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MFN 08-730

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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 248 Related to ESBWR Design Certification Application - Containment Systems - RAI Numbers 6.2-138 S02 and 6.2-157 S02**

Enclosure 1 contains the GE Hitachi Nuclear Energy (GEH) responses to the subject NRC RAIs originally transmitted via the Reference 1 and 2 letters, and supplemented by NRC requests for clarification in References 3, 4, and 5. DCD Markups related to these responses are provided in Enclosures 2 and 3, respectively.

If you have any questions or require additional information, please contact me.

Sincerely,

Richard E. Kingston

Richard E. Kingston
Vice President, ESBWR Licensing

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NRO

References:

1. MFN 06-419, Letter from U.S. Nuclear Regulatory Commission to David H. Hinds, *Request for Additional Information Letter No. 80 Related to ESBWR Design Certification Application*, November 2, 2006
2. MFN 07-327, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 100 Related to ESBWR Design Certification Application*, May 30, 2007
3. MFN 08-118, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 151 Related to ESBWR Design Certification Application*, February 7, 2008
4. MFN 08-475, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 200 Related to ESBWR Design Certification Application*, May 13, 2008
5. MFN 08-671, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 248 Related to ESBWR Design Certification Application*, August 27, 2008

Enclosures:

1. MFN 08-730 - Response to Portion of NRC Request for Additional Information Letter No. 248 Related to ESBWR Design Certification Application - Containment Systems - RAI Numbers 6.2-138 S02 and 6.2-157 S02
2. MFN 08-730 - Response to Portion of NRC Request for Additional Information Letter No. 248 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-138 S02 - DCD Markups
3. MFN 08-730 - Response to Portion of NRC Request for Additional Information Letter No. 248 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-157 S02 - DCD Markups

cc:	AE Cubbage	USNRC (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	RE Brown	GEH/Wilmington (with enclosures)
	eDRF	RAI 6.2-138 S02: 0000-0091-9567
		RAI 6.2-157 S02: 0000-0090-4878

Enclosure 1

MFN 08-730

Response to Portion of NRC Request for Additional Information Letter No. 248 Related to ESBWR Design Certification Application

Containment Systems

RAI Numbers 6.2-138 S02 and 6.2-157 S02

NRC RAI 6.2-138 S02:

GEH's response to RAI 6.2-138 S01 indicated that the maximum hydrogen concentration and the hydrogen production rate at 72-hours are established based on existing analyses. As noted in the response, there are sufficient details available that a bounding, though preliminary, design of the passive autocatalytic recombiner (PAR) System (minimum number and size, and locations (upper and/or lower) in the drywell and the wetwell) can be accomplished.

Please provide this information in Section 6.2.5 of the DCD, and create an ITAAC item to ensure the final design meets the criteria in the DCD.

GEH Response:

GEH agrees with this request, and will add the requested information for the passive autocatylitic recombiners (PARs) to the DCD.

The GEH detailed design of the PARs will include provisions for a nominal two full size equivalent PARs in containment. The PARs will be located and spaced using the criteria specified in the response to RAI 6.2-138 S01 (MFN 08-602, dated July 28, 2008). The bounding number of PARs to be utilized will be one full size PAR unit in each containment compartment for a total of two PARs. For PAR sizing, the hydrogen depletion rate of the installed PARs will be twice the maximum hydrogen generation rate at 72 hours. The maximum hydrogen generation rate is 0.32 kg/h. The hydrogen depletion rate of a full size PAR is nominally 0.8 kg/h with the smaller, fractionally sized units having a capacity in direct ratio to the full size unit. With this design, each containment compartment will have a minimum safety factor of two. Based on other design considerations, the number and sizing of PARs will be in line with a higher quantity of smaller sized PAR units and may differ slightly for the drywell or the wetwell.

DCD Impact:

DCD Tier 1, Subsection 2.15.8 and Table 2.15.8-1, will be added, and DCD Tier 2, Subsection 6.2.5.1, will be revised, as noted in the attached markup.

NRC RAI 6.2-157 S02:

In response to Item 7 of RAI 6.2-157 S01, GEH invoked Section 3.11.9.6 of NEDE-33271P, "NP-2010 COL Demonstration Project: Project Design Manual (PDM)," and provided an excerpt describing the design considerations in locating the containment isolation valves. GEH also credited the use of the PDM as guidance for future detailed design, and stated that the pipe length between the containment and the containment isolation valve is the COL holder item. Thus, no ITAAC is required.

The staff finds the proposed design criteria for locating the pipes to be reasonable. However, the response provided by GEH does not allow a safety conclusion that the ESBWR complies with GDC 55, 56, and 57. In addition, in Standard Review Plan Subsection 14.3-11.II, "Containment Systems and Severe Accidents (Tier 1)," the acceptance criteria for ITAAC includes: "...The reviewer should primarily utilize the SRP sections related to containment systems in its review of Tier 1 to determine the safety significance of SSCs. Other sources include applicable rules and regulations, GDCs, RGs, USIs and GSIs, ...".

Therefore, GEH must include the appropriate design in the DCD to demonstrate compliance to GDC 55, 56, and 57, and an ITAAC item must also be added to ensure that the detailed design complies with the guidance provided in the DCD.

GEH Response:

The design considerations for locating containment isolation valves as close to the containment as practical, which were provided in the response to Supplement 1 of this RAI (MFN 08-475, dated May 13, 2008), will be added to DCD Tier 2, Subsection 6.2.4.2. An Inspections, Tests, Analyses, and Acceptance Criteria (ITAAC) item will be added to DCD Tier 1, Table 2.15.1-2, to document the locations of containment isolation valves relative to containment and to review these locations relative to the design considerations. COL Holder Item 6.2-1-H, which was to provide the pipe lengths between the containment isolation valves and containment, will be deleted from DCD Tier 2, Subsection 6.2.8. The piping lengths in DCD Tier 2 Tables 6.2-16 through 6.2-45 will also be deleted.

DCD Impact:

DCD Tier 1, Subsection 2.15.1 and Table 2.15.1-2, and DCD Tier 2, Subsection 6.2.4.2, Subsection 6.2.8, and Tables 6.2-16 through 6.2-45, will be revised as noted in the attached markup.

Enclosure 2

MFN 08-730

Response to Portion of NRC Request for Additional Information Letter No. 248 Related to ESBWR Design Certification Application

Containment Systems

RAI Number 6.2-138 S02

DCD Markups

2.15.8 Passive Autocatalytic Recombiner

Design Description

The Passive Autocatalytic Recombiner (PAR) consists of independently mounted, self contained units which are each capable of recombining a stoichiometric mix of hydrogen and oxygen into water vapor. The PAR System consists of sufficient capacity PAR units to effect a minimum safety factor of two with respect to any efficiency loss primarily due to introduced catalytic poisons.

(1) Passive Autocatalytic Recombiners (PARs) are mounted within the Wetwell airspace and Drywell compartments so as to maximize recombination in those areas.

(2) PARs are of a quantity and size in each compartment (Wetwell and Drywell) to ensure a minimum safety factor.

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.15.8-1 provides a definition of the inspections, test and/or analyses, together with associated acceptance criteria for the Passive Autocatalytic Recombiner System.

Table 2.15.8-1

ITAAC For The Passive Autocatalytic Recombiner

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. Passive Autocatalytic Recombiners (PARs) are mounted within the Wetwell airspace and the Drywell compartments.	Inspection will be performed of the as-built installation of PARs in the Wetwell airspace and the Drywell compartments.	A report exists and concludes that the PARs are installed in the Wetwell airspace and the Drywell.
2. PARs are of a quantity and size in each compartment (Wetwell and Drywell) to ensure a minimum safety factor.	An analysis will be performed to verify the quantity and size of the PARs configuration in each compartment (Wetwell and Drywell) and that the design conforms to a minimum safety factor of two with respect to the hydrogen generation rate at 72 hours.	A report exists and concludes that that the quantity and size of the installed PARs in each containment compartment (Wetwell and Drywell) conforms to a minimum safety factor of two with respect to the hydrogen generation rate at 72 hours.

constituents is limiting the progress of the reaction. The FCS consists of passive autocatalytic recombiners (PARs) strategically located throughout the WW gas space and DW.

PARs are independently mounted components which are capable of recombining a stoichiometric mix of hydrogen and oxygen into water vapor. This recombination is facilitated through the use of a selective metal catalyst (typically palladium and hydrophobic polymer coating). This catalyst is located internal to the PARs typically constrained within a series of screens. These screens or plates are separated such that gas and vapor flow are not impeded to allow easy migration of the post-LOCA gasses through the PAR structure.

As the recombination process is exothermic, the heat created provides motive force to carry the vapor up and out of the PAR allowing more gasses to be drawn into the device to further the recombination process. As the gasses pass through the PAR (essentially a stainless steel cylinder or rectangle with an opening in either end), the hydrogen and oxygen pass by the catalyst and are selectively recombined into water vapor. The outer wall of the PAR continues above the level of the catalyst to provide a chimney effect, which further assists the convection driven flow of water vapor out of the device. This flow through the PAR aids in the overall containment mixing process by facilitating natural convection near and around the PAR locations.

The PAR device requires no external power or controls. They operate automatically when a stoichiometric mix of hydrogen and oxygen is realized. The oxygen and hydrogen molecules are adsorbed onto the surface of the catalyst due to the attractive forces of the catalyst. There they are recombined into water vapor and released. Although the recombination process is conservatively assumed to begin at 72 hours, it actually starts with as little as 1% by volume of an available stoichiometric mix of recombination gasses. And due to the hydrophobic coating of the catalyst, the recombination process does not require heating of the catalyst media enclosure (as is the case with the typical Offgas recombiner). It occurs through the full range of operating and post-accident containment temperatures.

The PAR system consists of sufficient capacity PAR units to effect a minimum safety factor of two for each containment compartment (Drywell and Wetwell), with respect to any efficiency loss primarily due to introduced catalytic poisons. ~~The PAR system is designed to utilize an adequate number of full size equivalent PAR units, for each of the two containment compartments (DW and WW). The PARs are sized to incorporate a minimum safety factor of two.~~ The number and size of PARs to be utilized in each containment compartment will be selected based on the nominal hydrogen depletion rate of each individual PAR unit such that the total depletion rate is twice the maximum hydrogen generation rate at 72 hours. The maximum hydrogen generation rate at 72 hours is 0.32 kg/h. As the hydrogen generation rate is dropping from that point forward in the accident, the amount of total hydrogen never exceeds this 72 hour maximum due to the operation of the PARs. The number and size of PARs specified will provide the minimum safety factor of two for each containment compartment (Drywell and Wetwell). There will be a minimum capacity of the equivalent of one full size PAR unit specified for each containment compartment, however due to other design considerations, more, smaller capacity units (with equivalent total capacity) will be specified. The nominal hydrogen depletion rates for the full size PAR will be a minimum of 0.8 kg/h. The half, quarter, and eighth size PARs have nominal depletion rates as a direct ratio to the full size PAR. ~~and~~ Additionally PARs are sited to incorporate items such as protection from jet impingement, protection from containment spray and cooling fan discharge, protection from flooding and pool swell,

Enclosure 3

MFN 08-730

Response to Portion of NRC Request for Additional Information Letter No. 248 Related to ESBWR Design Certification Application

Containment Systems

RAI Number 6.2-157 S02

DCD Markups

(15) Each vacuum breaker isolation valve automatically closes if the vacuum breaker does not fully close when required.

(16) Vacuum Breaker

a. Each vacuum breaker has proximity sensors to detect open/close position. This indication is available in the main control room.

b. Each vaccum breaker has temperature sensors to detect bypass leakage. This indication is available in the main control room.

(17) The containment penetration isolation design for each fluid piping system requiring isolation meets the single-failure criterion to ensure completion of penetration isolation.

(18) DW to WW bypass leakage is less than the assumed value used in the containment capability design basis containment response analysis.

(19) Total DW to WW vacuum breaker bypass pathway leakage is less than the assumed value used in the containment capability design basis containment response analysis.

(20) Each vaccum breaker opening differential pressure is less than or equal to the required opening differential pressure.

(21) Each vacuum breaker closing differential pressure is greater than or equal to the required closing differential pressure.

(22) Containment Isolation Valves

a. Containment Isolation Valves are located as close to the containment as practical, consistent with General Design Criteria 55, 56 and 57.

b. The as-built location of containment isolation valves relative to containment shall be reconciled with design requirements.

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.15.1-2 provides a definition of the inspections, tests, and/or analyses, together with associated acceptance criteria for the Containment System.

Table 2.15.1-2

ITAAC For The Containment System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
22. Containment Isolation Valves a. Containment Isolation valves are located as close to the containment as practical, consistent with General Design Criteria 55, 56 and 57.	Inspection of piping design isometric drawings will be conducted. {{Design Acceptance Criteria}}	A report exists and concludes that, based on a review of piping design isometric drawings, containment isolation valves are designed to be located as close to containment as practical, considering required access for: • In-service inspection of non-isolable welds, • 10CFR50 Appendix J leak testing, • Cutout and replacement of isolation valves using standard pipe fitting tools and equipment, • Local control, and • Valve seat resurfacing in place. {{Design Acceptance Criteria}}
b. The as-built location of containment isolation valves relative to containment shall be reconciled with design requirements.	A reconciliation evaluation of containment isolation valve locations relative to containment using as-designed and as-built information will be performed.	A report exists and concludes that a design reconciliation has been completed for the as-built locations of containment isolation valves relative to the design requirements. The report documents the results of the reconciliation evaluation.

- Isolation Condenser System steam supply.
- Isolation Condenser System condensate return.
- Fuel and Auxiliary Pools Cooling System suppression pool suction.
- Fuel and Auxiliary Pools Cooling System suppression pool return.

The containment isolation function is designed to Seismic Category I. Safety and quality group classifications of equipment and systems are found in Table 3.2-1. Containment isolation valve functions are identified in Tables 6.2-16 through 6.2-~~42~~45.

Penetration piping is evaluated for entrapped liquid subject to thermally-induced pressurization following isolation. The preferred pressure relief method is through a self-relieving penetration by selection and orientation of an inboard isolation valve that permits excess fluid to be released inward to the containment. Use of a separate relief valve to provide penetration piping overpressure protection is permissible on a case-by-case basis when no other isolation valve selection option is available.

The criteria for the design of the LD&IS, which provides containment and reactor vessel isolation control, are listed in Subsection 7.1.2. The bases for assigning certain signals for containment isolation are listed and explained in Subsection 7.3.3.

6.2.4.2 System Design

The containment isolation function is accomplished by valves and control signals, required for the isolation of lines penetrating the containment. The RCPB influent lines are identified in Table 6.2-13, and the RCPB effluent lines are identified in Table 6.2-14. Tables 6.2-15 through 6.2-45 show the pertinent data for the containment isolation valves, except for excess flow check valves as discussed in Subsection 6.2.4.2.2. ~~The COL Holder will provide the pipe lengths from containment to the isolation valves (COL 6.2-1-H).~~ Containment isolation valves are located as close to the containment as practical. Sufficient space is provided between the valves and the containment boundary to permit the following:

- Inservice inspection of non-isolable welds;
- 10 CFR 50 Appendix J leak testing;
- Cutout and replacement of isolation valves using standard pipe fitting tools and equipment;
- Local control; and
- Valve seat resurfacing in place.

A detailed discussion of the LD&IS controls associated with the containment isolation function is included in Subsection 7.3.3.

Power-operated containment isolation valves have position indicating switches in the control room to show whether the valve is open or closed. Power for valves used in series originates from physically independent sources without cross ties to assure that no single event can interrupt motive power to both closure devices.

pressure boundary within the context of RG 1.26, which assigns correspondence of Group B Quality Standard to ASME Code Section III Class 2.

6.2.8 COL Information

6.2-1-H Pipe Length from Containment to Inboard/Outboard Isolation Valve(Deleted)

~~The COL Holder will provide the pipe lengths from containment to the isolation valves. (Subsection 6.2.4.2.)~~

6.2.9 References

6.2-1 GE Nuclear Energy, "TRACG Application for ESBWR," NEDC-33083P-A, Class III, (Proprietary), March 2005, and NEDO-33083-A, Class I (Non-proprietary), October 2005.

6.2-2 Galletly, G.D., "A Simple Design Equation for Preventing Buckling in Fabricated Torispherical Shells under Internal Pressure," ASME Journal of Pressure Vessel Technology, Vol.108, November 1986.

6.2-3 GE letter from David H. Hinds to U.S. Regulatory Commission, TRACG LOCA SER Confirmatory Items (TAC # MC 8168), Enclosure 2, Reactor pressure Vessel (RPV) Level Response for the Long Term PCCS Period, Phenomena Identification and Ranking Table, and Major Design Changes from Pre-Application Review Design to DCD Design, MFN 05-105, October 6, 2005.

6.2-4 GE letter from David H. Hinds to U.S. Regulatory Commission, Revised Response – GE Response to Results of NRC Acceptance Review for ESBWR Design Certification Application – Item 2, MFN 06-094, March 28, 2006.

6.2-5 Moody, F.J., "Maximum Flow Rate of a Single Component, Two-Phase Mixture," Journal of Heat Transfer, Trans. ASME, Series C, Vol. 87, P 134, February 1965.

6.2-6 (Deleted)

6.2-7 GE Hitachi Nuclear Energy, "ESBWR Feedwater Temperature Operating Domain Transient and Accident Analysis," NEDO-33338, Class I, October 2007.

6.2-8 Moody, F.J. "Maximum Discharge Rate of Liquid-Vapor Mixtures from Vessels," General Electric Company, Report No. NEDO-21052, September 1975.

6.2-9 GE Hitachi Nuclear Energy, "ESBWR Scaling Report," NEDC-33082P, Revision 2, Class III (Proprietary), April 2008; NEDO-33082, Revision 2, Class I (Non-proprietary), April 2008.

6.2-10 TRACG Qualification for Simplified Boiling Water Reactor (SBWR), NEDC-32725P, Rev. 1, August 2002.

Table 6.2-16

Containment Isolation Valve Information for the Nuclear Boiler System

Main Steam Line A

Penetration Identification	B21-MPEN-0001		
Valve No.	**F001A**	**F002A**	**F016A**
Applicable Basis	GDC 55	GDC 55	GDC 55
Tier 2 Figure	5.1-2	5.1-2	5.1-2
ESF	No	No	No
Fluid	Steam	Steam	Steam/Water
Line Size+	750 mm (30 in)	750 mm (30 in)	50 mm (2 in)
Type C Leakage Test	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[a]	N/A	a_2	a_2
Leakage Past Seat[b]	b_3	b_3	b_3
Location	Inboard	Outboard	Outboard
Valve Type[e]	GT	GT	GT, QBL
Operator[c]	PM, NO	PM, AO	AO
Normal Position	Open	Open	Open
Shutdown Position	Closed	Closed	Open
Post-Acc Position	Closed	Closed	Open/Closed
Power Fail Position	Closed	Closed	Closed
Cont. Iso. Signal[d]	B,C,D,E,F,G,L	B,C,D,E,F,G,L	B,C,D,E,F,G,L
Primary Actuation	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual
Closure Time (sec)	3.0-5.0	3.0-5.0	15
Power Source	Div. 1, 3	Div. 2, 4	Div. 1, 2, 3

+ Nominal pipe size diameter

Note: For explanation of codes, see legend in Table 6.2-15.

Table 6.2-17

Containment Isolation Valve Information for the Nuclear Boiler System

Main Steam Line B

Penetration Identification	B21-MPEN-0002		
Valve No.	**F001B**	**F002B**	**F016B**
Applicable Basis	GDC 55	GDC 55	GDC 55
Tier 2 Figure	5.1-2	5.1-2	5.1-2
ESF	No	No	No
Fluid	Steam	Steam	Steam/Water
Line Size+	750 mm (30 in)	750 mm (30 in)	50 mm (2 in)
Type C Leakage Test	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_2	a_2
Leakage Past Seat[(b)]	b_3	b_3	b_3
Location	Inboard	Outboard	Outboard
Valve Type[(e)]	GT	GT	GT, QBL
Operator[(c)]	PM, NO	PM, AO	AO
Normal Position	Open	Open	Open
Shutdown Position	Closed	Closed	Open
Post-Acc Position	Closed	Closed	Open/Closed
Pwr Fail Position	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	B,C,D,E,F,G,L	B,C,D,E, F,G,L	B,C,D,E,F,G,L
Primary Actuation	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual
Closure Time (sec)	3.0-5.0	3.0-5.0	15
Power Source	Div. 1, 3	Div. 2, 4	Div. 1, 2, 3

+ Nominal pipe size diameter

Note: For explanation of codes, see legend in Table 6.2-15.

Table 6.2-18

Containment Isolation Valve Information for the Nuclear Boiler System

Main Steam Line C

Penetration Identification	B21-MPEN-0003		
Valve No.	**F001C**	**F002C**	**F016C**
Applicable Basis	GDC 55	GDC 55	GDC 55
Tier 2 Figure	5.1-2	5.1-2	5.1-2
ESF	No	No	No
Fluid	Steam	Steam	Steam/Water
Line Size[+]	750 mm (30 in)	750 mm (30 in)	50 mm (2 in)
Type C Leakage Test	Yes	Yes	Yes
(Deleted)~~Pipe Length from cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_2	a_2
Leakage Past Seat[(b)]	b_3	b_3	b_3
Location	Inboard	Outboard	Outboard
Valve Type[(e)]	GT	GT	GT, QBL
Operator[(c)]	PM, NO	PM, AO	AO
Normal Position	Open	Open	Open
Shutdown Position	Closed	Closed	Open
Post-Acc Position	Closed	Closed	Open/Closed
Power Fail Position	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	B,C,D,E,F,G,L	B,C,D,E,F,G,L	B,C,D,E,F,G,L
Primary Actuation	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual
Closure Time (sec)	3.0-5.0	3.0-5.0	15
Power Source	Div. 1, 3	Div. 2, 4	Div. 1, 2, 3

+ Nominal pipe size diameter

Note: For explanation of codes, see legend in Table 6.2-15.

Table 6.2-19

Containment Isolation Valve Information for the Nuclear Boiler System

Main Steam Line D

Penetration Identification	B21-MPEN-0004		
Valve No.	**F001D**	**F002D**	**F016D**
Applicable Basis	GDC 55	GDC 55	GDC 55
Tier 2 Figure	5.1-2	5.1-2	5.1-2
ESF	No	No	No
Fluid	Steam	Steam	Steam/Water
Line Size+	750 mm (30 in)	750 mm (30 in)	50 mm (2 in)
Type C Leakage Test	Yes	Yes	Yes
(Deleted)~~Pipe Length from cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_2	a_2
Leakage Past Seat[(b)]	b_3	b_3	b_3
Location	Inboard	Outboard	Outboard
Valve Type[(e)]	GT	GT	GT, QBL
Operator[(c)]	PM, NO	PM, AO	AO
Normal Position	Open	Open	Open
Shutdown Position	Closed	Closed	Open
Post-Acc Position	Closed	Closed	Open/Closed
Power Fail Position	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	B,C,D,E,F,G,L	B,C,D,E,F,G,L	B,C,D,E,F,G,L
Primary Actuation	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual
Closure Time (sec)	3.0-5.0	3.0-5.0	15
Power Source	Div. 1, 3	Div. 2, 4	Div. 1, 2, 3

+ Nominal pipe size diameter

Note: For explanation of codes, see legend in Table 6.2-15.

Table 6.2-20

Containment Isolation Valve Information

for the Nuclear Boiler System Main Steam Line Drains

Penetration Identification	B21-MPEN-0005	
Valve No.	**F010**	**F011**
Applicable Basis	GDC 55	GDC 55
Tier 2 Figure	5.1-2	5.1-2
ESF	No	No
Fluid	Steam/water	Steam/water
Line Size[+]	80 mm (3 in)	80 mm (3 in)
Type C Leakage Test	Yes	Yes
(Deleted)~~Pipe Length from cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_2
Leakage Past Seat[(b)]	b_3	b_3
Location	Inboard	Outboard
Valve Type[(e)]	QBL, GT	GT, QBL
Operator[(c)]	NO	AO/NO
Normal Position	Open	Open
Shutdown Position	Open	Open
Post-Acc Position	Closed	Closed
Power Fail Position	Closed	Closed
Cont. Iso. Signal[(d)]	B,C,D,E,F,G,L	B,C,D,E,F,G,L
Primary Actuation	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual
Closure Time (sec)	15	15
Power Source	Div. 2, 4	Div. 1, 3

+ Nominal pipe size diameter

Note: For explanation of codes, see legend in Table 6.2-15.

Table 6.2-21

Containment Isolation Valve Information for the Nuclear Boiler System Feedwater Line A

Penetration Identification	B21-MPEN-0006			
Valve No.	**F102A**	**F100A**	**F101A**	**F111A**
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55
Tier 2 Figure	5.1-2	5.1-2	5.1-2	5.1-2
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size[+]	550 mm (22 in)	550 mm (22 in)	550 mm (22 in)	300 mm (12 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_2	a_2	a_2
Leakage Past Seat[(b)]	b_8	b_8	b_8	b_5
Location	Inboard	Outboard	Outboard	Outboard
Valve Type[(e)]	CK	GT	GT	CK (testable)
Operator[(c)]	SA	PM	PM	SA/AO
Normal Position	Open	Open	Open	Open
Shutdown Position	Open/Closed	Closed	Closed	Open/Closed
Post-Acc Position	Open/Closed	Closed	Closed	Open/Closed
Power Fail Position	N/A	Closed	Closed	Closed

Table 6.2-22

Containment Isolation Valve Information for the Nuclear Boiler System Feedwater Line B

Penetration Identification	B21-MPEN-0007			
Valve No.	**F102B**	**F100B**	**F101B**	**F111B**
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55
Tier 2 Figure	5.1-2	5.1-2	5.1-2	5.1-2
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size[+]	550 mm (22 in)	550 mm (22 in)	550 mm (22 in)	300 mm (12 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_2	a_2	a_2
Leakage Past Seat[(b)]	b_8	b_8	b_8	b_5
Location	Inboard	Outboard	Outboard	Outboard
Valve Type[(e)]	CK	GT	GT	CK (testable)
Operator[(c)]	SA	PM	PM	SA/AO
Normal Position	Open	Open	Open	Open
Shutdown Position	Open/Closed	Closed	Closed	Open/Closed
Post-Acc Position	Open/Closed	Open/Closed	Open/Closed	Open/Closed
Power Fail Position	N/A	Closed	Closed	Closed

Table 6.2-23

Containment Isolation Valve Information for the Isolation Condenser System Loop A

Penetration Identification	B32-MPEN-0001**		B32-MPEN-0005**	
Valve Number	**F001A**	**F002A**	**F003A**	**F004A**
Valve Location	Steam Supply	Steam Supply	Condensate Return	Condensate Return
Applicable Basis	GDC 55*	GDC 55*	GDC 55*	GDC 55*
Tier 2 Figure	5.1-3	5.1-3	5.1-3	5.1-3
ESF	Yes	Yes	Yes	Yes
Fluid	Steam	Steam	Condensate	Condensate
Line Size^{+++}	350mm (14 in)	350mm (14 in)	200mm (8 in)	200mm (8 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	N/A	N/A	N/A
Leakage Past Seat[(b)]	b_6^+	b_6^+	b_6^+	b_6^+
Location	Inboard	Inboard	Inboard	Inboard
Valve Type[(e)]	QBL, GT	QBL, GT	QBL, GT	QBL, GT
Operator[(c)]	EH	NO/Acc	NO/Acc	EH
Normal Position	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open
Post-Acc Position	Open^{++}	Open^{++}	Open^{++}	Open^{++}
Power Fail Position	As is	As is	As is	As is
Cont. Iso. Signal[(d)]	I,K	I,K	I,K	I,K
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec)	< 60	< 60	< 35	< 35
Power Source	Div. 1, 3	Div. 2, 4	Div. 2, 4	Div. 1, 3

* With respect to meeting the requirements of US NRC 10 CFR 50, Appendix A, General Design Criteria 55, the closed loop safety-related IC loop outside the containment is a "passive" substitute for an open "active" valve outside the containment. The combination of an already closed loop outside the containment plus the

Table 6.2-24

Containment Isolation Valve Information for the Isolation Condenser System Loop A

Penetration Identification	B32-MPEN-0009**		B32-MPEN-0009+				B32-MPEN-0001**	
Valve Number	**F007A**	**F008A**	**F009A**	**F010A**	**F011A**	**F012A**	**F013A**	**F014A**
Valve Location	Upper Header Vent	Upper Header Vent	Lower Header Vent	Lower Header Vent	Lower Header Bypass Vent	Lower Header Bypass Vent	Purge line	Excess Flow Purge
Applicable Basis	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*
Tier 2 Figure	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3
ESF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases
Line Size+++	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)
Type C Leakage Test	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing(a)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Leakage Past Seat(b)	b_6++	b_6++	b_6++	b_6++	b_6++	b_6++	b_6++	b_6++
Location	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard
Valve Type	GB, QBL	GB, QBL	GB, QBL	GB, QBL	RV	GB, QBL	GB, QBL	Excess-CK

Table 6.2-25

Containment Isolation Valve Information for the Isolation Condenser System Loop B

Penetration Identification	B32-MPEN-0002**		B32-MPEN-0006**	
Valve Number	**F001B**	**F002B**	**F003B**	**F004B**
Valve Location	Steam Supply	Steam Supply	Condensate Return	Condensate Return
Applicable Basis	GDC 55*	GDC 55*	GDC 55*	GDC 55*
Tier 2 Figure	5.1-3	5.1-3	5.1-3	5.1-3
ESF	Yes	Yes	Yes	Yes
Fluid	Steam	Steam	Condensate	Condensate
Line Size^{+++}	350mm (14 in)	350mm (14 in)	200mm (8 in)	200mm (8 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[a]	N/A	N/A	N/A	N/A
Leakage Past Seat[b]	b_6^+	b_6^+	b_6^+	b_6^+
Location	Inboard	Inboard	Inboard	Inboard
Valve Type[e]	QBL, GT	QBL, GT	QB, GT	QBL, GT
Operator[c]	EH	NO/Acc	NO/Acc	EH
Normal Position	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open
Post-Acc Position	Open^{++}	Open^{++}	Open^{++}	Open^{++}
Power Fail Position	As is	As is	As is	As is
Cont. Iso. Signal[d]	I, K	I, K	I, K	I, K
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec)	< 60	< 60	< 35	< 35
Power Source	Div. 1, 3	Div. 2, 4	Div. 2, 4	Div. 1, 3

Table 6.2-26

Containment Isolation Valve Information for the Isolation Condenser System Loop B

Penetration Identification	B32-MPEN-0010**		B32-MPEN-0010+				B32-MPEN-0002**	
Valve Number	F007B	F008B	F009B	F010B	F011B	F012B	F013B	F014B
Valve Location	Upper Header Vent	Upper Header Vent	Lower Header Vent	Lower Header Vent	Lower Header Bypass Vent	Lower Header Bypass Vent	Purge line	Excess Flow Purge
Applicable Basis	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*
Tier 2 Figure	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3
ESF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases
Line Size+++	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)
Type C Leakage Test	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Leakage Past Seat[(b)]	b_6++	b_6++	b_6++	b_6++	b_6++	b_6++	b_6++	b_6++
Location	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard

Table 6.2-27

Containment Isolation Valve Information for the Isolation Condenser System Loop C

Penetration Identification	B32-MPEN-0003**		B32-MPEN-0007**	
Valve Number	**F001C**	**F002C**	**F003C**	**F004C**
Valve Location	Steam Supply	Steam Supply	Condensate Return	Condensate Return
Applicable Basis	GDC 55*	GDC 55*	GDC 55*	GDC 55*
Tier 2 Figure	5.1-3	5.1-3	5.1-3	5.1-3
ESF	Yes	Yes	Yes	Yes
Fluid	Steam	Steam	Condensate	Condensate
Line Size+++	350 mm (14 in)	350 mm (14 in)	200 mm (8 in)	200 mm (8 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[a]	N/A	N/A	N/A	N/A
Leakage Past Seat[b]	b_6^+	b_6^+	b_6^+	b_6^+
Location	Inboard	Inboard	Inboard	Inboard
Valve Type[e]	QBL, GT	QBL, GT	QB, GT	QBL, GT
Operator[c]	EH	NO/Acc	NO/Acc	EH
Normal Position	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open
Post-Acc Position	Open++	Open++	Open++	Open++
Power Fail Position	As is	As is	As is	As is
Cont. Iso. Signal[d]	I,K	I,K	I,K	I,K
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec)	< 60	< 60	< 35	< 35
Power Source	Div. 1, 3	Div. 2, 4	Div. 2, 4	Div. 1, 3

* With respect to meeting the requirements of US NRC 10 CFR 50, Appendix A, General Design Criteria 55, the closed loop safety-related IC loop outside the containment is a "passive" substitute for an open "active" valve outside the containment. The combination of an already closed loop outside the containment plus the two series automatic isolation valves inside the containment comply with the intent of the isolation guidelines of 10 CFR 50, App.A, Criterion 55 and 56.

** Two in series valves

\+ Closed barrier outside containment (IC piping outside containment is Quality Group B)

++ Except on IC pipe or tube failure

+++ Nominal pipe size diameter

Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-28

Containment Isolation Valve Information for the Isolation Condenser System Loop C

Penetration Identification	B32-MPEN-0011**		B32-MPEN-0011+				B32-MPEN-0003**	
Valve Number	**F007C**	**F008C**	**F009C**	**F010C**	**F011C**	**F012C**	**F013C**	**F014C**
Valve Location	Upper Header Vent	Upper Header Vent	Lower Header Vent	Lower Header Vent	Lower Header Bypass Vent	Lower Header Bypass Vent	Purge line	Excess Flow Purge
Applicable Basis	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*
Tier 2 Figure	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3
ESF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases
Line Size+++	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)
Type C Leakage Test	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing(a)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Leakage Past Seat(b)	b_6^{++}	b_6^{++}	b_6^{++}	b_6^{++}	b_6^{++}	b_6^{++}	b_6^{++}	b_6^{++}
Location	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard
Valve Type(e)	GB, QBL	GB, QBL	GB, QBL	GB, QBL	RV	GB, QBL	GB, QBL	Excess-CK

Table 6.2-29

Containment Isolation Valve Information for the Isolation Condenser System Loop D

Penetration Identification	B32-MPEN-0004**		B32-MPEN-0008**	
Valve Number	**F001D**	**F002D**	**F003D**	**F004D**
Valve Location	Steam Supply	Steam Supply	Condensate Return	Condensate Return
Applicable Basis	GDC 55*	GDC 55*	GDC 55*	GDC 55*
Tier 2 Figure	5.1-3	5.1-3	5.1-3	5.1-3
ESF	Yes	Yes	Yes	Yes
Fluid	Steam	Steam	Condensate	Condensate
Line Size+++	350 mm (14 in)	350 mm (14 in)	200 mm (8 in)	200 mm (8 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[a]	N/A	N/A	N/A	N/A
Leakage Past Seat[b]	b_6+	b_6+	b_6+	b_6+
Location	Inboard	Inboard	Inboard	Inboard
Valve Type[e]	QBL, GT	QBL, GT	QBL, GT	QBL, GT
Operator[c]	EH	NO/Acc	NO/Acc	EH
Normal Position	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open
Post-Acc Position	Open++	Open++	Open++	Open++
Power Fail Position	As is	As is	As is	As is
Cont. Iso. Signal[d]	I, K	I, K	I, K	I, K
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec)	< 60	< 60	< 35	< 35
Power Source	Div. 1, 3	Div. 2, 4	Div. 2, 4	Div. 1, 3

* With respect to meeting the requirements of US NRC 10 CFR 50, Appendix A, General Design Criteria 55, the closed loop safety-related IC loop outside the containment is a "passive" substitute for an open "active" valve outside the containment. The combination of an already isolated loop outside the containment plus the two series automatic isolation valves inside the containment comply with the requirements of the isolation guidelines of 10 CFR 50, Appendix A, Criterion 55 and 56.

** Two in series valves

\+ Closed barrier outside containment (IC piping outside containment is Quality Group B)

++ Except on IC pipe or tube failure

+++ Nominal pipe size diameter

Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-30

Containment Isolation Valve Information for the Isolation Condenser System Loop D

Penetration Identification	B32-MPEN-0012**		B32-MPEN-0012+				B32-MPEN-0004**	
Valve Number	**F007D**	**F008D**	**F009D**	**F010D**	**F011D**	**F012D**	**F013D**	**F014D**
Valve Location	Upper Header Vent	Upper Header Vent	Lower Header Vent	Lower Header Vent	Lower Header Bypass Vent	Lower Header Bypass Vent	Purge line	Excess Flow Purge
Applicable Basis	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*	GDC 55*
Tier 2 Figure	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3	5.1-3
ESF	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fluid	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/steam /Non Cond Gases	Cond/Steam /Non Cond Gases	Cond/Steam /Non Cond Gases
Line Size+++	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)	20mm (0.75 in)
Type C Leakage Test	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing(a)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Leakage Past Seat(b)	b_6++	b_6++	b_6++	b_6++	b_6++	b_6++	b_6++	b_6++
Location	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard	Inboard
Valve Type(e)	GB, QBL	GB, QBL	GB, QBL	GB, QBL	RV	GB, QBL	GB, QBF	Excess-CK

Table 6.2-31

Containment Isolation Valve Information for the Reactor Water Cleanup/Shutdown Cooling System

Penetration Identification	G31-MPEN-0001		G31-MPEN-0003		G31-MPEN-0002		G31-MPEN-0004	
Valve No.	**F002A**	**F003A**	**F007A**	**F008A**	**F002B**	**F003B**	**F007B**	**F008B**
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55	GDC 55	GDC 55	GDC 55	GDC 55
Tier 2 Figure	5.1-4	5.1-4	5.1-4	5.1-4	5.1-4	5.1-4	5.1-4	5.1-4
ESF	No	No	No	No	No	No	No	No
Fluid	Water	Water	Water	Water	Water	Water	Water	Water
Line Size+	250 mm (10 in)	250 mm (10 in)	150 mm (6 in)	150 mm (6 in)	250 mm (10 in)	250 mm (10 in)	150 mm (6 in)	150 mm (6 in)
Type C Leakage Test	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing(a)		a_1	N/A	a_1	N/A	a_1	N/A	a_1
Leakage Past Seat(b)	b_3	b_3	b_3	b_3	b_3	b_3	b_3	b_3
Location	Inboard	Outboard	Inboard	Outboard	Inboard	Outboard	Inboard	Outboard
Valve Type(e)	GB, QBL, AF	GT, QBL, AF	GB, QBL, AF	GT, QBL, AF	GB, QBL, AF	GT, QBL, AF	GB, QBL, AF	GT, QBL, AF
Operator(c)	NO	AO	NO	AO	NO	AO	NO	AO
Normal Position	Open	Open	Open	Open	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open	Open	Open	Open	Open
Post-Acc Position	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

Table 6.2-31a

Containment Isolation Valve Information for the Reactor Water Cleanup/Shutdown Cooling System

Penetration Identification	G31-MPEN-0005		G31-MPEN-0006	
Valve No.	**F038A**	**F039A**	**F038B**	**F039B**
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55
Tier 2 Figure	5.1-4	5.1-4	5.1-4	5.1-4
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size[+]	20 mm (.75 in)	20 mm (.75 in)	20 mm (.75 in)	20 mm (.75 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_1	N/A	a_1
Leakage Past Seat[(b)]	b_7	b_7	b_7	b_7
Location	Inboard	Outboard	Inboard	Outboard
Valve Type[(e)]	GB	GB	GB	GB
Operator[(c)]	SO	SO	SO	SO
Normal Position	Closed	Closed	Closed	Closed
Shutdown Position	Open/Closed	Open/Closed	Open/Closed	Open/Closed
Post-Acc Position	Open/Closed	Open/Closed	Open/Closed	Open/Closed
Power Fail Position	Closed	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	B,C,F,M,N	B,C,F,M,N	B,C,F,M,N	B,C,F,M,N
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec)	<15	<15	<15	<15
Power Source	Div. 2, 4	Div. 1, 3	Div. 2, 4	Div 1, 3

+ Nominal pipe size diameter

Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-32a

Containment Isolation Valve Information for the Standby Liquid Control System

Penetration Identification	C41-MPEN-0001			
Valve No.	F005A	F004A	F003A	F003C
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55
Tier 2 Figure	9.3-1	9.3-1	9.3-1	9.3-1
ESF	Yes	Yes	Yes	Yes
Fluid	Boron/Water	Boron/Water	Boron/Water	Boron/Water
Line Size+	80 mm (3 in)	80 mm (3 in)	80 mm (3 in)	80 mm (3 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[a]	N/A	a_1	a_1	a_1
Leakage Past Seat[b]	b_5	b_5	b_5	b_5
Location	Inboard	Outboard	Outboard	Outboard
Valve Type	CK	CK	SQ*	SQ*
Operator[c]	SA	SA	EX	EX
Normal Position	Closed	Closed	Closed	Closed
Shutdown Position	Closed	Closed	Closed	Closed
Post-Acc Position	Open/Close	Open/Close	Open	Open
Power Fail Position	N/A	N/A	As is	As is
Cont. Iso. Signal[d]	Q	Q	N/A**	N/A**
Primary Actuation	Flow	Flow	N/A**	N/A**
Secondary Actuation	N/A	N/A	N/A**	N/A**
Closure Time (sec)	N/A	N/A	N/A**	N/A**
Power Source	N/A	N/A	N/A**	N/A**

* The disk/inlet-fitting cap is hermetically sealed and when valve is actuated, the cap is sheared to permanently open the flow path.
** Not relevant to the valve isolation function.
\+ Nominal pipe size diameter
Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-32b

Containment Isolation Valve Information for the Standby Liquid Control System

Penetration Identification	C41-MPEN-0002			
Valve No.	**F005B**	**F004B**	**F003B**	**F003D**
Applicable Basis	GDC 55	GDC 55	GDC 55	GDC 55
Tier 2 Figure	9.3-1	9.3-1	9.3-1	9.3-1
ESF	Yes	Yes	Yes	Yes
Fluid	Boron/Water	Boron/Water	Boron/Water	Boron/Water
Line Size+	80 mm (3 in)	80 mm (3 in)	80 mm (3 in)	80 mm (3 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[a]	N/A	a_1	a_1	a_1
Leakage Past Seat[b]	b_5	b_5	b_5	b_5
Location	Inboard	Outboard	Outboard	Outboard
Valve Type	CK	CK	SQ*	SQ*
Operator[c]	SA	SA	EX	EX
Normal Position	Closed	Closed	Closed	Closed
Shutdown Position	Closed	Closed	Closed	Closed
Post-Acc Position	Open/Close	Open/Close	Open	Open
Power Fail Position	N/A	N/A	As is	As is
Cont. Iso. Signal[d]	Q	Q	N/A**	N/A**
Primary Actuation	Flow	Flow	N/A**	N/A**
Secondary Actuation	N/A	N/A	N/A**	N/A**
Closure Time (sec)	N/A	N/A	N/A**	N/A**
Power Source	N/A	N/A	N/A**	N/A**

* The disk/inlet-fitting cap is hermetically sealed and when valve is actuated, the cap is sheared to permanently open the flow path.
** Not relevant to the valve isolation function.
\+ Nominal pipe size diameter
Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-33a

Containment Isolation Valve Information for the Fuel and Auxiliary Pools Cooling System

Penetration Identification	G21-MPEN-0005		G21-MPEN-0002	
Valve No.	F321A	F322A	F306A	F307A
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.1-1	9.1-1	9.1-1	9.1-1
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size+	250 mm (10 in)	250 mm (10 in)	250 mm (10 in)	250 mm (10 in)
Type C Leakage Test	No****	No****	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	a_1	a_1	a_1	N/A
Leakage Past Seat[(b)]	b_6	b_6	b_6	b_6
Location	Outboard	Outboard	Outboard	Inboard
Valve Type	GT, QBL	GT, QBL	GT, QBL	CK
Operator[(c)]	AO	AO	AO	SA
Normal Position	Closed*	Closed*	Closed*	closed*
Shutdown Position	Closed*	Closed*	Closed*	N/A
Post-Acc Position	Closed**	Closed**	Closed***	Closed
Power Fail Position	As-is	As-is	As-is	N/A
Cont. Iso. Signal[(d)]	P	P	P	Q
Primary Actuation	Remote manual	Remote manual	Remote manual	Flow
Secondary Actuation	Local manual	Local manual	Local manual	N/A
Closure Time (sec)	<30	<30	<30	N/A
Power Source	Div. 1, 3	Div. 2, 4	Div. 1, 3	N/A

Note: For explanation of codes, see legend on Table 6.2-15.

* The valve is open occasionally for the suppression pool cooling and cleanup function

** The valve is open remote manually for performing low pressure coolant injection (LPCI), DW Spray, or Suppression Pool Cooling function if required

*** The valve is opened remote manually for performing Suppression Pool Cooling function if required

**** The FAPCS suppression pool 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

\+ Nominal pipe size diameter

Table 6.2-33b

Containment Isolation Valve Information for the Fuel and Auxiliary Pools Cooling System

Penetration Identification	G21-MPEN-0007		G21-MPEN-0006	
Valve No.	F321B	F322B	F306B	F307B
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.1-1	9.1-1	9.1-1	9.1-1
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size+++	250 mm (10 in)	250 mm (10 in)	250 mm (10 in)	250 mm (10 in)
Type C Leakage Test	No***	No***	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing(a)	a_1	a_1	a_1	N/A
Leakage Past Seat(b)	b_6	b_6	b_6	b_6
Location	Outboard	Outboard	Outboard	Inboard
Valve Type	GT, QBL	GT, QBL	GT, QBL	CK
Operator(c)	AO	AO	AO	SA
Normal Position	Closed*	Closed*	Closed*	Closed*
Shutdown Position	Closed*	Closed*	Closed*	N/A
Post-Acc Position	Closed+	Closed+	Closed++	Closed
Power Fail Position	As-is	As-is	As-is	N/A
Cont. Iso. Signal(d)	P	P	P	Q
Primary Actuation	Remote manual	Remote manual	Remote manual	Self
Secondary Actuation	Local manual	Local manual	Local manual	N/A
Closure Time (sec)	<30	<30	<30	N/A
Power Source	Div. 1, 3	Div. 2, 4	Div. 2, 4	N/A

* The valve is open occasionally for the suppression pool cooling and cleanup function.

*** The FAPCS suppression pool 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

\+ The valve is opened remote manually for performing LPCI, DW Spray, or Suppression Pool Cooling function if required.

++ The valve is opened remote manually for performing Suppression Pool Cooling function if required.

+++ Nominal pipe size diameter

Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-34

Containment Isolation Valve Information for the Fuel and Auxiliary Pools Cooling System

Penetration Identification	G21-MPEN-0004		G21-MPEN-0003	
Valve No.	F323	F324	F303	F304
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.1-1	9.1-1	9.1-1	9.1-1
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size[+]	250 mm (10 in)	250 mm (10 in)	250 mm (10 in)	250 mm (10 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_1	a_1	N/A
Leakage Past Seat[(b)]	b_6	b_6	b_6	b_6
Location	Inboard	Outboard	Outboard	Inboard
Valve Type	GB, QBL, AF	GT, QBL	GT, QBL	CK
Operator[(c)]	NO	AO	AO	SA
Normal Position	Closed*	Closed*	Closed*	Closed*
Shutdown Position	Closed	Closed	Closed	N/A
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	N/A
Cont. Iso. Signal[(d)]	B,C,H	B,C,H	B,C,H	Q
Primary Actuation	Automatic	Automatic	Automatic	Flow
Secondary Actuation	Remote manual	Remote manual	Remote manual	N/A
Closure Time (sec)	<30	<30	<30	N/A
Power Source	Div. 2, 4	Div. 1, 3	Div. 1, 2, 3	N/A

* The valve is open occasionally for GDCS pools cooling and cleanup function
\+ Nominal pipe size diameter
Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-35

Containment Isolation Valve Information for the Fuel and Auxiliary Pools Cooling System

Penetration Identification	G21-MPEN-0001		G21-MPEN-0008	
Valve No.	**F309**	**F310**	**F212**	**F213**
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.1-1	9.1-1	9.1-1	9.1-1
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size+	250 mm (10 in)	250 mm (10 in)	250 mm (10 in)	250 mm (10 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing [a]	a_1	N/A	N/A	N/A
Leakage Past Seat [b]	b_6	b_6	b_6	b_6
Location	Outboard	Inboard	Inboard	Inboard
Valve Type	GT, QBL	CK	GT, QBL	GT, QBL
Operator[c]	AO	SA	M	M
Normal Position	Closed	Closed	Closed	Closed
Shutdown Position	Closed	N/A	Open / Closed	Open / Closed
Post-Acc. Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	N/A	N/A	N/A
Cont. Iso. Signal [d]	P	Q	R	R
Primary Actuation	Remote manual	Flow	Local Manual	Local Manual
Secondary Actuation	N/A	N/A	N/A	N/A
Closure Time (sec)	<35	N/A	N/A	N/A
Power Source	Div. 1, 2, 3	N/A	N/A	N/A

+ Nominal pipe size diameter

Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-36

Containment Isolation Valve Information for the Containment Inerting System

PenetrationIdentification	T31-MPEN-0004				T31-MPEN-0003*			
Valve No.	**F012**	**F011**	**F013**	**F016**	**F010**	**F011**	**F014**	**F015**
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.4-14	9.4-14	9.4-14	9.4-14	9.4-14	9.4-14	9.4-14	9.4-14
ESF	No	No	No	No	No	No	No	No
Fluid	Air/N_2	Air/N_2	Air/N_2	Air/N_2	Air/N_2	Air/N_2	Air/N_2	Air/N_2
Line Size[+]	350 mm (14 in)	500 mm (20 in)	200 mm (8 in)	200 mm (8 in)	400 mm (16 in)	500 mm (20 in)	25 mm (1 in)	25mm (1 in)
Type C Leakage Test	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	a_1	a_1	a_1	a_1	a_1	a_1	a_1	a_1
Leakage Past Seat[(b)]	b_2/b_5	b_2/b_5	b_2/b_5	b_2/b_5	b_2/b_5	b_2/b_5	b_2/b_5	b_2/b_5
Location	Outboard	Outboard	Outboard	Outboard	Outboard	Outboard	Outboard	Outboard
Valve Type	QBF, QBL	QBF, QBL	QBF, QBL	QBF, QBL	QBF, QBL	QBF, QBL	GB, QBL	GB, QBL
Operator[(c)]	AO	AO	AO	AO	AO	AO	AO	AO
Normal Position	Closed	Closed	Closed	Closed	Closed	Closed	Closed**	Closed**
Shutdown Position	Closed**	Closed**	Closed	Closed	Closed**	Closed**	Closed	Closed
Post-Acc Position	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	N/A	N/A	Closed	Closed	Closed	Closed

Table 6.2-37

Containment Isolation Valve Information for the Containment Inerting System

Penetration Identification	T31-MPEN-0002*			
Valve No.	**F008**	**F007**	**F024**	**F023**
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.4-14	9.4-14	9.4-14	9.4-14
ESF	No	No	No	No
Fluid	Air/N_2	Air/N_2	Air/N_2	Air/N_2
Line Size+	500 mm (20 in)	350 mm (14 in)	25 mm (1 in)	25 mm (1 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	a_1	a_1	a_1	a_1
Leakage Past Seat[(b)]	b_2	b_2	b_2	b_2
Location	Outboard	Outboard	Outboard	Outboard
Valve Type	QBF, QBL	QBF, QBL	QBL, QBF	QBL, QBF
Operator[(c)]	AO	AO	AO	AO
Normal Position	Closed	Closed	Open	Open
Shutdown Position	Open	Open	Closed	Closed
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	B,C,H,T	B,C,H,T	B,C,H,T	B,C,H,T
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec.)	< 30	< 30	< 5	< 5
Power Source	Div. 1, 3	Div. 2, 4	Div. 2, 4	Div. 1, 3

* Valve F008 in series with F007, valve F024 in series with F023
\+ Nominal pipe size diameter
Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-38

Containment Isolation Valve Information for the Containment Inerting System

Penetration Identification	T31-MPEN-0001*			
Valve No.	**F025**	**F023**	**F008**	**F009**
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.4-14	9.4-14	9.4-14	9.4-14
ESF	No	No	No	No
Fluid	Air/N_2	Air/N_2	Air/N_2	Air/N_2
Line Size+	25 mm (1 in)	25 mm (1 in)	500 mm (20 in)	350 mm (14 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	a_1	a_1	a_1	a_1
Leakage Past Seat[(b)]	b_2	b_2	b_2	b_2
Location	Outboard	Outboard	Outboard	Outboard
Valve Type	QBL, QBF	QBL, QBF	QBF, QBL	QBF, QBL
Operator[(c)]	AO	AO	AO	AO
Normal Position	Open	Open	Closed	Closed
Shutdown Position	Closed	Closed	Open	Open
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	B,C,H,T	B,C,H,T	B,C,H,T	B,C,H,T
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec)	< 5	< 5	< 30	< 30
Power Source	Div. 2, 4	Div. 1, 3	Div. 1, 3	Div. 2, 4

* Valve F008 in series with F009, valve F025 in series with F023
\+ Nominal pipe size diameter
Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-39

Containment Isolation Valve Information for the Chilled Water System Train A

Penetration Identification	P25-MPEN-0001		P25-MPEN-0002	
Valve No.	**F023A**	**F024A**	**F025A**	**F026A**
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.2-3	9.2-3	9.2-3	9.2-3
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size+	150 mm (6 in)	150 mm (6 in)	150 mm (6 in)	150 mm (6 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	a_1	N/A	N/A	a_1
Leakage Past Seat[(b)]	b_2	b_2	b_2	b_2
Location	Outboard	Inboard	Inboard	Outboard
Valve Type	QBL, GT	GB, QBL, AF	GB, QBL, AF	QBL, GT
Operator[(c)]	SO	NO	NO	SO
Normal Position	Open	Open	Open	Open
Shutdown Position	Open/Closed	Open/Closed	Open/Closed	Open/Closed
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	C,H	C,H	C,H	C,H
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec.)	< 30	< 30	< 30	< 30
Power Source	Div. 2, 4	Div. 1, 3	Div. 1, 3	Div. 2, 4

\+ Nominal pipe size diameter
Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-39a

Containment Isolation Valve Information for the Chilled Water System Train B

Penetration Identification	P25-MPEN-0003		P25-MPEN-0004	
Valve No.	**F023B**	**F024B**	**F025B**	**F026B**
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.2-3	9.2-3	9.2-3	9.2-3
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size+	150 mm (6 in)	150 mm (6 in)	150 mm (6 in)	150 mm (6 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	a_1	N/A	N/A	a_1
Leakage Past Seat[(b)]	b_2	b_2	b_2	b_2
Location	Outboard	Inboard	Inboard	Outboard
Valve Type	QBL, GT	QBL, GT	GB, QBL, AF	QBL, GT
Operator[(c)]	SO	NO	NO	SO
Normal Position	Open	Open	Open	Open
Shutdown Position	Open/Closed	Open/Closed	Open/Closed	Open/Closed
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	C,H	C,H	C,H	C,H
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec.)	< 30	< 30	< 30	< 30
Power Source	Div. 2, 4	Div. 1, 3	Div. 1, 3	Div. 2, 4

+ Nominal pipe size diameter

Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-40

Containment Isolation Valve Information for the High Pressure Nitrogen Gas Supply System

Penetration Identification	P54-MPEN-0001		P54-MPEN-0002	
Valve No.	F0026	F027	F009	F010
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	9.3-4	9.3-4	9.3-4	9.3-4
ESF	No	No	No	No
Fluid	Air/N_2	Air/N_2	N_2	N_2
Line Size+	50 mm (2 in)	50 mm (2 in)	50 mm (2 in)	50 mm (2 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	a_1	N/A	a_1	N/A
Leakage Past Seat[(b)]	b_2	b_2	b_2	b_2
Location	Outboard	Inboard	Outboard	Inboard
Valve Type	QBL, QBF	CK	QBL, QBF	CK
Operator[(c)]	AO	SA	AO	SA
Normal Position	Open	Open/Closed	Open	Open/Closed
Shutdown Position	Open/Closed	Open/Closed	Open/Closed	Open/Closed
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	N/A	Closed	N/A
Cont. Iso. Signal[(d)]	C,H	Q	C,H	Q
Primary Actuation	Automatic	Flow	Automatic	Flow
Secondary Actuation	Remote manual	N/A	Remote manual	N/A
Closure Time (sec.)	< 15	N/A	< 15	N/A
Power Source	Div. 2, 4	N/A	Div. 2, 4	N/A

+ Nominal pipe size diameter

Note: For explanation of codes, see legend on Table 6.2-15.

Table 6.2-41

Containment Isolation Valve Information for the Makeup Water System

Penetration Identification	P10-MPEN-0001	
Valve No.	**F016**	**F015**
Applicable Basis	GDC 56	GDC 56
Tier 2 Figure	N/A	N/A
ESF	No	No
Fluid	Water	Water
Line Size+	< 50 mm (2 in)	< 50 mm (2 in)
Type C Leakage Test	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_1
Leakage Past Seat[(b)]	b_6	b_6
Location	Inboard	Outboard
Valve Type	CK	GT, QBL
Operator[(c)]	SA	M
Normal Position	Closed	Closed
Shutdown Position	Closed	Closed
Post-Acc Position	Closed	Closed
Power Fail Position	N/A	N/A
Cont. Iso. Signal[(d)]	Q	R
Primary Actuation	Flow	Local manual
Secondary Actuation	N/A	N/A
Closure Time (sec.)	N/A	N/A
Power Source	N/A	N/A

+ Nominal pipe size diameter

Table 6.2-42

Containment Isolation Valve Information for the Process Radiation Monitoring System

Penetration Identification	D11-MPEN-0001*		D11-MPEN-0002**	
Valve No.	F001	F002	F003	F004
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	6.2-30	6.2-30	6.2-30	6.2-30
ESF	No	No	No	No
Fluid	Air/N_2	Air/N_2	Air/N_2	Air/N_2
Line Size+	25 mm (1 in)	25 mm (1 in)	25 mm (1 in)	25 mm (1 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_1	N/A	a_1
Leakage Past Seat[(b)]	b_2	b_2	b_2	b_2
Location	Inboard	Outboard	Inboard	Outboard
Valve Type	GB	GB	GB	GB
Operator[(c)]	SO	SO	SO	SO
Normal Position	Open	Open	Open	Open
Shutdown Position	Open	Open	Open	Open
Post-Acc Position	Open	Open	Open	Open
Power Fail Position	As-is	As-is	As-is	As-is
Cont. Iso. Signal[(d)]	C,H,T	C,H,T	C,H,T	C,H,T
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec.)	< 5	< 5	< 5	< 5
Power Source	Div. 2, 4	Div. 1, 3	Div. 2, 4	Div. 1, 3

Note: For explanation of codes, see legend on Table 6.2-15.
* Valve F001 in series with F002
** Valve F003 in series with F004
\+ Nominal pipe size diameter

Table 6.2-43

Containment Isolation Valve Information for the Equipment and Floor Drain System

Penetration Identification	U50-MPEN-0001		U50-MPEN-0002	
Valve No.	**F001**	**F002**	**F003**	**F004**
Applicable Basis	GDC 56	GDC 56	GDC 56	GDC 56
Tier 2 Figure	N/A	N/A	N/A	N/A
ESF	No	No	No	No
Fluid	Water	Water	Water	Water
Line Size+	< 50 mm (2 in)	< 50 mm (2 in)	< 50 mm(2 in)	< 50 mm (2 in)
Type C Leakage Test	Yes	Yes	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[(a)]	N/A	a_1	N/A	a_1
Leakage Past Seat[(b)]	b_7	b_7	b_7	b_7
Location	Inboard	Outboard	Inboard	Outboard
Valve Type	QBL, GB, AF	QBL, GT	QBL, GB, AF	QBL, GT
Operator[(c)]	NO	AO	NO	AO
Normal Position	Closed	Closed	Closed	Closed
Shutdown Position	Closed	Closed	Closed	Closed
Post-Acc Position	Closed	Closed	Closed	Closed
Power Fail Position	Closed	Closed	Closed	Closed
Cont. Iso. Signal[(d)]	B, C, H	B, C, H	B, C, H	B, C, H
Primary Actuation	Automatic	Automatic	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual	Remote manual	Remote manual
Closure Time (sec.)	N/A	N/A	N/A	N/A
Power Source	Div. 2, 4	Div. 1, 3	Div. 2, 4	Div. 1, 3

+ Nominal pipe size diameter

Table 6.2-44

Containment Isolation Valve Information for the Service Air System

Penetration Identification	P51-MPEN-0001	
Valve No.	**F001**	**F002**
Applicable Basis	GDC 56	GDC 56
Tier 2 Figure	N/A	N/A
ESF	No	No
Fluid	Air	Air
Line Size+	< 50 mm (2 in)	< 50 mm (2 in)
Type C Leakage Test	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[a]	a_1	N/A
Leakage Past Seat[b]	b_6	b_6
Location	Outboard	Inboard
Valve Type	QBL, GB	QBL, GB
Operator[c]	M	M
Normal Position	Closed	Closed
Shutdown Position	Open	Open
Post-Acc Position	Closed	Closed
Power Fail Position	N/A	N/A
Cont. Iso. Signal[d]	R	R
Primary Actuation	Local manual	Local manual
Secondary Actuation	N/A	N/A
Closure Time (sec.)	N/A	N/A
Power Source	N/A	N/A

+ Nominal pipe size diameter

Table 6.2-45

Containment Isolation Valve Information for the Containment Monitoring System

Penetration Identification	T62-MPEN-0001 through 0008	
Valve No.	**Various**	**Various**
Applicable Basis	GDC 56	GDC 56
Tier 2 Figure	N/A	N/A
ESF	No	No
Fluid	Air/N_2	Air/N_2
Line Size+	< 50 mm (2 in)	< 50 mm (2 in)
Type C Leakage Test	Yes	Yes
(Deleted)~~Pipe Length from Cont. to Inboard/Outboard Isolation Valve~~	~~COL Holder to provide~~	~~COL Holder to provide~~
Leakage Through Packing[a]	a_1	N/A
Leakage Past Seat[b]	b_2	b_2
Location	Outboard	Inboard
Valve Type	GB, QT	GB, QT
Operator[c]	SO, AO	SO, AO
Normal Position	Open	Open
Shutdown Position	Open	Open
Post-Acc Position	Open	Open
Power Fail Position	Open	Open
Cont. Iso. Signal[d]	B, C, H	B, C, H
Primary Actuation	Automatic	Automatic
Secondary Actuation	Remote manual	Remote manual
Closure Time (sec.)	N/A	N/A
Power Source	Div. 2, 4	Div. 1, 3

+ Nominal pipe size diameter