	300	O-ring	B
X-105B	Neutron Detection	13500	180	1350	300	O-ring	B
X-105C	Neutron Detection	13500	180	-5250	300	O-ring	B
X-105D	Neutron Detection	13500	280	1350	300	O-ring	B
X-110	Spare	20100	103	-2700	300	O-ring	B
X-111	Spare	20100	285	-2700	300	O-ring	B
X-112	Spare	16400	45	4050	300	O-ring	B
X-113	Spare	14500	220	0	300	O-ring	B

Table 6.2-8 Primary Containment Penetration List [2] (Continued)

6.2.6 (5)

Penetration Number	Name	Elevation (mm)	Azimuth (deg)	Offset (mm)	Diameter (mm)	Barrier Type	Testing[1,3]
X-130A	C & I	13500	45	0	300	O-ring	B
X-130B	C & I	13500	124	0	300	O-ring	B
X-130C	C & I	13500	212	0	300	O-ring	B
X-130D	C & I	13500	295	0	300	O-ring	B
X-140A	C & I	13500	45	-1000	300	O-ring	B
X-140B	C & I	13500	300	0	300	O-ring	B
X-141A	C & I	13500	63.5	0	300	O-ring	B
X-141B	C & I	13500	208	0	300	O-ring	B
X-142A	C & I	20100	38	0	100	O-ring	B
X-142B	C & I	20100	116	0	100	O-ring	B
X-142C	C & I	20100	244	0	100	O-ring	B
X-142D	C & I	20100	296.5	2000	100	O-ring	B
X-143A	C & I	14700	45	0	100	O-ring	B
X-143B	C & I	14700	124	0	100	O-ring	B
X-143C	C & I	14700	212	0	100	O-ring	B
X-143D	C & I	14700	300	0	100	O-ring	B
X-144A	C & I	12650	45	0	100	O-ring	B
X-144B	C & I	12650	124	0	100	O-ring	B
X-144C	C & I	12650	212	0	100	O-ring	B
X-144D	C & I	12650	300	0	100	O-ring	B
X-146A	C & I	19000	38	0	300	O-ring	B
X-146B	C & I	19000	112	0	300	O-ring	B
X-146C	C & I	19000	248	0	300	O-ring	B
X-146D	C & I	19000	296.5	0	300	O-ring	B
X-147	C & I	20100	248	0	100	O-ring	B
X-160	LDS Monitor	20100	42	0	300	O-ring	B
X-161A	CAMS C & I	14700	45	-1000	250	O-ring	B
X-161B	CAMS C & I	14700	290	0	250	O-ring	B
X-162A	CAMS C & I	19000	116	0	250	O-ring	B
X-162B	CAMS C & I	19000	244	0	250	O-ring	B
X-170	C & I	13500	310	0	100	O-ring	B
X-171	C & I	20100	50	0	300	O-ring	B
X-177	C & I	15900	135	-1200	300	O-ring	B
X-200A	Wetwell Spray	8900	260	0	100		A
X-200B	Wetwell Spray	8900	100	0	100		A
X-201	RHR Pump Suction (A)	-7085	36	0	450		A
X-202	RHR Pump Suction (B)	-7085	216	0	450		A
X-203	RHR Pump Suction (C)	-7085	144	0	450		A
X-204	RHR Pump Test (A)	1200	85	0	250		A
X-205	RHR Pump Test (B)	1200	265	0	250		A
X-206	RHR Pump Test (C)	1200	95	0	250		A
X-210	HPCF Pump Suction (B)	-7085	252	0	400		A
X-211	HPCF Pump Suction (C)	-7085	108	0	400		A

Table 6.2-8 Primary Containment Penetration List[2] (Continued)

6.2.6 (5)

Penetration Number	Name	Elevation (mm)	Azimuth (deg)	Offset (mm)	Diameter (mm)	Barrier Type	Testing[1,3]
X-213	RCIC Turbine Exhaust	5800	60	0	350		A
X-214	RCIC Pump Suction	-7050	72	0	200		A
X-215	RCIC Pump Exhaust				50		A
X-216	SPCU Pump Suction	-7050	306	-1300	200		A
X-217	SPCU Return	1550	340	0	250		A
X-230	Low Conductivity Drain						
X-231	High Conductivity Drain						
X-240	Wetwell Purge Suction	8500	45	500	550		A
X-241	Wetwell Purge Exhaust	9000	230	0	550		A
X-242	FCS Return	800	220	0	150		A
X-243	VGL Exhaust	8850	32	0	50		A
X-250	Spare	8500	45	0	400		A
X-251	Spare	9000	213	0	400		A
X-300A	C & I	6000	132	0	300	O-ring	B
X-300B	C & I	6000	213	0	300	O-ring	B
X-320	C & I	8850	70	0	100	O-ring	B
X-321A	C & I	6000	32	0	300	O-ring	B
X-321B	C & I	6000	220	0	300	O-ring	B
X-322A	C & I	400	75	0	100	O-ring	B
X-322B	C & I	400	285	0	100	O-ring	B
X-322C	C & I	400	80	0	100	O-ring	B
X-322D	C & I	400	105	0	100	O-ring	B
X-322E	C & I	400	255	0	100	O-ring	B
X-322F	C & I	400	280	0	100	O-ring	B
X-323A	C & I	-4700	75	0	100	O-ring	B
X-323B	C & I	-4700	285	0	100	O-ring	B
X-323C	C & I	-6700	80	0	100	O-ring	B
X-323D	C & I	-6700	115	0	100	O-ring	B
X-323E	C & I	-6700	245	0	100	O-ring	B
X-323F	C & I	-6700	280	0	100	O-ring	B
X-324A	Spare						
X-324B	Spare						
X-324C	Spare						
X-324D	Spare						
X-330	LDS Monitor Return	8850	78	0	100	O-ring	B
X-331A	CAMS Gamma Det.	6000	24	0	250	O-ring	B
X-331B	CAMS Gamma Det.	6000	230	0	250	O-ring	B
X-332A	CAMS Sampling Ret.	6000	128	0	300	O-ring	B
X-332B	CAMS Sampling Ret.	6000	224	0	300	O-ring	B
X-334	C & I	8850	74	0	100	O-ring	B
X-341	C & I	Hold			100	O-ring	B
X-342	C & I	Hold			100	O-ring	B

Table 6.2-8 Primary Containment Penetration List [2] (Continued)

6.2.6 (5)

Penetration Number	Name	Elevation (mm)	Azimuth (deg)	Offset (mm)	Diameter (mm)	Barrier Type	Testing[1,3]
X-400A	TIP Drive				95		A
X-400B	TIP Drive				95		A
X-400C	TIP Drive				95		A
X-401	TIP Drive Purge				95		A

Notes:

1. All penetrations will be subject to the Type A test. Those penetrations subject to Type B testing are also tested in the Type A test.
2. This table provided in response to Questions 430.49d & e.
3. All penetrations excluded from Type B testing are welded penetrations and do not include resilient seals in their design.

6.2.6 (5)

Table 6.2-10 Potential Bypass Leakage Paths[1]

6.2.6 (9)a

Item	Name	Diameter (mm)	Termination Region (3)	Leakage Barriers (2)	Potential Bypass Path
X-1	U/D Equipment Hatch	2600	S		No
X-2	U/D Personnel Hatch	2600	S		No
X-3	ISI Hatch	200	S		No
X-4	Wetwell Access Hatch	2000	S		No
X-5	L/D Personnel Hatch	2400	S		No
X-6	L/D Equipment Hatch	2400	S		No
X-10A	Mainsteam Line	1100	E	C	No
X-10B	Mainsteam Line	1100	E	C	No
X-10C	Mainsteam Line	1100	E	C	No
X-10D	Mainsteam Line	1100	E	C	No
X-11	Mainsteam Drain	600	E	C	No
X-12A	Feedwater Line	950	E	C	No
X-12B	Feedwater Line	950	E	C	No
X-22	Borated Water INjection	40	S		No
X-30A	Drywell Spray	200	S		No
X-30B	Drywell Spary	200	S		No
X-31A	HPCF (B)	600	S		No
X-31B	HPCF (C)	600	S		No
X-32A	LPFL (B)	650	S		No
X-32B	LPFL (C)	650	S		No
X-33A	RHR Suction (A)	750	S		No
X-33B	RHR Suction (B)	750	S		No
X-33C	RHR Suction (C)	750	S		No
X-37	RCIC Turbine Steam	550	S		No
X-38	RPV Head Spray	550	S		No
X-50	CUW Pump Feed	600	S		No
X-60	MUWP Suction	50	S		No
X-61	RCW Suction (A)	200	E	C	No
X-62	RCW Return (A)	200	E	C	No
X-63	RCW Suction (B)	200	E	C	No
X-64	RCW Return (B)	200	E	C	No
X-65	HNCW Suction	150	E	C	No
X-66	HNCW Return	150	E	C	No
X-69	SA	25	E	C	No
X-70	IA	50	E	C	No
X-71A	ADS Accumulator (A)	50	S		No
X-71B	ADS Accumulator (B)	50	S		No
X-72	RElief Valve Accum.	150	S		No
X-80	Drywell Purge Suction	550	E	C	No
X-81	Drywell Purge Exhaust	550	E	C	No
X-82	FCS Suction	100	S		No
X-90	Spare	400	P	A	No
X-91	Spare	400	P	A	No
X-92	Spare	400	P	A	No
X-93	Spare	400	P	A	No
X-100A	IP Power	450	S		No
X-100B	IP Power	450	S		No
X-100C	IP Power	450	S		No

Table 6.2-10 Potential Bypass Leakage Paths[1] (Continued)

6.2.6 (9) a

Item	Name	Diameter (mm)	Termination Region (3)	Leakage Barriers (2)	Potential Bypass Path
X-100D	IP Power	450	S		No
X-100E	IP Power	450	S		No
X-101A	LP Power	300	S		No
X-101B	LP Power	300	S		No
X-101C	LP Power	300	S		No
X-101D	FMCRD Power	300	S		No
X-101E	FMCRD Power	300	S		No
X-101F	FMCRD Power	300	S		No
X-101G	FMCRD Power	300	S		No
X-102A	C & I	300	S		No
X-102B	C & I	300	S		No
X-102C	C & I	300	S		No
X-102D	C & I	300	S		No
X-102E	C & I	300	S		No
X-102F	C & I	300	S		No
X-102G	C & I	300	S		No
X-102H	FMCRD Control	300	S		No
X-102J	FMCRD Control	300	S		No
X-103A	C & I	300	S		No
X-103B	C & I	300	S		No
X-103C	C & I	300	S		No
X-104A	FMCRD Pos. Indicator	300	S		No
X-104B	FMCRD Pos. Indicator	300	S		No
X-104C	FMCRD Pos. Indicator	300	S		No
X-104D	FMCRD Pos. Indicator	300	S		No
X-104E	FMCRD Pos. Indicator	300	S		No
X-104F	FMCRD Pos. Indicator	300	S		No
X-104G	FMCRD Pos. Indicator	300	S		No
X-104H	FMCRD Pos. Indicator	300	S		No
X-105A	Neutron Detection	300	S		No
X-105B	Neutron Detection	300	S		No
x-105C	Neutron Indicator	300	S		No
X-105D	Neutron Indicator	300	S		No
X-110	Spare	300	P	A	No
X-111	Spare	300	P	A	No
X-112	Spare	300	P	A	No
X-113	Spare	300	P	A	No
x-130A	C & I	300	S		No
X-130B	C & I	300	S		No
X-130C	C & I	300	S		No
X-130D	C & I	300	S		No
X-140A	C & I	300	S		No
X-140B	C & I	300	S		No
X-141A	C & I	300	S		No
X-141B	C & I	300	S		No
X-142A	C & I	100	S		No
X-142B	C & I	100	S		No
X-142C	C & I	100	S		No
X-142D	C & I	100	S		No

Table 6.2-10 Potential Bypass Leakage Paths[1] (Continued)

Item	Name	Diameter (mm)	Termination Region (3)	Leakage Barriers (2)	Potential Bypass Path
X-143A	C & I	100	S		No
X-143B	C & I	100	S		No
X-143C	C & I	100	S		No
X-143D	C & I	100	S		No
X-144A	C & I	100	S		No
X-144B	C & I	100	S		No
X-144C	C & I	100	S		No
X-144D	C & I	100	S		No
X-146A	C & I	300	S		No

6.2.6 (9)a

Notes:

1. This Table provided in response to Question 430.52b.

2. A) Penetration is capped
   B) Terminates at Primary Containment Wall
   C) Terminates inside Secondary Containment
   D) Terminates outside Secondary Containment
   E) Redundant Containment Isolation Valves

6.2.6 (9)a

3. E - Environment
   P - Primary containment
   S - Secondary containment

system is designed to provide and maintain an environment with controlled temperature and humidity to ensure both comfort and safety of the operators and the integrity of the control room components.

(2) Provisions for periodic inspection, testing and maintenance of the principal components shall be a part of the design requirements.

6.4.2 System Design

Figure 9.4-1 provides the flow diagrams describing the control building HVAC system. Heating, cooling and pressurizing the control building, and filtering the air therein, is fully described in Section 9.4.1, wherein function is discussed and equipment is listed.

6.4.2.1 Control Building Envelope

The control building spaces within the envelope supplied by the HVAC habitability systems includes:

(1) control room proper including the critical document file;

(2) computer room;

(3) control equipment room;

(4) upper and lower corridors;

(5) elevator shaft and stair wells;

(6) office and chart room;

(7) kitchen and lunch rooms;

(8) instrument repair room;

(9) sleeping area

(10) men's lavatory;

(11) women's lavatory and lounge;

(12) HVAC mechanical equipment rooms.

9.125 Of these spaces, all but the mechanical equipment room are maintained at a positive pressure of ~~+0.1~~ to +0.5 in. of water gage pressure at all times. The mechanical equipment room is maintained at 0.0 to +0.5 in. of water gage. Pressure control dampers at the inlet of the ventilation system maintain these pressures. These spaces constitute the operation, living and environmental control areas and can be isolated for an extended period if such is required by the existence of a LOCA or high radiation condition. 6.4(4)

~~Frequent access to spaces numbered (1), (2), (3), (5), (6), (7), (8), (9), (10), and (11) during both normal and emergency conditions are safe for extended human occupancy.~~ No occupancy is expected in spaces numbered 4 and 12 during an emergency mode of operation.

6.4.2.2 Ventilation System Design

The design, construction and operation of the control building HVAC system are described in detail in Subsection 9.4.1. Figure 9.4-1 is a diagram of the control building HVAC system, showing major components, seismic classifications and instrumentation.

Description of the charcoal filters is given in Subsection 9.4.1.

Description of control room instrumentation for monitoring of radioactivity is given in Subsections 11.5.2 and 12.3.4.

A description of the smoke detectors is in Subsection 9.5.1.

6.4.2.2.1 Control Room Drawings

Layout drawings of the control room and the remainder of the control building are given in Section 1.2.

6.4.2.2.2 Release Points

Release points (SGTS vent) are shown in Figure 6.4-1 (plan view). The air intakes are well above grade. Elevation of other structures is seen in Figures 1.2-9 and 1.2-10. 430.54f ventilation exhaust, the SGTS is automatically actuated. If system operation is not confirmed, the redundant process fan and dryer train are automatically placed into service. In the event a malfunction disables an operating process fan or dryer train, the standby process fan and dryer train are manually initiated.

6.5.1.2.3.2 Manual

The SGTS is on standby during normal plant operation and may be manually initiated before or during primary containment purging (de-inerting) when required to limit the discharge of contaminants to the environment. It may be manually initiated whenever its use may be needed to avoid exceeding radiation monitor setpoints.

6.5.1.2.3.3 Decay Heat Removal

Cooling of the SGTS filters may be required to prevent the gradual accumulation of decay heat in the charcoal. This heat is generated by the decay of radioactive iodine adsorbed on the SGTS charcoal. The charcoal is typically cooled by the air from the process fan.

A water deluge capability is also provided, but primarily for fire protection since redundant process fans are provided for air cooling. Since the deluge is available, it may also be used to remove decay heat for sequences outside the normal design basis. Temperature instrumentation is provided for control of the SGTS process and space electric heaters. This instrumentation may also be used by the operator to [re-]establish a cooling air flow post-accident, if required.

Water is supplied from the fire protection system and is connected to the SGTS via a spool piece.

6.5.1.3 Design Evaluation

6.5.1.3.1 General

(1) A slight negative pressure is normally maintained in the secondary containment by the reactor building HVAC system (Subsection 9.4.5). On SGTS initiation per Subsection 6.5.1.2.3.1, the secondary containment is automatically isolated from the HVAC system.

(2) The SGTS filter particulate and charcoal efficiencies are outlined in Table 6.5-1. Dose analyses of events requiring SGTS operation, described in Subsections 15.6.5 and 15.7.4, indicate that offsite doses are within the limits established by 10 CFR 100.

(3) The SGTS is designated as an engineered safety feature since it mitigates the consequences of a postulated accident by controlling and reducing the release of radioactivity to the environment. The SGTS, except for the deluge, is designed and built to the requirements for Safety Class 3 equipment as defined in Section 3.2, and 10 CFR 50, Appendix B.

The SGTS has independent, redundant active components. Should any active component fail, SGTS functions can be performed by the redundant component. The electrical devices of independent components are powered from separate Class 1E electrical buses.

(4) The SGTS is designed to Seismic Category I requirements as specified in Section 3.2. The SGTS is housed in a Category I structure. All surrounding equipment, components, and supports are designed to appropriate safety class and seismic requirements.

(5) The SGTS design is based on the maximum pressure and differential pressure, maximum integrated dose rate, maximum relative humidity, and maximum temperature expected in secondary containment for the LOCA event. 6.2.6 (9)

6.5.1.3.2 Sizing Basis

Figure 6.5-2 provides an assessment of the secondary containment pressure after the design-basis LOCA assuming an SGTS fan capacity of 4000 scfm (70°F, 1 atmosphere) per fan and the leakage rates shown in Table 6.5-2. Credit for secondary containment as a fission product control system is only taken if the secondary containment is actually at a negative pressure by considering the potential effect of wind on the ambient pressure in the vicinity of the reactor building. For the ABWR dose analysis, direct transport of containment leakage to the environment was assumed for the first 20 minutes after LOCA event initiation (in addition to the leakage through the MSIVs to the main turbine condenser). Each SGTS fan was sized to establish a continuously negative differential pressure (considering the

(c) MUWC transfer pumps (see Table 9.2-3) (three 550 gpm at 141 psi head.)

(3) Water can be sent to the CST from the following sources:

(a) MUWP pumps

(b) CRD system

(c) radwaste disposal system

(d) condensate demineralizer system effluent (main condenser high level relief)

(4) Associated receiving and distribution piping valves, instruments, and controls shall be provided.

(5) Overflow and drain from the CST shall be sent to the radwaste system for treatment.

(6) Any outdoor piping shall be protected from freezing.

(7) All surfaces coming in contact with the condensate shall be made of corrosion-resistant materials.

(8) All of the pumps mentioned in (2) above shall be located at an elevation such that adequate suction head is present at all water levels in the CST.

(9) Instrumentation shall be provided to indicate CST water level in the main control room.

(10) Potential flooding is discussed in Subsection 3.4. Potential flooding from lines within the reactor building and the control building are evaluated in Subsection 3.4.1.1.1.

9.2.9.3 Safety Evaluation

Operation of the MUWC system is not required to assure any of the following conditions:

(1) integrity of the reactor coolant pressure boundary;

(2) capability to shut down the reactor and maintain it in a safe shutdown condition; or

(3) ability to prevent or mitigate the consequences of events that could result in potential offsite exposures.

The MUWC system is not safety-related. However, the systems incorporate features that assure reliable operation over the full range of normal plant operations.

9.2.9.4 Tests and Inspections

The MUWC system is proved operable by its use during normal plant operation. Portions of the system normally closed to flow can be tested to ensure operability and the integrity of the system.

The air-operated isolation valves are capable of being tested to assure their operating integrity by manual actuation of a switch located in the control room and by observation of associated position indication lights.

Flow to the various systems is balanced by means of manual valves at the individual takeoff points. Divisional isolation valves are installed at the primary containment boundaries.

9.2.10 Makeup Water System (Purified) Distribution System

9.2.10.1 Design Bases

(1) The makeup water-purified (MUWP) distribution system shall provide makeup water purified for makeup to the reactor coolant system and plant auxiliary systems.

(2) The MUWP system shall provide purified water to the uses shown in Table 9.2-2.

(3) The MUWP system shall provide water of the quality shown in Table 9.2-2a. ^ * 41051

(4) The MUWP system is not safety-related.

(5) All tanks, pumps, piping, and other equipment shall be made of corrosion-resis- 9.2.10 (5b)

* If these water quality requirements are not met, the water shall not be used in any safety-related system. The out-of-spec water shall be reprocessed or discharged.

tant materials.

(6) The system shall be designed to prevent any radioactive contamination of the purified water.

(7) The interfaces between the MUWP system and all safety-related systems located in the control building or reator building which are Seismic Category I, tornado-missile resistant and flood protected structures.

(8) Safey-related equipment located by portions of the MUWP system are in Seismic Category I structures and protected from all system impact.

9.2.10.2 System Description

The MUWP system P&ID is shown in Figure 9.2-5. This system includes the following:

(1) A purified water storage tank shall be provided outdoors with adequate freeze protection and adequate diking and other means to control spill and leakage.

(2) Two MUWP forwarding pumps shall take suction from the purified water storage tanks. They shall have a capacity of 308 gpm and a discharge head of 114 psi.

(3) Distribution piping, valves, instruments and controls shall be provided.

(4) Any outdoor piping shall be protected from freezing.

(5) All surfaces coming in contact with the purified water shall be made of corrosion-resistant materials.

(6) All pumps shall be located at an elevation such that adequate suction head is present at all levels in the purified water storage tanks.

(7) Instruments shall be provided to indicate purified water storage tank level in the main control room.

(8) Continuous analyzers are located at the demineralized water makeup system and at the demineralized water storage tank. These are supplemented as needed by grab samples. Allowance is made in the water quality specifications for some pickup of carbon dioxide and air in the demineralized water storage tank. The pickup of corrision products should be minimal because the MUWP piping is stainless steel.

(9) Intrusions of radioactivity into the MUWP system from other potentially radioactive systems are prevented by one or more of the following:

(a) check valves in the MUWP lines

(b) air (or syphon) breaks in the MUWP lines

(c) the MUWP system lines are pressurized while the receiving system is at essentially atmospheric pressure.

(d) piping to the user is dead ended.

(10) There are no automatic valves in the MUWP system. During a LOCA, the safety-related systems are isolated from the MUWP system by automatic valves in the safety-related system.

9.2.10.3 Safety Evaluation

Operation of the MUWP system is not required to assure any of the following conditions:

(1) integrity of the reactor coolant pressure boundary;

(2) capability to shut down the reactor and maintain it in a safe shutdown condition; or

(3) ability to prevent or mitigate the consequences of events which could result in potential offsite exposures.

The MUWP system is not safety-related. However, the systems incorporate features that assure reliable operation over the full range of normal plant operations.

9.2.10.4 Tests and Inspections

The makeup water purified distribution system is proved operable by its use during normal plant operation. Portions of the system

9.2.10 (1) * The interfaces with safety-related systems are safety-related valves which are part of the safety-related systems.

System components and piping materials are selected where required to be compatible with the available site cooling water in order to minimize corrosion. Cathodic protection of the tubing side of the heat exchanger shall be provided. Adequate corrosion safety factors are used to assure the integrity of the system during the life of the plant.

During all plant operating modes, all divisions have at least one RCW cooling water pump operating. Therefore, if a LOCA occurs, the RCW cooling water system required to shut down the plant safely is already in operation. If a loss of offsite power occurs during a LOCA, the pumps momentarily stop until transfer to standby diesel generator power is completed. The pumps are restarted automatically according to the diesel loading sequence. If a LOCA occurs, most nonsafety-related components are automatically isolated from the RCW system. Consequently, no operator action is required, following a LOCA, to start the RCW system in its LOCA operating mode.

All heat exchangers and pumps will be required during the following plant operating conditions, in addition to LOCA: shutdown at 4 hours, shutdown at 20 hours and hot standby with loss of AC power.

Loss of one RCW division will result in loss of RCW cooling to every other RIP (five total) as shown on RRS P&ID (Figure 5.4-4) and will cause those five RIPs to runback to minimum speed. The RIP M-G set in the same electrical division, which is cooled by the same RCW division which failed and powers two more RIPs, would stop by M-G set cooling water prptection. This would completely shutdown three RIPs and would have the resul [illegible] of seven RIPs either at minimum spee [illegible] Assuming the event began at full p [illegible] 100% Control Rod Line, the resu [illegible] rary reactor power would be appr [illegible] % power. The operator would then corre [illegible] V problem or initiate a normal plant shutdown.

The drywell cooling system can perform its function after the loss of any RCW division. With only one RCW division and one drywell cooler operating, the drywell temperature will increase but not to a temperature that would damage equipment or require an immediate shutdown.

9.2.11.4 Testing and Inspection Requirements

The RCW system is designed to permit periodic in-service inspection of all system components to assure the integrity and capability of the system.

The RCW system is designed for periodic pressure and functional testing to assure: (1) the structural and leaktight integrity by visible inspection of the components; (2) the operability and the performance of the active components of the system; and (3) the operability of the system as a whole.

The tests shall assure, under conditions as close to design as practical, the performance of the full operational sequence that brings the system into operation for reactor shutdown and for LOCA, including operating of applicable portions of the Reactor Protection System and the transfer between normal and standby power sources.

9.2.11 (2)

INSERT 9.2.11.14

The RCW system is supplied with a chemical addition tank to add chemicals to each division. The RCW system is initially filled with demineralized water. A corrosion inhibitor can be added if desired. These measures are adequate to protect the RCW system from the ill effects of corrosion or organic fouling.

The RCW system is designed to conform with the foregoing requirements. Initial tests shall be made as described in Subsection 14.2.12.

9.2.11.5 Instrumentation and Control Requirements

All equipment is provided with either globe or butterfly valves to give the capability for manual control. These valves are accessible downstream of the equipment for regulation of flow through the equipment or for balancing the circuits. The isolation valves to the nonessential RCW system are automatically and remote-manually operated.

9.2.11
(2)

INSERT 9.2.11.14

These tests shall include periodic testing of the heat removal capability of each RCW heat exchanger. Each of these heat exchangers has been designed to provide 20% margin above the heat removal capability required for LOCA in Tables 9.2-4 a, b and c. This margin is provided to compensate for the combined effects of fouling and tube plugging. When this margin is no longer present, the heat exchanger heat removal capacity will be increased by either cleaning or retubing.

9.2.12 HVAC Normal Cooling Water System

9.2.12.1 Design Bases

9.2.12.1.1 Power Generation Design Bases

The HVAC normal cooling water system (nonsafety-related) shall provide chilled water to the cooling coils of the drywell coolers, of each building supply unit and of local air conditioners to maintain design thermal environments during normal and upset conditions. The supply temperature is 44.6°F. The return temperature is 53.6°F.

9.2.12.1.2 Safety Design Bases

The HVAC normal cooling water system does not perform any safety functions, except for the containment penetration and isolation valves.

9.2.12.2 System Description

The HVAC normal cooling water system components are listed in Table 9.2-6 and shown in Figure 9.2-2.

System components consist of five 25% chillers, each with pumps, serving a common chilled water distribution system connected to the chilled water cooling coils in the drywell coolers, the cooling coils of each building supply unit and cooling coils of local air conditioners. Condenser cooling is from the turbine building cooling water system. Each chiller and pump set has either a three-way mixing valve for automatically controlling the temperature of the chilled water delivered or a flow control valve to maintain the desired temperature. Each chiller evaporator is designed, fabricated and certified in accordance with the ASME Code Section VIII, Division 1. A chemical feed tank is provided. Makeup water is from the turbine building cooling water system surge tank which receives water from the MUWP system. Isolation valves and piping for primary containment penetrations are designed to seismic Category I, ASME code, Section III, class 2, Quality Group B, Quality Assurance B requirements. The supply line penetration has a Division 1 isolation valve outside containment and Class 2 piping into the drywell. The return line penetration has divisional isolation valves inside and outside containment. These valves are motor operated.

No diesel-generator power is available to this system during a LOPP or a LOCA.

9.2.12.3 Safety Evaluation

Operation of the HVAC normal cooling water system is not required to assure the following conditions:

(1) integrity of the reactor coolant pressure boundary;

(2) capability to shut down the reactor and maintain it in a safe shutdown condition; and

(3) ability to prevent or mitigate the consequences of events which could result in potential offsite radiological exposures.

The HVAC normal cooling water system is not safety-related. However, it does incorporate features that assume reliable operation over the full range of normal plant operations.

Portions of the chilled water system which penetrate the primary containment ~~and drywell~~ are provided with isolation valves and penetrations which are Seismic Category I, Safety class 2. The valves may be manually operated from the control room, except when a LOCA signal assumes control.

9.2.12 (1) Part b

(3) The system shall be designed and constructed in accordance with Seismic Category I, ASME code, Section III, Class 3 requirements.

(4) The system shall be powered from Class 1E buses.

(5) The HECW system shall be protected from missiles in accordance with Subsection 3.5.1.

(6) Design features to preclude the adverse effects of water hammer are in accordance with the SRP section addressing the resolution of USI A-1 discussed in NUREG-0927.

INSERT 9.2.13.1.2 →

(7) The HECW system shall be protected from failures of high and medium energy lines as discussed in Section 3.6.

9.2.13 (2)

9.2.13.2 System Description

The HVAC emergency cooling water system consists of redundant subsystems in three divisions. Each division consists of two 50% chiller units, two 50% pumps, instrumentation and distribution piping and valves to corresponding cooling coils. A chemical addition tank is shared by all HECW divisions. Each HECW division shares a surge tank with the corresponding division of the RCW system. The chiller capacity is designed to cool all heat loads with two chillers, but also cool the heat load of the main control room with one chiller.

Equipment is listed in Table 9.2-9. Each cooling coil has a three-way valve controlled by a room thermostat. Alternately, flow may be controlled by a temperature control valve. The subsystems are designated Division I and Division II power, respectively. One compressor is the operating unit, while the other is on standby. Condenser cooling is from the corresponding division of RCW.

Piping and valves for the HECW system, as well as the cooling water lines from the RCW system, designed entirely to ASME Code, Section III, Class 3, Quality Group C, Quality Assurance B requirements. The extent of this classification is up to and including drainage block valves. There are not primary or secondary containment penetrations within the system. The HECW system is not expected to contain radioactivity.

High temperature of the returned cooling water causes the standby chiller unit to start automatically. Makeup water is supplied from the MUWP system, at the surge tank. Each surge tank has the capacity to replace system water losses for more than 100 days during an emergency.

9.2.13.3 Safety Evaluation

The HECW system is a Seismic Category I system, protected from flooding and tornado missiles. All components of the system are designed to be operable during a loss of normal power by connection to the ESF buses. Redundant components are provided to ensure that any single component failure does not preclude system operation. The system is designed to meet the requirements of Criterion 19 of 10CFR50. Each chiller is isolated in a separate room.

9.2.13.4 Tests and Inspection

Initial testing of the system includes performance testing of the chillers, pumps and coils for conformance with design capacity water flows and heat transfer capabilities. An integrity test is performed on the system upon completion.

The HECW system is designed to permit periodic in-service inspection of all system components to assure the integrity and capability of the system.

The HECW system is designed for periodic pressure and functional testing to assure: (1) the structural and leaktight integrity by ~~visible~~ inspection of the components; (2) ~~the~~ operability and the performance of the active components of the system; and (3) the operability of the system as a whole. — visual 9.2.13 (8)

Local display devices are provided to indicate all vital parameters required in testing and inspections. Standby features are periodically tested by initiating the transfer sequence during normal operation.

9.2.13
(7)

INSERT 9.2.13.1.2

These features shall include:

(a) an elevated surge tank to keep the system filled,
(b) vents provided at all high points in the system,
(c) after any system drainage, venting is assured by personnel training and procedures and
(d) system valves are slow acting.

9.2.17 Interfaces

9.2.17.1 Ultimate Heat Sink Capability

Interface requirements pertaining to ultimate heat sink capability are delineated in Subsection 9.2.5 as follows:

430.204

Subsection	Title
9.2.5.1	Safety Design Bases
9.2.5.2	Power Generation Design Bases
9.2.5.6	Evaluation of UHS Performance
9.2.5.7	Safety Evaluation
9.2.5.8	Conformance to Regulatory Guide 1.27
9.2.5.9	Instrumentation and Alarms
9.2.5.10	Tests and Inspections

9.2.17.2 Makeup Water System Capability

The raw water treatment and preparation of the demineralized water is sent to the makeup water system (purified) described in Subsection 9.2.10.

INSERT 9.2.17.2 (9.2.10 (1))

430.205 The makeup water preparation system shall be located in a building which does not contain any safety-related structures, systems or components. If the system is not available, demineralized water can be obtained from mobile equipment. The system shall be designed so that any failure in the system, including any that cause flooding, shall not result in the failure of any safety-related structure, system or component.

9.2.17.3 Potable and Sanitary Water System

430.201 The potable and sanitary water system shall be designed with no interconnections with systems having the potential for containing radioactive materials. Protection shall be provided through the use of air gaps, where necessary. (See Subsection 9.2.4).

INSERT 9.2.17.2

The demineralized water preparation system shall consist of at least two divisions capable of producing at least 200 gpm of demineralized water each. Storage of demineralized water shall be a least 200,000 gallons. If additional demineralized water is needed during peak usage periods, rented portable demineralizers shall be used as required.

9.2.10
(1)

TABLE 9.2-2a

WATER QUALITY CHARACTERISTICS FOR THE MAKEUP WATER SYSTEM (PURIFIED)

WATER QUALITY PARAMETER		Operating Target	System Design	Maximum Value
Chloride ppb)		10.0	20.0	100.0
Sulfate (ppb)		10.0	20.0	100.0
Conductivity* at 25°C (uS/cm)		0.2	0.3	1.0
Silica (ppb as SiO_2)		10.0	20.0	100.0
pH at 25°C	min	6.4	6.2	5.6
	max	7.8	8.0	8.6
Corrosion Product Metals (ppb)				
Fe insoluble				
soluble				
Cu total		10.0	20.0	100.0
all other metals				
sum		10.0	20.0	100.0
Organic Impurities**				
Equivalent K (uS/cm)		0.2	0.4	2.0

* Does not include an incremental conductivity value of 0.8 uS/cm at 25°C due to carbon dioxide from air in water stored in tanks open to the atmosphere.

** Organic impurity values apply to fresh makeup water stored in ~~the~~ any Demineralized Water Storage Tank.

9.2.10 (1)

410.52

9.4 AIR CONDITIONING HEATING, COOLING AND VENTILATION SYSTEMS

9.4.1 Control Building HVAC

The control building heating,ventilating and air-conditioning (HVAC) system is divided into two separate systems. A HVAC system for the control room equipment on the top two floors. Plus a HVAC system for essential electrical and heat exhanger equipment.

9.4.1.1 Control Room Equipment HVAC

9.4.1.1.1 Design Basis

(1) The control room (HVAC) system is designed with sufficient redundancy to ensure operation under emergency conditions assuming the single failure of any one active component.

(2) Provisions are made in the system to detect and limit the introduction of airborne radioactive material in the control room.

(3) Provisions is made in the system to detect and remove smoke and radioactive material from the control room.

(4) The HVAC system is designed to provide a controlled temperature environment to ensure the continued operation of safety-related equipment under accident conditions.

(5) The HVAC system and components are located in a Seismic Category I structure that is tornado-missile and flood protected.

9.4.1.1.2 Power Generation Design Basis

(1) The HVAC system is designed to provide an environment with controlled temperature and humidity to ensure both the comfort and safety of the operators. The nominal design conditions for the control room environment are 75°F and 50% relative humidity.

(2) The system is designed to permit periodic inspection of the principal system components.

(3) The outside design conditions for the control room HVAC system are 115°F during the summer and -40°F during the winter.

9.4.1.1.3 System Description

The control room is heated, cooled and pressurized by a recirculated air system with filtered outdoor air for ventilation and pressurization purposes. The recirculated air and the outdoor air will be mixed and drawn through a filter section, a heating coil section, and a cooling coil section. Under normal conditions, sufficient air is supplied to pressurize the control room and exfiltrate to pressurize the control building.

The control building HVAC P&ID is shown in Figure 9.4-1. The control room flow rate is given in Table 9.4-3, and the system component descriptions are given in Table 9.4-4. The control building recirculation unit consists of a prefilter section, a high efficient section, an electric heater, a cooling coil, two 50% capacity supply fans.

Two 50% capacity return exhaust fans draw air from the electrical area, corridors, control room, computer room, office areas, and the HVAC equipment room. This air is returned to the air conditioning unit during normal operations. Modulating dampers in the return duct work to the fans are controlled by a pressure controller to maintain the required positive pressure. The controller is located in the electrical equipment area. During smoke removal mode, both fans are turned on and the air is discharged to atmosphere.

2 6.4 CII

An emergency recirculation system consisting of an electrical heating coil, a prefilter, HEPA filter, charcoal adsorber, and HEPA filter with a booster fan, is provided parallel to the normal mixed outdoor and return air path to the supply conditioning units. The charcoal adsorber will be 6 inches deep as a minimum. The system is normally on standby for use only during high radiation. A radioactivity monitoring system monitors the building intakes for radiation. The radiation monitor allows the control room operator to select the safest intake. The makeup air for pressurization can be diverted through the HEPA and charcoal adsorbing system before distribution in the control room areas.

Smoke detectors in the control room and the control equipment room exhaust systems actuate an

12.2.2.3 Airborne Sources During Refueling

The airborne radioactivity during refueling in the containment is expected to be similar to that observed in operating stations. Experience at operating BWR has shown that airborne radioactivity can result from the water in the reactor cavity exceeding 100°F and flaking of cobalt dioxide (CoO_2) from the dryer and separator if their surfaces are allowed to dry. Other potential airborne sources could occur during vessel head venting and fuel movement. The airborne radioactive material sources resulting from reactor vessel head and internals removal have been determined from operating plant experience. The major radioisotopes found were I-131, Co-60, and Mn-54, with Nb-95, Zr-95, Ru-103, and Ce-144 at moderate concentrations, and with Ce-141, Cs-137, Co-58, and Cr-51 at low concentrations. The radioactive particulates ranged as high as 2×10^{-8} μCi/cc and the I-131 as high as 4×10^{-8} μCi/cc.

To minimize the containment airborne radioactivity contribution due to removal of the reactor pressure vessel head:

(1) the steam dryer and separator surfaces will be kept wet or covered;

(2) the fuel pools are cooled through heat exchangers of large capacity; and the

(3) ventilation system on the refueling pool is designed to sweep air from the pool surface and remove a large portion of potential airborne contamination.

12.2.2.4 Average Annual Doses

For compliance with 10CFR50 Appendix I, evaluations have been made to determine average annual doses to unrestricted areas subject to airborne and liquid releases. For airborne dose calculations, isotopic release were taken from Table 12.2-20 assuming a 0.5 mile exclusion boundary. Releases were assumed from plant stack since all major (reactor building, turbine building and radwaste building) ventilation systems pipe to the stack for normal releases. Since a site meteorology is not definitively defined, astatistical approach was used to evaluate the releases over a series of metrologies discussed in References 6 and 7. Doses were calculated using methodologies and conversion factors consistent with Regulatory Guides 1.109 and 1.111 as implemented in references 8 and 9. The results of the airborne evaluations is given in Table 12.2-21. For the ingestion doses given in Table 12.2-21, ingestion values given in Table E-5 of Regulatory Guide 1.109 were used. Liquid doses were based upon releases given in Table 12.2-22 and were evaluated using methodologies consistent with Regulatory Guide 1.113 as implemented at in reference 10. The results of the liquid release are given in Table 12.2-23.

12.2.~~3~~ 4 References

← INSERT 12.2.3

3.11 (3)

1. J.E. Smith, *Noble Gas Experience in Boiling Water Reactors*, Paper No. A-54, presented at Noble Gases Symposium, Las Vegas, Nevada, September 24, 1974.

2. *Airborne Releases from BWRs for Environmental Impact Evaluations*, NEDO-21159-2 (1977).

3. American Nuclear Society, ANS-18.1, Table 5.

4. *Airborne Releases from BWRs for Environmental Impact Evaluations*, NEDO-21159 March 1976.

5. *Calculation of Releases of Radioactive Materials in Gaseous and Liquid Effluents from Boiling Water Reactors* (BWR-GALE Code) U.S. NRC NUREG-0016 Rev. 1, January 1979.

6. I. Hall, et al, *Generation of Typical Meteorological Years for 26 SOLMET Stations*, Scandia National Laboratory Report SAND78-1601 (1978).

INSERT 12.2.3

3.11 (3)

12.2.3 Interfaces

12.2.3.1 10CFR20 and GDC61 Compliance

Applicants referencing the ABWR design will provide source tables and operational criteria to insure compliance with respect to worker restrictions of 10CFR20 and GDC61.

RESPONSE 410.9

No local barriers or shields outside the containment are used for mitigating missile effects. Each safety-related system is contained in its own room of a Seismic Category I building. The walls, floor and ceiling of this room act as the missile barrier or shield from missiles generated outside this room.

For non-safety related components, no local shields and barriers are required. Non-safety-related components are arranged in such a way that any missile generating component is in a separate room away from safety-related components.

(3.5.1.1 (1))

RESPONSE 410.46

The surge volume of the system is within the condensate storage tank (CST). The capacity requirements of the CST are in Table 9.2-3. Section 3.4 demonstrates that failure of the CST will not lead to unacceptable results. "HPCF pumps" means the high pressure core flooder pumps.

QUESTION 410.47

Describe the design features provided in the system and/or interfacing components to ensure automatic switchover of the suction of the applicable pumps to safety-related water sources, if so required. (9.2.9)

RESPONSE 410.47

Level sensing elements and transmitters are provided for the condensate storage tank (CST). Signals are sent to the HPCF, RCIC and ~~SPCU~~ pumps to provide automatic switchover to the suppression pool when sufficient water is not available in the CST. The switchover of the SPCU pumps is manual.

9.2.9(2)

QUESTION 410.48

Discuss conformance of the MUWC systems design with the requirements 10 CFR 50.63, "Loss of all Alternating Current Power." Specifically include the system's capacity and capability to ensure core cooling by removing decay heat independent of preferred and onsite emergency ac power in the event of a station blackout for the specified duration, in accordance with guidelines of Regulatory Guide 1.55, "Station Blackout," Positions C.3.2 through C.3.5, as applicable. (9.2.9)

RESPONSE 410.48

The condensate storage tank (CST) is designed to provide approximately 150,000 gallons of water for use during station blackout. Other consumers of condensate are switched to other water sources so that this volume of water is always available during power operation. This volume of water is sufficient for operation of the RCIC system to remove decay heat during the first eight hours of station blackout.

QUESTION 410.49

Discuss compliance of the system with Positions C1 and C2 of Regulatory Guide 1.29. (9.2.9)

RESPONSE 410.49

The normal secured source of water for decay heat removal is the suppression pool. The condensate storage tank (CST) is used in preference to the suppression pool because the water quality is normally better. As a result the CST is not required to be Seismic Category I.

QUESTION 410.50

Provide P&IDs for the Demineralized Water Makeup System (i.e., Makeup Water System (Purified) (MUWP)). (9.2.10)

RESPONSE 410.50

The MUWP P&ID is provided as Figure 9.2-5.